Appendix 7.3

Log of Drillhole

155

	E	ΞΡΙ	DC	;							swissboring				CE	Ŀ	
										GI	OLOGIC LOG OF DRILL HOLE						
PRO	OJEC	СТ	HYI	DRC	ORE	LECT	RIC (COM	IPLE	хо	/ER THE TOROLA RIVER		CDB-	SHEE		1 0	
-						L DAM	SITE			DE	PTH OF HOLE 70 00 m		COMMECE				1/12/1
ELE					.84					1	PTH OF OVERBURDEN 2 05 m	⊣	OMPLETE				1/12/5
		INAT				093 m	90º	69 62	!4 m	+	IGTH OF ROCK DRILLING 67 95 m	-	PRILLED BY		SW		ORING
		FRO G OF					90-			1	FAL LENGTH OF CORE 70 00 m RE RECOVERY 100%		OGGED B'		oltor I		Perez
DEA	ALTHIN	G O	AIN	GLC	: no						THE RECOVERY 100%		OI LITTION		aner r	ICITI	angez
			_			<u> </u>	,	,	,	,	OBSERVATION OF CORE	٦٧	VATER TAR	F -\	$\sqrt{}$		
	۱		Red	Core				2		<u>%</u>				-			-
	ROCK NAME			and	-	ᇤ		WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	,	WATER PRE EAKAGE OF DI		T	_	ELEVATION
DEPTH	충	ا ن	F	RQD)	KIND OF I	COLOR	`	윤	Ш	BESONIF HON		ATER	WLLING		DEPTH	A
꿈	5	10G	۸_	. 40	00%	N S	8	₹	₹	6		o	LUGEO	N VALUE	40	<u> </u>	<u></u>
	 	9	ΠŢ	Ti'	00%		-	╁	┢	۳.	Colluvial material low to medium consistency, low	Ť	T I		T		m
1]	COLLUVIAL DEPOSIT	0.0				≥	l	ľ	1	l	water content, low plasticity, low to moderate, dry			1 1			ł
	EPC	0	Hi			Z	Ę				strength consists of basalt and andesite fragments,				_		1
1_	LD					ā	Light Brown				up to 40 mm in diameter				_	1]
_:	₹	0.0				Z	Ħ								 -		
!	1	ુ				AS									ļ -		
	8	S	\prod			ં]]]	0.05				Ì -		
2_	⊢	7					-	├		├	2 05 m	+			-	2	
-		, ,								to 4					-		l
-		, ,	⇈	.				ŀ		<u>ب</u>				1 1			
3_		7.7								l	Basalt fine to medium grained, igneous, from 2 05 m to					3	
								22			4 50 with abundant voids, joints are planar, rough and some joints contains very thin iron oxides films and some						
_		1.3	38				≳	۔ 5			jonts contain clay minerals from 4 85 to 5 33 m; exhibit	7		1 ;	-		ł
_			%		1111		نَّق		33		vertical joints and contains clay minerals, joints dip				-		
4_		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					Light Gray		2 to	8	20°,30° and 90°				-	4	
-							בֿי						1		-		
-		, ,						\vdash					rmeability te		-		
- 5_			TT'l										spended by v si 3 00-5 00			5	203 84
<u>-</u> -[٠. ×	Ш					-		4		֓֝֟֝֟֝֟֝֟֝֟֝֟֝֟		 	<i>[</i> -	•	20007
-						Ø				3 to							
	.	, ,	1111	앀		Z		ŀН			5 75 m	╢			L		
6_	BASALT					<u>م</u>	Brown to Reddish Brown				Basalt, joints are planar, rough and contains clay				L	6	
_	BAS					<u> </u>	lsh I	ایرا	+		minerals from 8 00 m to 8 80 m, exhibit vertical] _		-		
_			69 %	6		AS	3edc	2 to 3	3 to 4	Ø	joint, joints dip 50°, 70° and 90°	۲	12	<u>LU</u>	-		
-		, ,				Ö	to	~	ຶ						-		
7_		`;`		-			rowr								-7	7	
-		; ; <u>,</u>	ПП	╌┦		- 1	<u>m</u>			4		١,			-		
-					.							"	l m dic 2 le depth 8 00		-		
8_ 		: :							l				A			3	
٦-	ł	1	'	111		ł			ł						7		
1	ŀ	;;]	\prod_{1}'	5%			ray		_	က							
_[; ;	jji	$ \tilde{1} $			Light Gray	2	to 3								
9_		;;[$\prod $				ig.		٧						_9	•	
_		· ·			$\ \ $		_								_		
_	ļ									4		• .	0 m, dic 2,		_		
-[ſ	;;		\prod		[- 1	ſ			Hol	le depth 10 0	0 m	-		` <u> </u>
10_		> >		Ш	111						10 00 m	Щ			1	0	198 84

The recovery value will only be shown if it is below 100%.

		ΕP	DC						swissboring			CEL	
							G	EO	LOGIC LOG OF DRILL HO	LE			
	OJE					OM	PLE	хо	VER THE TOROLA RIVER		CDB-1 SHEE	T 2 OF	7
_			CHAPARR		SITE			1	PTH OF HOLE · 70 00 r		COMMECED		1/12/1
		INAT	· 208.84	5 093 m	E 56	0 61	24 m		PTH OF OVERBURDEN 2 05 I		DRILLED BY		1/12/5
-			M HORIZOI		909)	4 111	_	NGTH OF ROCK DRILLING 67 95 r TAL LENGTH OF CORE 70 00 m		LOGGED BY	SWISSB	Perez
BEA	RIN	IG O	F ANGLE H	OLE				-	RE RECOVERY 100%		SUPERVISION BY . W		
	Τ-	1	<u> </u>	T					OBSERVATION OF CORE		<u> </u>	····	
	ľ.,,		Core	18		m		G	GBOEHWITTON OF GOTIE		WATER TARIF	<u>~- </u>	
DEPTH	ROCK NAME	LOG	Recovery and RQD	KIND OF	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION		WATER PRESSURE TES LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
_		,,,			Dark Brown	2 to 3	4					-	m
_	1				0 8	2 t	Ľ		Basalt in some places exhibit spheroidal weath joints are planar, rough, and some joints contain			-	
11_		$\langle \cdot \rangle$							clay minerals, joints dip 50° to 70°	13			
_		, ,			≥								
-			37		Light Gray	2 to 3						-	
12	1		%		Ę	Ö						- 12	
		; ;						က					
_	ļ	; ;					to 4				72	_	
_			31		RB	4	က				L.U.	-	
13_		> >	%									_13	
_		, ,			1	60		ļ			1 11 1 1 1		
_	ĺ	,,				2 to						_	
14_		N;		:	\$	ľ		_	14 00 m		4	_14	
_		, , ,	62 %		Light Gray with Brown		_	1			5004-0		
_	١.		~		with			N	Basalt joints are planar, stepped rough, and cor	ntains	5 60 dic 2 Hole depth 15 00 m	-	
15_	BASALT			i	Sray				very thin iron oxide films, from 15 70 m to 16 50			15	193 84
_	M				ght (က		4	exhibit vertical joint			- i	
]]	2 to 3						-	
16_							6					- . 16	
_		``				ļ	2 to	ဗ	16 30 m			-	
_		! ;;}	32 %									_	
		;;;	<i>"</i>		RB	-						-	
17_					ıray			2				_17	
_					Light Gray	e					148LU	~	
_			60%		L _g			4	Basalt exhibit abundant voids, joints are planar,			_	
18_					/w C				rough and contains clay minerals, joints dip 60º a	and		_18	
-			47%		Light Gray w/ Reddish Brown	to 3			70º			-	
-		::<:\l			th G	2 t					1		
- 19_					R. C.		၉	33				_ _19	
-			56%		Dark Grayw/ Brown	3		2 to				-	
-		$ \cdot $	╼╥╢╢								5 93 dic 2 Hole depth 20 00 m	-	
20_		33	38%		Dark Gray	2			20 00 m		7-10/e depin 20 do 111		188 84

	i	ΕP	DC							swissboring	C	EL
						•				LOGIC LOG OF DRILL HOLE	ODD 4	
-	OJE						OM	PLE	,	VER THE TOROLA RIVER	CDB-1 SHEET	3 OF
		ION TION	CHAPA 208			SHE			-	PTH OF HOLE 70 00 m PTH OF OVERBURDEN 2 05 m	COMMECED ·	2001/12/ 2001/12/
		INA"			093 m	F 56	 89 62	21 m	_	NGTH OF ROCK DRILLING 67 95 m	-	WISSBORIN
			M HORIZ			902	39 02	. 4 (111	-	TAL LENGTH OF CORE 70 00 m	LOGGED BY	L. Pere
-			F ANGLE			.=-			-	RE RECOVERY 100%	SUPERVISION BY Walte	r Hernandez
	.,	,			,				<u> </u>			1 1
l	}		C	_	•		Τ	_		OBSERVATION OF CORE	WATER TARIF	-
1	Ų		Core Recov				9		S S		WATER REFORMER TEST	Z
_	ROCK NAME		and	-	: BłT	ا	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	DEPTH ELEVATION
DEPTH	ğ	901	RQI	D	Ö 5	COLOR	ATE	2	l iii		LEAKAGE OF DRILLING WATER	DEPTH ELEVAT
۵	ľ	3	0 ->1	00%	KIND OF I	8	×	₹	8		0 LUGEON VALUE 4	1 - 1 -
_		;<;		\prod		ray						_ m
_						Light Gray			4	Basalt joints are planar, rough and contains clay		-
_	-	訤				Ē		က		minerals, from 20 00 to 20 65 m exhibit vertical joint,		-
21_		, ,	45 %			0 8			2	joints dip 60°, 70° and 90°		21_
_	1						1	\vdash		21 30 m	-	-
-	1											
22_		133				≥						22_
_		, ,				Light Gray			60			_
_		33				F					18 LU	-
-		; ; ;				_	6			Basalt exhibit abundant voids, contains scattered		
23_									<u> </u>	joints and contains clay minerals, jonts dip 40° to		23_
-						 	ł	4]	60°		-
-						_ n		`	4			
24	1	33				۵						24_
_		;;				<u> </u>	1					_
_							ļ				18 45 dic 03	-
-	 	$\langle \cdot \rangle$									Hole depth 25 00 m	-
25_	BASAL					}			ဗ			25_ 183 8
-	M									25 60 m		-
_			40				 			23 60 111	- 	-
26_			-									26_
_						Light Gray						-
_			26			텵			4			-
_		3.5				Ĕ				Basalt joints are planar, rough and contains clay		-
27_	1						2 to 3	8	က	minerals, joints dip 40° to 70°		27_
-	i		61 %				2					-
-									4			-
- 28_							[,		<u> </u>		31 LU	28_
-02	ĺ		28		ĺ							
_			%						3	28 50 m		
_]	_
29_		; ;,		Щ		Reddish Brown			4	Basalt Brecciaceous, consists of basaltica clasts up to		29_
_	:	;;				r B	to 3	9		0 10m in length, the matrix is tuffaceous, hard, joints are		-
-		 ;;	100 %	,]		ddis	21		to 2	planar, close, joint dip 0°, 10° and 30°	11 35 dic 03] -
		$ \cdot,\cdot $				æ			-		Hole depth 30 00 m	_ 30_ 178 8
30_		1					┖		ليسيا			1/08

	E	ΞP	DC		•				swissboring	C	EL	
PRO	DJEC	et.	HYDRORE	LECT	RIC (CON			PLOGIC LOG OF DRILL HOLE VER THE TOROLA RIVER	CDB-1 SHEET	4 OF	7
LOC	ATI	ON ·	CHAPARRA	L DAM	SITE			DE	PTH OF HOLE 70 00 m	COMMECED		/12/1
ELE	VAT	ION	208 84	m				ÐΕ	PTH OF OVERBURDEN 2 05 m	COMPLETED		/12/5
COC	ORD	INAT	E N 305 (093 m		69 62	24 m	LE	NGTH OF ROCK DRILLING · 67 95 m	DRILLED BY S	WISSB	DRING
			M HORIZON		90º			TO	TAL LENGTH OF CORE 70 00 m	LOGGED BY		erez
BEA	ARIN	IG OI	F ANGLE HO)LE ·				CO	RE RECOVERY 100%	SUPERVISION BY Walte	er Herna	ndez
								,	OBSERVATION OF CORE	WATER TARLE		
ОЕРТН	ROCK NAME	LOG	Core Recovery and RQD 0-100%	KIND OF BIT CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LUGEON VALUE 4	DEPTH	ELEVATION
_		, ,							Same as 28 50 m to 30 60 m			m
_		: ;;			<u> </u>	$oldsymbol{ol}}}}}}}}}}}}}}}}}$	1				_	
31_	ALT		11%		wn Light Gray	2 to 3	8	3 4 3	Basalt, fine grained, igneous, massive, joints are planar, rough close and contains clay minerals, joint dip 30° to 50° 34 20 m Agglomeratic Basalt, with clasts up to 0 10m in length,	18 5 L U 16 10 dic 03 Hole depth 35 00 m	31_32_ 32_ 33_ 34_ 35_	173 84
36_ -	BASALT		100 %		Reddish Brown	2		1 to 2	joints are close, rough, clean, dip 0° and 10°	V	36_	
37_ - - 38_			19%		Light Gray with Reddish Brown	2 to 3		2 to 3	Basalt; fine to medium grained, igneous, fractured, joints are planar, rough, and contain clay minerals, joints dip 40° to 60° 38 30 m	24.5 L.U	37_ - - 38_ -	
39_ - - - 40_i			41 % 32 %		Light Gray	-	2 to 3	3 to 4	Basalt, fine grained, igneous, massive, with voids, joints are rough, moderatly open, with manganese oxides dip 0°, 30°, 40°, 60° and 90°	30 75 dic 03 Hole deptin 40 00 m	39_ 39_ -	168 84

		ΕP	DC							swissboring		C	EL	
						-		G	EC	LOGIC LOG OF DRILL HOLE				
-	OJE			-			OM	PLE	_	VER THE TOROLA RIVER		EET	5 OF	
	_		CHAPA 208			SITE			-	PTH OF HOLE 70 00 m PTH OF OVERBURDEN 2 05 m	COMMECED			1/12/1 1/12/5
-		TANIC			093 m	F 56	 39 62	4 m	-	PTH OF OVERBURDEN 2 05 m IGTH OF ROCK DRILLING 67 95 m	DRILLED BY	SV		ORING
-			M HORI			90º	70 OE	7 111	-	TAL LENGTH OF CORE 70 00 m	LOGGED BY			Perez
BE/	ARIN	IG O	ANGLE	E HO	LE					RE RECOVERY 100%	SUPERVISION BY	Walte	r Herna	ındez
ļ	Γ	T							ļ	OBSERVATION OF CORE	WATER TARIE -	···		
	<u>ш</u>		Core Recov				g		তু					2
	ROCK NAME		and	-	! ዀ		WEATHERING	တ္သ	É	DESCRIPTION	WATER PRESSURE	rest	_	ELEVATION
ОЕРТН	§	U	RQ)	P S	COLOR	À.	HARDNESS	딩	BESSIII 113W	LEAKAGE OF DRILLING WATER		рертн	LEV4
2	2	LOG	0 -> 1	00%	KIND OF E	8	ΥE	₹	CORE CUTTING		D LUGEON VALUE	≣ 40		Ш
		;;;	Ť		Ŭ						1 1		_	m
_									4	Same as 38 30 to 43 05m			-	
- ا	-	33						₆					 41	
41_		, ,						2 to	├		4		' "'-	
_	1							"	က				_	
_			23				•						_	
42_			<u>~</u>				<u> </u>						42_	
-									4				_	
			40%			1		4			10 3 LiU		-	
43_										43 05 m			43_	
			$\Pi \Pi$										_	
_	l			1111		Gray				Basalt, fine grained, igneous, massive, joints are rough,			-	
_						Light Gray				close and contains manganese, mostly dips to 30°, 40°			-	
44_	1	S	ЩП			-	2 5		2 to	and 60°			44_	
_			26				1 to				30 55 dx 04		-	
_			%					3			Hole depth 45 00 m		_	
45 <u>_</u>	\ -										1 1		45_	163 84
_	BASAL		ΠH			i					T Vil		_	
-	-			$\ \ \ $									-	
_													- 46_	
46_			11%						9				40_	
-													_	
_							~						_	
47_										47.15 m			47_	
-		[;;]	"	$\ \ $		<u> </u>	H		4	47 15 m	1 ; , !		-	
				$\ \ \ $		Reddish Brown				Barata analysis, baratanana and trafficancia and second	21 8 LU		-	
- 48_			21 %			- E	2 to 3			Basalt, partially brecciaceous and tuffaceous, joints are planar, rough, close, with manganese oxides.			48_	
		N.	⁷⁶ [[] [] [gg	2	3 to 4		,			_]	
_						2		က						
- 49_			_			ر ا ا	2		60				- 49_	
_		;;\				Reddish Brown w/ Light Gray					; ; ,		-	į
-			18%			idish Brown Light Gray	2 to 3				1:, :		-	
						leddis Lig	CV							150 04
50_		111		[1]								ı	50_	158 84

	E	ΞPI	DC						swissboring			C	EL	
					-		G	ΕO	LOGIC LOG OF DRILL I	HOLE				
PRO	JEC	T	HYDRORE	LECT	RIC C	ЮМ	PLE	x o	ER THE TOROLA RIVER		CDB-1	SHEET	6 OF	7
-			CHAPARRA		SITE			-		00 m	COMMECED			/12/1
			: 208.84					_		05 m	COMPLETED	01		/12/5
	ORDI		E N:305 M HORIZON		E 56	9 62	4 m	_		95 m 00 m	LOGGED BY	51		ORING Perez
_			ANGLE HO		<u> </u>					00%	SUPERVISION	BY Walte		
		r	-										E	
			Core	<u></u>		σ		Г	OBSERVATION OF CORE		WATER TARIE	- ^\		_
DEPTH	ROCK NAME	907	Recovery and ROD 0	IND OF	COLOR	WEATHERING	HARDNESS	CORE	DESCRIPTION		WATER PRESSU LEAKAGE OF DRILL WATER	ING	DEPTH	ELEVATION
- - 51_ - -			91 %		Brown to Reddish Brown	2 to 3		1 to 2	Same as 47 15 to 55 00 m				- - 51_ - -	m
52_ - - - 53_			19%		Light Gray w/ Brown	2	2 to 3	2 2 3			34 45 dic 0 Hole depth 52 4	i	52_ - - - - 53_	
- 54_ -			67 %		Reddish Brown	က		1 to 2			30 19 dic 0		54_ 	
- 55_	ᇦ	• •	100%			┢			55 00 m		Hole depth 55 (00 m	_ 	153 84
"-	BASALT			1		to 2		4	50 00 111		I		† °-	
_	B					Ŀ		ო			!		_	
			67 %		1	~	<u> </u>	4	Basalt,				_	
56_ - - 57_ - - 58_					Light Gray	1 to 2	2 to 3	3 to 4	Joints are planar, rough, and contain clay m from 57 75 m to 58 65 m exhibit sound rock		6 7, L.U		56 57_ 58_	
59_ ' 			55%			ဧ	3	2 to 3	Aggiomeratic basalt volcanic vesicular, joint planar and rough, and contains clay mineral to 70°		24 80 dic 0	1	59_ - - 60_	148 84

· 		EP	DC			_	_		swissboring			C	EL	
PRC) IEC	·T	HYDRORE	:) FCT	BIC (:OM			LOGIC LOG OF DRII VER THE TOROLA RIVER	LL HOLE	CDB-1	SHEET	7 OF	7
			CHAPARRA				II EL	_	PTH OF HOLE	70 00 m	COMMECED	OHEE!		/12/1
ELE	_							_	PTH OF OVERBURDEN	2 05 m	COMPLETED			/12/5
COC	RD	INA	TE N 305 (0 9 3 m	E 56	69 62	24 m	LE	NGTH OF ROCK DRILLING	67 95 m	DRILLED BY	SV	VISSBO	DRING
ANG	LE	FRO	M HORIZON	TAL	90º			ΤO	TAL LENGTH OF CORE	70 00 m	LOGGED BY		<u>L. F</u>	erez
BEA	RIN	G O	F ANGLE HO	LE				CO	RE RECOVERY	100%	SUPERVISION	BY Walte	r Herna	ndez
		Γ	0			т—		<u> </u>	OBSERVATION OF CORE		WATER TARIE			
DEPTH	ROCK NAME	100	Core Recovery and RQD	KIND OF BIT CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION		WATER PRESS LEAKAGE OF DRIL WATER	LING	DEPTH	ELEVATION
-			54 %						Same as 58 90 to 60 50m				-	m
- 61_								2	60 50 m				- 61_	
- -			15%	'					Basalt Joints are planar, rough and commerals, joints dip 50° to 60°	ontain clay				
62_ -						1 to 2	ю	4					62_ -	
-			10%		iray			3 to			0 5 L.U.		- 63	
63_ -					Light Gray to Dark Gray								-	
- 64_					at Gray t	<u> </u>			63 80 m		$-\parallel \parallel \parallel \parallel \parallel \parallel$		 64_	
-			67 %		Ę				Basalt, igneous, massive, strong, fine joints are planar, rough, contain mang	-	45 60 dic 0		-	
_	_	3.3				ĺ		ľ	oxide films, joints dip 50° to 60°	•	Hole depth 65	, ,	_	- 1
65_	BASALT						•				 	<u> </u>	_ 65_	143 84
-	BAS	, ,	60 %			l_	_						-	
-		> >											-	
-	ŀ	, ;	╼═╌╂╏╏╏╏			1		1				1 1 1	-	1
66_		, ,											66_	
-			62 %										-	
-		> >						٠.						
67_	ļ	: 				 _ 	<u> </u>	1 to 2	66 90 m		4 1 1		67_	
_		; ;	55 %					-	Basalt, medium grained, igneous, with	voids,			_	
_	[W				joints are planar, rough, and contain cl		60		-	1
-		;;	100 %		Bro	ď			from 69 50 m to 69 87 joints are close	and joints	LU.			
68_	Ī			- 1	dish	ا 10							68_]
-	ŀ	::\			Reddish Brown								-	
-			82 %		-		2						-	1
69_	ļ		- /º	}		Щ							69_	
-	ļ			l	īray							<u> </u>	-	
-	ŀ	;;			Light Gray	2					27 40 dic 09		-	
70_	ţ	;.;	60%		اد				End of Boring		Hole depth 70 (~"	70_	138 84

	E	ΕPI	DC						swissbor				C	EL	
			15/P=#=-		- 				LOGIC LOG OF	PRILL HOLE	_	`DD ^			
LOC			CHAPARRA			OM	PLE		PTH OF HOLE	60 00 m		DB-2	SHEET	200	F 6 1/12/6
ELE			183.95		OITE			-	PTH OF OVERBURDEN :	3 00 m		APLETED.			1/12/9
COC	ORDI	INAT	E N 305	147 m	E 56	9 70	2 m	LEN	IGTH OF ROCK DRILLING	53 65 m	DRIL	LED BY		WISSE	ORING
-			M HORIZON		90º				TAL LENGTH OF CORE	56 65 m	$\overline{}$	GED BY	: _ :		Perez
BEA	RING	G OF	ANGLE HO	LE				CO	RE RECOVERY	100%	SUP	ERVISIO	NBY Walt	er Hern	andez
		1		1				<u> </u>	OBSERVATION OF CORE		+		~ ^ ^		\top
			Core'					<u></u>			T WAI	FR TARI F			
	ROCK NAME		Recovery and	<u>₩</u>		WEATHERING	ဖ္တ	CORE CUTTING			WAT	FER PRESS	SURE TEST		O.
DEPTH	X	ا ,, ا	RQD	KIND OF BIT CASING	8	뿔	HARDNESS	5	DESCRIP	TION	LEAR	KAGE OF DA	ILLING	DEPTH	ELEVATION
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	\vdash	Ģ	0	- 3			┝	3			10	LUGEON	VALUE	40	m
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-		ġ. ;						l	Alluvial deposit consists of sa rock fragments up to 0.20 m in					_	
1_		ö					İ		mederate weathered, silty sand	matrix, low water				_1	
-	Ϊ	0			Light Brown				content, low plasticity					-	
-	P.S.	Ö			ig Bi									-	
2_	ALLUVIAL DEPOSIT	.			Ę			ļ						_2	
_	Ν	<u>ن</u>												_	
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	۲	0:							2 00		Dic 0	6 fo 2001		3	
3_		Q						 	3 00 m		+	$\top \top \lor$	 	十"	
_		Ŏ.	88%								3 15 1	n dic 06		_	
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4_	H	7,7	170 66						Alluvial Deposit consits of grav		++	 '\}-		 -#	
-	1		17% %						rounded, hard with traces of sa	na				-	
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5_		, ',	53 %		Light Gray									_5	178 95
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-		; ;	62%		S.				7 75 m					-	
8_ 8_		; ;	<u> </u>		Brown to Reddish Brown			N	7.70111		┥ ╽	1		8	1
		;;;	54 %		ılsh			+							
_		[;`;			3ed(2-3	က		Basalt, from 7 75 m to 9 40 m					-	
-		; ;			ot				contains abundant voids, joints					-	
9_		; ;	35		OWI				slightly weathered, contains cla	y minerals, joints				_9	
-		[: :]	%		Ē		Ì	\vdash	dip 40° to 65°					-	
-		[; ;[25					3-4			5	9 L. U		_	
10_		٠,٠	%											_10	173 95

The recovery value will only be shown if it is below 100%.

	E	ΕP	DC						swissboring			CEL	
	o :=:	-	UVDDQ===	-1 PA-	- DIA 1				LOGIC LOG OF DRILL HO	LE	CDB-2 SHE	- 	OF
	OJEC		CHAPARRA			JON	IPLE		VER THE TOROLA RIVER PTH OF HOLE 60 00 m		CDB-2 SHEE		OF 001/12/
		TION			SITE	_		+	PTH OF OVERBURDEN 3 00 m		COMPLETED		001/12/
		INAT		-	E 56	59 70)2 m	+	NGTH OF ROCK DRILLING 53 65 m		DRILLED BY		SBORIN
ANG	GLE	FRO	M HORIZON	TAL	90º			то	TAL LENGTH OF CORE 56 65 m		LOGGED BY		L. Pere
BEA	ARIN	IG O	F ANGLE HO	IE.				CO	RE RECOVERY 100%		SUPERVISION BY W	alter He	ernandez
	Τ	T	_					·	OBSERVATION OF CORE	<u></u>	WATER TARIE -	_	7
DEPTH	ROCK NAME	P07	Core Recovery and RQD 0 -> 100%	KIND OF BIT CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION		WATER PRESSURE TE		ELEVATION
- - 11	-		25			2-3	e	e	Same as 9 40 - 10 00 m		0 97 m dic 07 Hole depth 10 6 m		_ m 11_
11_ - - 12_ - - 13_			90 %		Light Gray	2	2	က	11 60 m Basalt joints are planar, rough, and contains clay minerals, joints dip 50° to 70°	1	5 9 L.U		112_
- 14_ -								4	14 00 m	. _			14_
	BASALT		67 % 60% 63% 60% 50% 80% 633%		Dar k Gray	3	3	4	Fault Zone (15 25-20 00 m) Basalt, joints exhibit slickensided surfaces and contains iron oxides and clay minerals		4.9 L U 0 60m dic 08 Hole depth 18 75 m	1	- 168.9 - 168.9 - 166. - 7. - 8. - 9. 163.9

	E	- EPI	DC			 .				swissboring		EL	
						-		G	ΕO	LOGIC LOG OF DRILL HOLE			
PRO							ОМ	PLE		/ER THE TOROLA RIVER	CDB-2 SHEET	3 OF	6
⊢					L DAM	SITE				PTH OF HOLE · 60 00 m	COMMECED. COMPLETED		/12/6 /12/9
COC				3.95	111 147 m	E 56	9 70	2 m		PTH OF OVERBURDEN . 3 00 m IGTH OF ROCK DRILLING 53 65 m		NISSB(
-			M HOR			90º	3 70	۲. ۱۱۱		TAL LENGTH OF CORE 56 65 m	LOGGED BY		erez
BEA	RIN	G OF	ANGL	E HO	LE ·					RE RECOVERY , 100%	SUPERVISION BY Walte	r Herna	ndez
	1				1					OBSERVATION OF CORE		1	
			Cor	re					/n		WATER TARIE -VV-	1	
рертн	ROCK NAME	LOG	Recov and RQ	ď	KIND OF BIT CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	рертн	ELEVATION
۵	-		0 🗪	100%	≨ર્ફ	8	₹	È	Ö		0 LUGEON VALUE 4		
-		33	35			ļ	ဗ	က		Same as 14 00-20 60 m			m
-						<u>.c. o</u>	3	4	C ₁	20 60 m] -	
21_ - - 22_			24 %			Dark gray to Light Gray	2	2 to 3	2 to 3	Basalt joints are planar, rough and contain clay minerals and abundant voids, joints dips 40° to 60°, moderate strength		21_	,
-						Dar			4	22 90 m	12 8 L. U.	-	
23_			60 %			Reddish Brown to Dark Brown	2	3	2	Basalt, joints are planar, rough and contains fron oxides and clay minerals, from 24.8 m to 25 25 m exhibit voids, joints dips 50° to 70°		23_	
 25	BASALT		29 %			Reddish Brov			ε	25 25 m	5 0 dic 08 Hole depth 25 00 m	25_	158 95
_ 		200000	50%			Dark Gray	8	8	4 2	Basalt joints are planar, rough and contains iron oxides, and clay minerals, joints dip subhorizontally, 26 40 m		26_	
27_			20%	75 %		Reddish Brown to Dark Brown		8	4	Basalt joints are planar, rough and contain clay minerals, joints dip 50°		27_	
28_ - - 29_			9	2%		Dark Gray	2 to 3	က	4	Basaît joints are planar, rough, and contains iron oxides and clay minerals, joints dip 60°	25 B L U	28_	
30_						Reddish Brown	2 to 3	8	8	29 30 m Basalt [,] joints are planar, rough, and contains clay minerals, joints dip 40° to 50° and scattered voids	- 28 85 dic 08 Hole depth 30 00 m	30_	153 95

stains, joints dips subhorizontally stains, joints dips subhorizontally stains, joints dips subhorizontally 36 37 37 37 38 38 48 Basalt altered, in part with tuff breccia, joints are planar, rough, and contains clay stains, joints dip 50° 39 30 60 dic 09 Hole depth 40 00 m		E	ΞP	DC				-	_		swissboring	-	EL	
SELVATION	PRO	OJEC	<u>. TC</u>	HYD	RORE	ELECT	RIC (СОМ					4 OF	6
CODEDINATE N-395 147 m E-689 702 m E-689 702 m E-680 702 m E	_						SITE			DE	PTH OF HOLE 60 00 m			
ANGLE FROM HORIZONTAL 908 TOTAL LENGTH OF CORE \$6.65 m LOGGED BY L. Perr										$\overline{}$				
## DESCRIPTION WATER PRESSURE TEST LEAWAGE OF DILLING WATER PRESSURE TES		_						59 70	12 m	_		- 		
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Second S		\Box				T				<u> </u>	OBSERVATION OF CORE		T	
13% 34%		ĺ	ĺ	Co	re		Π	1,5		G		WATER TARIF - VV	-	ĺ _
13% 34%		AME				⊨		ĬŽ.	တ္တ	Ì		WATER PRESSURE TEST	}	É
13% 34%	표	X				1 H 2	<u>K</u>	뮏	Š	5	DESCRIPTION		₹	×
13% 34%	OEP	l M	မြို			P S	ļ	Į Š	ARE	뿚			120	33
31_ 32					TIT	ΣŞ	-	\ <u> </u>	I	8		0 LUGEON VALUE 4	-	
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31	-	1	٠,٠,		049/		'		, "	``	30.75 m		_	
32	- 31	1	;;;	-"		1	\vdash	╁	\vdash	\vdash			31	
32 0 m Basalt, contains voids, joints are planar, rough, and contains clay minerals, joints dip 60° 20 3 L. U 32 0 m Basalt, contains voids, joints are planar, rough, and contains clay minerals, joints dip 60° 20 3 L. U 32 0 m 33 2	U			22		ł	<u>ş</u>	_		_				
32 0 m Basalt, contains voids, joints are planar, rough, and contains clay minerals, joints dip 60° 20 3 L. U 32 0 m Basalt, contains voids, joints are planar, rough, and contains clay minerals, joints dip 60° 20 3 L. U 32 0 m 33 2			\cdot				Θ	2	က	50	•			
33.				_			Dar	67		8			_	
33	32_		 ;;	31 8	36%		L				32 00 m		32_	
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33	_						P de	2 to	3	4	•		-	
100 % 69 % 69 % 8asalt joints are slickensided and contains clay stains, joints dips subhorizontally 36. 37. 38. 38. 39. 39. 30.60 dic 09 Hole depth 40 00 m 39. 30.60 dic 09 Hole depth 40 00 m 39. 30.60 dic 09 Hole depth 40 00 m 39.	-						<u> </u>	-			32 90 m	20 3 L. U		
34	33_		\cdot			i		2	က	4			33_	
Basalt joints are slickensided and contains clay Service of the stains, joints dips subhorizontally Service of the stains, joints are planar, rough, and contains clay stains, joints are planar, rough, and contains clay stains, joints dip 50° Service of the stains of	-			100)%			<u> </u>					-	
Basalt joints are slickensided and contains clay Se So So So So So So So So So So So So So	-		, ,		-								[-	
Basalt joints are slickensided and contains clay Se So So So So So So So So So So So So So	34 -	{											34	
Basalt joints are slickensided and contains clay stains, joints dips subhorizontally 36 37 38 40 40 40 56 % 36 40 40 40 40 40 40 40 40 40 4	٠			69 %										
Basalt joints are slickensided and contains clay stains, joints dips subhorizontally Solve the stains of the stai	_											29 10 dic 09		
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36 36 % 37 35 m 37 35 m 14 5 L U. 38 38 38 38 39 39 39 39 39 39 39 39 39 39 39 39 39	_	AS	, ,				ark				stains, joints dips subhorizontally		-	
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38. 38. 38. 38. 38. 39. 39. 39.	٠		;;		11111						37 35 m		, v.~	
Basalt altered, in part with tuff breccia, joints are planar, rough, and contains clay stains, joints dip 50° 39 30 60 dic 09 Hole depith 40 600 m	-		,									14 5 L U.		
Basalt altered, in part with tuff breccia, joints are planar, rough, and contains clay stains, joints dip 50° 39 30 60 dic 09 Hole depith 40 600 m			.;;										_	
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30 60 dic 09 — — — — — — — — — — — — — — — — — —	_		$\langle \cdot \rangle$	4[[[[Bro	2	က	- 1		ar,	_	
30 60 dic 09 — — Hole depth 40 00 m	_			14%			цs		-		rough, and contains clay stains, joints dip 50°		-	
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Hole depth 40 60 m	-1		;;	-	HHH	1	Œ		t	1				ļ
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PROJECT HYDRORELECTRIC COMPLEX OVER THE TOROLA RIVER CDB-2 SHEET 5 OF 6		E	ΕΡΙ	DC						swissboring			·	<u>.</u>	CE	 EL	
DECRIPON CHAPARANA DAM SITE DEPTH OF HOLE* 69 00 m COMMECED 2001/12/6			~-	UVDDADE		- DIO 0						~	מם	OUE		- OF	
ELEVATION 183.95 m				~~~			OM	PLE	_		To	$\overline{}$		SHEE	. 1		
COORDINATE N 395 147 m E-989 702 m						SITE			+		+-			-			
ANOLE PROMING OF ANGLE HOLE CORE RECOVERY OBSERVATION OF CORE Each of Recovery Hold ROD ROD ROD ROD ROD ROD ROD ROD	-					E:56	9 70	2 m	+		⊣ `						
Note Note	ANG	3LE	FRO	M HORIZON	TAL ·				_		L	ogo	SED BY				
Same as 37 55 to 40.00 m with pherocrystals Fractured surface, contains calcite, joints dip subhorizontally and contain magnanese oxides and calcite; from 44 73 m to 44 92 m the rock exhibits calcite veins and joints 45 m to 44 92 m the rock exhibits calcite veins and joints 46 m to 100 % 10	BEA	RIN	G O	F ANGLE HO	LE				co	RE RECOVERY 100%	s	UPE	RVISION	IBY W	alter	Herna	ndez
Same as 37 55 to 40.00 m with pherocrystals Fractured surface, contains calcite, joints dip subhorizontally and contain magnanese oxides and calcite; from 44 73 m to 44 92 m the rock exhibits calcite veins and joints 45 m to 44 92 m the rock exhibits calcite veins and joints 46 m to 100 % 10		Τ	П	<u> </u>	1				<u> </u>	OBSERVATION OF CORE				^/			
14 14 14 14 14 14 14 14	DEРТН	ROCK NAME	106	Recovery and RQD	1	COLOR	WEATHERING	HARDNESS	CORE CUTTING		N L	/ATE EAKA /ATEF	R PRESS GE OF DRI R	URE TES		рертн	ELEVATION
Same as 37 35 to 40.00 m with pherocrystals Fractured surface, contains clay strains and some yellow altered material 42. 43. 44. 45. 67 % 46. 100 % AB 36 N AB 100 % AB 20 N		;;;						4		Г	İ				_	m	
Same as 37 35 to 40.00 m with pherocrystals Fractured surface, contains clay strains and some yellow altered material 42. 43. 44. 45. 67 % 46. 100 % AB 36 N AB 100 % AB 20 N	-	-	3.3						<u> </u>							-	.
Same as 37 35 to 40.00 m with pherocrystals. Fractured surface, contains clay strains and some yellow altered material 42. 43. 44. 45. 67 % 46. 100 % AF 10 Micro escape 47. 100 % 88 % 88 % 88 % 88 % 88 % 88 % 89 % 100 % 88 % 89 % 100				14%					2								
44_ 44_ 43 60 m 5	-					leddish Brown	2 to 3	4	4	surface, contains clay strains and some yellow altered	di `						
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44.	-		$\langle \cdot \rangle$						-		'	Ju				_	
44. 44. 45. 67 % 68 % 46. 47. 40 % 48. 48. 48. 48. 48. 48. 48. 48	43_			88 %			ŀ		<u> </u>		l					43_	
Basalt, in some places is arrigidatione and contains calcite, joints dip subhorizontally and contain manganese oxides and calcite; from 44 73 m to 44 92 m the rock exhibits calcite veins and joints dip 55° 48	ի -	ì	3.3		<u>'</u>	1			4	42 60 m	1	}				-	
Basalt, in some places is amigddaloide and contains calcite, joints dip subhorizontally and contain manganese oxides and calcite; from 44.73 m to 44.92 m the rock exhibits calcite veins and joints dip 55° 48_	-	1					<u> </u>			40 00 III	╛					_	
Managanese oxides and calcite; from 44 73 m to 38 00 dic 10 Hole depth 45 00 m 44 92 m the rock exhibits calcite veins and joints 46 46 46 46 46 47 48 48 48 48 48 48 49 49	44	1	3.3				l		-	Basalt, in some places is amigddaloide and contains						44_	
Manganese oxides and calcite; from 44 73 m to 44 92 m the rock exhibits calcite veins and joints Hole depth 45 00 m 45 138 95	_		3,							calcite, joints dip subhorizontally and contain							.]
45_ 63 %	- ا	ĺ) ;	67 %	.				Ľ				39 00 dic	10		_	
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50 5 5							1			50.00 m		Ho!	le depth 50	00 m		<u>-</u>	133 95

	I	ΕP	DC						swissb e ring						(CEL	
					-		G	EC	LOGIC LOG OF DRILL H	HOLE							
PRO	OJE						IPLE	_	VER THE TOROLA RIVER	<u>-</u>			DB-2		HEET		
LOC	_		CHAPARRA		SITE			ſ		00 m	+-		/ECEI				1/12/6
	_	NOIT	183.95 FE N:305		E S	CO 7/)2 m	+		00 m 65 m	-		LETE ED BY				11/12/9 BORING
			M HORIZON		90º	09 /(<i>j2</i> (III			65 m	_		ED B				Perez
	_		F ANGLE HO							0%	-				Wa	ter Herr	
	Γ	T							OBSERVATION OF CORE		w.	ATF	R TABI	IF	$\Delta \Lambda$		Τ
			Core			(5		g									
1	ROCK NAME		Recovery and	KIND OF BIT CASING		WEATHERING	SS	CORE CUTTING	BECODIFIEN					SSURE	TEST	_	ELEVATION
DEPTH	ş	l o	RQD	무말	COLOR	淐	HARDNESS	8	DESCRIPTION			AKAG TER		RILLING		DEPTH	¥
閚	2	8	0>100%	AS IS] 🖁	Ĭ.	HAH	S S			o	,	UCEO	N VALU)E	# #	🖆
	 	>,>	0 - 100%	1 - 0	╁	 	┢	10	Basalt exhibit vertical joints and contains		۳	Ħ	.OGEO	VALC			m
_	ļ.								manganese oxides and calcite							} .	
-			93 %			to 2	2	102									-
51_	•	33		l]]	-)	-								51	-]]
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53_						-			53 25 m							53_	1
-		·	67 %	1	<u> </u>	 		-	Lithic Tuff, smooth, weak, joints are planar, r	ough and	1					-]]
								2	contains manganese oxides and calcite	Jug.: 4210	1		-				
54_	ıμ				1	~	က	100								54_	.
-	TUFF				ay			,				l				-	-
-			75 %	1	Dark Gray	}	4		54 40 m		;		13 70 d			-	-
- 55_		***	III		Dar	α	3 to	4	Tuff and Basalt, fine grained with some lapill m in diameter 54 90 i		1	Hole	depth.	55 00 m		55_	128 95
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					ĺ			2	Basalt intercalated with fine tuff exhibits vert	ical joints							
-			67 %	}		1 1			with some red stains		,	-				-	} }
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	-	; ;[ack ack		- 1		Basalt joints contains calcite, and dips 40° to	50°	i] [
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Ξ		ΑŽ	RQD	ក្ខខិ	۳	뜊	NES	<u>F</u>	DESCRIPTION	WATER PRESSURE TE		ELEVATION
рертн	LOG	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		LEAKAGE OF DRILLING WATER	DEPTH	
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-	O ::		10%	DARK GRAY- LIG GRAY GR		5 4	5 3	5 4-5	4 30 - 4.60 m TUFF, fine grained, water laid, poorly cemented		-	
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			31%		l .				4 80 m			
6_ - - 7_ -		BASALT	35%		LIGHT GRAY	2-3	2	2	BASALT; massive-hard, fine grained and igneous, joints are open, rough, filled with manganese oxides and dip 45° and 90° 555 m BASALT; massive-hard, joints are rough and contains calcite films and manganese oxides, dip 0°, 30° and 45°		- -6 - - - -7 -	
8_			83%		OWN	3	3-4	3	7 70m BASALT; massive, joints are planar, rough and contains epidote and iron oxides		8 ~	
9_			92%		REDDISH BROWN	2	2-3	1	9 90 m BASALT; massive, fine to medium grained, phaneritic, joints are wide to close, rough, contains iron oxides and dip 0º (horizontal)		_9 - - - _10	326 (

PROJECT HYDROELECTRIC COMPLEX OVER THE TOROLA RIVER LOCATION DAM STEE, RIGHT MARGIN DEPTH OF ROLE LEVATION TOOIS (138 m) DEPTH OF OVERBURDEN 400 m COMMUNITER DAY OVER THE TOROLA RIVER 100 m COMPLETED 2002/12/10 COMPONITER DAY OVER THE TOROLA RIVER 100 m COMPLETED 2002/12/10 COMPONITER DAY OVER THE TOROLA RIVER 100 m COMPLETED 2002/12/10 COMPONITER DAY OVER 100 m COMPONITER DAY OVER 100								G	EC	LOGIC LOG OF DRILL HOLE								
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_[;	ζ;	į	65%		GH			_		1				_	
-[;	3	į			DARK GRAY WITH RED AND GRAY CLASTS		Ì	<u>.</u>						_	
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-01	<u>- 1.</u>	K	(((((d)						. 			1		<u> </u>	_000

							G	EC	LOGIC LOG OF DRILL HOLE							<u>-</u>
PRO		_						OVE	ER THE TOROLA RIVER	CDI	3-3	SH			OF	
LOC			DAM SIT		T M	ARG	AIN		PTH OF HOLE 50 00 m	COMM				002		
COC			mosl (1 E N 305,		569	771		+	PTH OF OVERBURDEN 4 00 m IGTH OF ROCK DRILLING 46 00 m	COMPI DRILLE			E HER	.002, RERA		
			M HORIZON		90º				AL LENGTH OF CORE 47 00 m	LOGGI			L. PE			.verp.
BEA	RIN	G OF	F ANGLE HO	LE				CO	RE RECOVERY 94%	SUPER	RVISI	ON E	3Y	WF	IERN	ANDEZ
				—			 I	1 6	OBSERVATION OF CORE	WATER	TAB:	LE ·	_~	<u> </u>		
		ROCK NAME	CORE RECOVERY	В =		WEATHERING	ပ္ထ	Ĕ		WATER				-		Ν̈́
DEPTH	(5	SK N	RQD	KIND OF CASING	COLOR	뿔	HARDNESS	5	DESCRIPTION	LEAKAG WATER		DRILL	ING		DEPTH	ELEVATION
DE	FOG	윤	0 100%	KINI	ខ្ច	WEA	HAR	CORE CUTTING		0	LU	GEON	1	40	ם	
	***								40 05m Contact at 40 05 m is gradual	-						m
-	÷		35%			2	N	3	BASALT; hard, strong, fine grained and igneous, close jointing, open, rough, dip 20°, 30° and 45°		10	0.0	L.U	-		
-	٠,													-		
41					≽				1 40 08 m	'				4	1	
-					2				from 40.80 m to 43.00 m; very close jointing, joints are open, rough, contains iron oxides and manganese					-	•	
-	;;;				DARK GRAY		ကြ								•	
42	ç				-		2-3	4		l I				4	2	
	្ដុំ									1						
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43	·;;								43 00 m					4	3	
-									•					-		
-	, ,		20%						BASALT					-		
-[, ; , ;				_				from 43.00 m to 48.00 m; close jointing, joints are open,			_		-		
44	?				DARK BROWN				smooth, rough, contains iron oxides and manganese, and			5m	•	4	4	
-[્રે				(BR				dip 30°-45° and 60°		- 1		c. 02	' I		
-			20%		ARI						"	45	Deptl	' -		
45		Ļ										43	***	4	5	291 0
	; ; ; ;	BASAL							•				+		J	23.0
1			45%			2	2	2-3								
-	S							2			4	8 L.	U.	-		
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-[-		
-	3		38%								ļ			-		
-														-		
47														4	7	
-	$\langle \cdot $				DARK GRAY									-		
-	$ \cdot $				₹.									-		
AR.					PA							45	m	4	8	
	③					İ									_	
	3		84%													
	्री								From 48.00 m to 50.00 m; moderate to wide close							
49	`;`						23	1-2	jointing, joints are close, rough and dip 0°, 30°, and 80°			5m	,	4	9	
	$ \cdot $						CA	+			11	1 Die	c. 02	_		
_	`;`		/// _{62%}								H	ole l	Deptl	<u> </u>		
-												50	m	_		
50	35								50 00 m END OF BORING					5	0	286 0

									LOGIC LOG OF DRILL HOLE	~ D	ND 4		_
	DJEC								ER THE TOROLA RIVER		B-4 SHEE	<u>1 0</u> 2002/	F 8
_	VAT		mosi (2			MAF	(GIN		PTH OF HOLE 80 00 m PTH OF OVERBURDEN 1 25 m		MECED ·	2002/	
			€ N 305,			.85	2	-	GTH OF ROCK DRILLING 78,75 m	7		ERRERA -	
			M HORIZON		909			-	FAL LENGTH OF CORE 59,20 m			PEREZ	
			ANGLE HO					-	RE RECOVERY 74%		RVISION BY		RNANDEZ
				· · · · · ·				I	OPCEDIATION OF CORE	<u> </u>			
	} ,		CORE	18	T	1 15	1	U	OBSERVATION OF CORE	WATE	RTARIF -	V~	_
		ROCK NAME	RECOVERY			WEATHERING	တ္တ	CORE CUTTING		WATE	R PAESSURE T		DEPTH
Ŧ		X	ROD	KIND OF CASING	HO HO	뿔	HARDNESS	ə	DESCRIPTION	LEAKA	AGE OF DRILLING		DEPTH ELEVAT
DEPTH	LOG	ğ		S S	COLOR	1	AR	뿚		WATE	R,		
		\vdash	0 → 100%	* 0	┸	5	Ξ.	ŏ.	CLAVEV CILT. Inv. water content, non plactic high do	0	LUGEON	40	
_		<u> </u>		ĺ	I A		1	ĺ	CLAYEY SILT; low water content, non plastic, high dry resistance, with high weathered rock fragments up to 3			-	m
	:	Pos			⊨	1	1	İ	cm in length			: _	
		COLLUVIAL DEPOSIT			喜		1		-				
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1_		ŝ	<u> </u>		ξ		•					-1	J
_		\Box			ő	<u></u>			1 25 m			-	
_	::				LIGHT BROWN TO LIGHT GRAY	I			BASALT; HIGHLY WEATHERED; low water content, non plastic, high dry resistance, with high weathered rock				
	 				[호	1			fragments up to 3 cm in length				
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		BASALT			LIGHT GRAY] [-	
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7_	쉱				뒒				7 00 m - 8 00 m			_7	
1	$\langle \cdot $				۲ĭ		ļ	ŀ	ROCK FRAGMENTS; weathered, up to 4 cm in size,				
7	;:				الإ			ļ	contains silt, low to medium water content, low plasticity			-	
	$ \cdot $				뗾				· , · , · ,			-	
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8_	;;]	희			- 1	800 m - 93 m			8_	
	:	J		1	اة	J			Medium water content, low plasticity, consist of a				
-[3:			1		- 1			residual, saprolitic clayey silt with scattered rock				
-				ļ	. ફે		ŀ		fragments			-	
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9_[;	<u>`` </u>	- []	 	1	ĘΙ			- }					
į	;			ŀ	₫		1		9 30 m	+1			
-[:;[ł	칫		$ \bot $		BASALT; highly weathered, weak rock, fine grained and			-	
-	;:		75%	ļ	DARK GRAY LIGHT BROWN TO LIGHT GRAY	T			igneous, jointing cannot be determidated, contains clay			-	
_	31			1	ŘΙ	4	9.4	4	and oxides			-	
			THE ROOM	- 1	-	- 1							

							G	EC	LOGIC LOG OF DRILL HOLE						
	OJEC								R THE TOROLA RIVER			3-4 SHEE		OF	8
	CATI		DAM SITE A			MAR	GIN		PTH OF HOLE · 80 00 m	_		ECED		2/11/	
_		ION	mosl (2					_	TH OF OVERBURDEN 1 25 m	1		ETED.		2/11/	
			E N 305,2				2		GTH OF ROCK DRILLING 78,75 m	+			IERREI		RIVERA
			/ HORIZONT		909	!			AL LENGTH OF CORE 59,20 m				PER	EZ	
BE/	ARIN	G OF	ANGLE HOL	_E				COF	RE RECOVERY 74%	SU	PER	VISION BY	٧	/ HEAN	IANDEZ
				<u></u>		7		1 5	OBSERVATION OF CORE	w	TER	TARIF -	<u>~~</u>		
	1	AME	CORE RECOVERY	BIT]	≗	ဖ	ž		\ w.	TED	PRESSURE	TEQT	ļ	ĕ
Ξ		2	ROD	ဋ္ဌာတ္ခ	۳	皇		둜	DESCRIPTION					E	\{ \
DEPTH	106	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	= 100 0000		AKAGI ATER	É OF DRILLING		DEPTH	ELEVATION
	-	۳	0 → 100%	× 0	0	≩	主	8	BASALT; highly weathered, weak rock, fine grained and	0	-	LUGEON	41		<u> </u>
- - 11 -			90%			4	3-4	4	igneous, jointing cannot be determidated, contains clay and oxides					- 111	m
-					┝	-			11 70 m					-	
12									BASALT,weathered					12	
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-	\$		75%				.							-	
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16									16 00 m						
	\$5						Ī		From 16.00 m to 20.50m; very close to close jointing,						
-									joints are open, rough, with oxides, manganese, epidote,					-	
-									and dip 0º, 30º and 90º	, '				-	
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	JEC								ER THE TOROLA RIVER	CDE			HEE		3 OF	8
	ATIC		DAM SITE A			MAR	GIN		PTH OF HOLE 80 00 m	COMM)2/11	
	VATI		mosl (2 E · N 305,2			851			PTH OF OVERBURDEN 1 25 m GTH OF ROCK DRILLING: 78,75 m	COMPL			E1)2/11 BA - L :	/3U RIVERA
			M HORIZONT		909		-		TAL LENGTH OF CORE 59,20 m	LOGGE				PER		HIVENA
			ANGLE HOL						RE RECOVERY 74%	SUPER					•	NANDEZ
																,
						,			OBSERVATION OF CORE	WATER	TAR	ı =	_	~ ~	-	
		ROCK NAME	CORE RECOVERY	E B		WEATHERING	က္ည	CORE CUTTING		WATER	PRE	SSU	JRE 1	EST		Ö.
F		ž	ROD	ក្ខភ	Ę	皇	Į Š	5	DESCRIPTION	LEAKAG					DEPTH	ELEVATION
рертн	103	P00		KIND OF CASING	COLOR	Æ	HARDNESS	뿚		WATER						
ļ.,	(> >)		0 - 100%		 	5	Ξ	8_		0	LU	GEO I	N !	4	<u> </u>	+
-	; ;				¥		_	10	•	'					-	m
-			50%		DARK GRAY	2	3-4	4-5	20 50 m						-	
_	33				Ě	1			Contact zone between volcanic flows, close jointing, joints are open, rough, clean and dip 0° - 45°, porous in						_	
21	33								upper portion			7r	m		21	
					삘 .				21 00 m	. [2:	2 N	ov.	02		
					REDDISH PURPLE									pth		
-	\;\		45%		<u>-</u>		ဗ	2-3	BASALT; fine grained and igneous, massive, hard, with voids under 1 cm diameter, very close to close jointing,		''	1	2 m	ř i		
-	;;				[왕]		"	Ċ	joints are open, rough, and dip 0°, 20°, 30° and 45°	'		120	≤ (11) 		-	
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-	;;		<u> </u>				- [From 27.00 m to 28.30 m; close jointing, joints are close, open, rough, with oxides and chlorite, and dip 0°,	'			20	1 11	-	
-[$\langle \cdot \rangle$]						30° and 45°				24		 -]
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28						J]		A pore 10 cm across at 28 1 m			ļi			28	
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	DJEC				_		_		ER THE TOROLA RIVER	CDB-4			OF	
	VATIO	_	DAM SITE		_	MAR	GIN	_	PTH OF HOLE 80 00 m	COMMECE			2/11/ 2/11/	
_			mosl (2 r∈ N 305,			.852	<u> </u>	-	PTH OF OVERBURDEN 1 25 m GTH OF ROCK DRILLING 78,75 m	COMPLETE DRILLED BY		200 HERREI		
			M HORIZON		909			_	TAL LENGTH OF CORE 59,20 m	LOGGED B		PER		
			F ANGLE HO					COF	RE RECOVERY 74%	SUPERVISI	ON BY	٧	V HERN	AND
														
				<u> </u>	_	I		75	OBSERVATION OF CORE	WATER TAR	F —	^	-	
		ROCK NAME	RECOVERY	18		WEATHERING	ဖ္တ	CORE CUTTING		WATER PRE	SSURE	TEST		FIFVATION
Ŧ		Ž X	ROD	Ö	5	里	NE.	5	DESCRIPTION	LEAKAGE OF I	ORILLING	ì	DEPTH	5
DEPTH	LOG	ĕ		KIND OF CASING	COLOR	VEA:	HARDNESS	품		WATER				5
	٠,٠		0 -> 100%		۲	>	_	ŏ			SEON	40	<u> </u>	╁
-	3								BASALT; hard rock, strong, fine grained and igneous,				-	r
-			35%						with several voids filled with quartz, close to moderate jointing, joints are close, planar, rough and contains caly	' '			-	
_							2	3	minerals and oxides, and dip 0° and 45°			5 m	-	
31	:											23 No	31	
_	35											2002	_	
_	3.5		24%						31 40 m			Hole	_	
	33								· ———	' '		Depth	L	
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	1.5	æ			DARK GRAY									
35	1,5				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2	2-3	2-3			}		35	11
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-									BASALT; hard rock, strong, fine grained and igneous,		_	1	-	
-			30%						with several voids filled with quartz, close to moderate jointing, joints are close, planar, rough, contains clay		5		-	
	ंः				G.P.				minerals, oxides, and dip 0º and 45º		1	Nov	-	
36					LIGHT GRAY TO						1 1	002	36	
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_	,;,		64%				. [De	epth	-	
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							_	_	LOGIC LOG OF DRILL HOLE	<u> </u>	D 4					_
PRO									R THE TOROLA RIVER	CD			SHE		5 OF	8
LOC	_		DAM SITE			żΗΤ		-	PTH OF HOLE 80 00 m	COM)2/11,	
		TION	mosl (2 re N 305,			05/		-	OTH OF DOCK DRIVING 78.75 m	COMF)2/11,	
			M HORIZON		909		<u> </u>	_	GTH OF ROCK DRILLING 78,75 m TAL LENGTH OF CORE 59,20 m	LOGG		_	L	HERRE . PER		TIVEHA
			F ANGLE HO		3U-			-	AL LENGTH OF CORE 59,20 m RE RECOVERY 74%	SUPE						IANDEZ
DEA	*LIIV	iG O	F ANGLE HO					CO	REPECOVERT 14%	SUFE	TVIC)()	NDI		Y HERI	NANDEZ
		Ī		<u> </u>	r	<u></u>	I		OBSERVATION OF CORE	WATE	R TA	QI E	. —	^	-	
		ROCK NAME	CORE RECOVERY	: BIT		WEATHERING	ις.	CORE CUTTING		WATE	RPR	ESS	SURE	TEST		ELEVATION
Ξ	l	Z Y	ROD	KIND OF CASING	٦	異	HARDNESS	1 5	DESCRIPTION	LEAKA	GE OF	- DR	allino	3	DEPTH	₹
DEPTH	Log	8		ASII B	COLOR	ΙŽ	₽	분		WATER		J.,		-	当	
	-	-	0 →▶100%	Σ 0	₩	≯	<u></u> ₹	8_		0	<u> </u>	JGE	ON	4	0	-
-		BASALT			TO D. GRAY	2	2-3	3-4		' 1		-			-	m
-	[, ·;	BAS			<u> </u>	•	ά	က်		' '		i			-	ŀ
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	[1			₹				TUFF; soft, fine grained, water laid, poorly cemented,			2	24 No	ov 02	L	
-					ĮŽ	2	πO	2	most core was not recovered due to drilling operations	'		-		Depth		1
-	.	出	10%		EDDISH BROWN	-	-	"		; '		[- 1	1		1
-	{:: <i>`</i>	발			SS								42	2 m		
42	<u> </u>	_			ਜ਼,	,			42 00 m	-	11	4	-		42	
_	l 🔆				一一]			BASALT; medium hard to hard rock, fine to medium,						_	
_/	ļ.;								grained and igneous, with small voids up to 0.5cm in	t		-	120	L.U	L	
									diameter, very close to close jointing, joints are open,	:						
_	S				١.				rough, with oxide, mostly dip 0°, 30°, 45° and 90°						-	1
43	 				I≩						Ш	Ì			43	1
_	[, ·,			Ĭ	REDDISH GRAY						$\ \cdot\ $				-	
_					호		2-3	3-4			$\ \cdot\ $				-	
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PROJECT HYDROELECTRIC COMPLEX OVER THE TOROLA RIVER LOCATION MASTER ANS INSTRUM MRSIN DEPTH OF PICE B 90 0m COMMETCE CONTROL 15 9m COMPLETED COORDINATE N SOCIETY COMPLETED COMPL			GEC	LOGIC LOG OF DRILL HOLE			
ELEVATION most (211 99 m) DEPTH OF OVERRUPEN 1.25 m COMPINATE 2002/11/30 COORDINATE 30,0525-2 E 569,892 LENATHO PROCODE 58,20 m LOGGED BY L. PEREZ	PROJECT HYDROELECTRIC	COMPLI	EX OVI	ER THE TOROLA RIVER	CDB-4 SHEET	6 OF	8
CORENATE N 369, 262-E 569, 352 LENGTH OF FOCK DRILLING			N DE	PTH OF HOLE 80 00 m			
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LOCATION DAM SITE AXIS, RIGHT MARGIN DEPTH OF HOLE ELEVATION mosl (211.99 m) DEPTH OF OVERBURDEN 125 m COMPLETED 2002/11/30 COORDINATE: N 305, 252-E 569,852 LENGTH OF ROCK DRILLING: 78,75 m ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE S9.20 m LOGGED BY L. PEREZ CORE RECOVERY 74% SUPERVISION BY WHERNAN OBSERVATION OF CORE WATER TABLE PROMO OF SUPERVISION BY WHERNAN OBSERVATION OF CORE WATER TABLE PROMO OF SUPERVISION BY WATER PRESSURE TEST LEAVAGE OF DRILLING WATER ULGGED 40 124 L U 71 30 m BASALT; AGGLOMERATIC; medium hard to hard rock, moderate strength, consists of subangular andestic and basaltic dasts up to 3 cm in length, in a medium graned andestic matrix, close jointing, open, rough, clean, and dip 0°, 30° and 45° 72 73 74 LIVE OF STORY THE OF STORY THE OF										LOGIC LOG OF DRILL HOLE						
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PRC					_		EX	1	R THE TOROLA RIVER				7
LOC			DAM SITE,		IARG	IN			TH OF HOLE 70 00 m	COMME		2003/2	
			mosl (225 E N 305,		560	QQI			PTH OF OVERBURDEN 7.5 m IGTH OF ROCK DRILLING 62.5 m	COMPL DRILLE		003/2/ .LECILLOS	
			M HORIZON		909			! 	FAL LENGTH OF CORE 69 37 m	LOGGE			
_			ANGLE HO					_	RE RECOVERY 99 10%	_	VISION BY	W HER	IANDEZ
\vdash		Π						<u> </u>	OBSERVATION OF CORE			<u> </u>	-
			CORE	BIT		ত্র			OBSERVATION OF CORE	WATER	TARIF —	_	z
_		ΜĒ	RECOVERY			WEATHERING	HARDNESS			WATER	PRESSURE TEST	_T	ELEVATION
ОЕРТН		Ž	RQD	KIND OF CASING	COLOR	₩ H	Ď.	ING	DESCRIPTION	LEAKAGI WATER	E OF DRILLING	DEPTH	
5	9	ROCK NAME	0	≹ হ	8	¥	₹	CORE		0	LUGEON	40	ш
111	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	BASALT			DARK GRAY AND BROWN	4-5		5	IDEM MATERIAL; TOP OF WEATHERED ROCK, CLAYEY SILT WITH ROCK FRAGMENTS; consists of a clayey slit, low to medium water content, low to medium plasticity, contains abundant highly weathered rock fragments up to 15 cm in length			- - 11 - - - 12	m
13		BASALT			DARK GRAY	3-4	3-4	4	BASALT; brittle, fine grained and igneous, no apparent jointing, highly fractured 14 80 m			- - 13 - - - 14	
15 - - 16			17%			2-3	6	8	TOP OF SOUND ROCK; BASALT; dense, moderate to high weathered, fine grained and igneous, close jointing, joints are open, rough, with clay minerals and manganese			15 _ _ _ _ 16	210 45
- 17					AND LIGHT GRAY			4	BASALT, AGGLOMERATIC; brittle, very close to close jointing, contains basaltic fragments up to 15 cm in diameter, in a fine grained tuffaceous and andesitic matrix Porous		42 6 L U	17	
18		BASALT	52% 52%		GREENISH, REDDISH AND LIGHT GRAY	E	3-4	2	17 5~19 2 with white clay fill 18 70 m		5m 7 Feb.	- 18 - -	
19 - - 20					DARK GRAY	2-3	o.	3	BASALT; very brittle to brittle, fairly fresh, very close jointing, joints are open, rough and contains iron oxides and manganese 19 80 m		2003 Hole Depth 20.00 m	19 _ _ _ _ 20	205 45

									LOGIC LOG OF DRILL HOLE	ODD -:		
PRO							LEX	_	R THE TOROLA RIVER	CDB-5A SHEET	3 OF	7
_		_	DAM SITE, I		IARC	SIN			7TH OF HOLE 70 00 m		2003/2 003/2/	
			mosl (225. E N 305,		560	ga	5		PTH OF OVERBURDEN 7.5 m GTH OF ROCK DRILLING 62.5 m	COMPLETED 2: DRILLED BY JOSE VAL		
			M HORIZONT		909				AL LENGTH OF CORE 69 37 m	LOGGED BY L. PER		
_			ANGLE HO					_	RE RECOVERY 99 10%	SUPERVISION BY	W HER	ANDEZ
											1	T
			CORE	BIT	_	l o	ı		OBSERVATION OF CORE	WATER TARIF	-	,
		핗	RECOVERY			Ž	SS			WATER PRESSURE TEST		ELEVATION
Ē		Ž	RQD	Θğ	<u>۾</u>	뿔	Ä	9	DESCRIPTION	LEAKAGE OF DRILLING	DEPTH	\$
ОЕРТН	90	ROCK NAME	0 - 1000	KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE		WATER		
21 - 22 - 23 - 244	00	BASALT	0 -> 100%	N C C	REDDISH	M	2	00 00	IDEM MATERIAL; BASALT; hard to brittle, fairly fresh, close jointing, joints are open, rough and contains iron oxides and manganese			m
24 - - - 25 - - - 26 - -			11%		DARK GRAY	2-3	3	3-4	24 7-27 0 Porous partly filled with clay minerals	36 6 L U.	- - - 25 - - - 26 - - - 27	200
	**	[-					27 20 m		_	
- 28 - - - 29		TUFF	65%		REDDISH-BROWN	3-4	8	4	TUFF; fine grained, water laid, tuffaceous matrix, strongly cemented, joints are open, rough, with clay and iron oxides Rich in amicdals	5m 8 Feb 02 2003 Hole Depth 30 00 m	- 28 - - - 29	
- 30	***	BASALT	10%		DARK GRAY	2-3	2-3	2-3	BASALT; dense, fine to medium grained and igneous, massive, close jointing, open, rough with manganese, mostly dip 0, 70° and 90°		- - - 30	195 4

							G	EC	LOGIC LOG OF DRILL HOLE				
PRO	OJEC	T	HYDROEL	ECTRIC	CO	MPL	EX (OVE	R THE TOROLA RIVER	CDB-5A SHE		0F	
_			DAM SITE,		ARG	iN		DEP	TH OF HOLE 70 00 m	COMMECED		03/2/	
			mosl (225					_	TH OF OVERBURDEN . 75 m	COMPLETED		3/2/1	0
			E. N 305,				5		GTH OF ROCK DRILLING 62 5 m		OSE VALLEO		
_			M HORIZON		90º				AL LENGTH OF CORE 69 37 m	•	PERE		
BE/	ARIN(G OF	F ANGLE HO	LE				COF	RE RECOVERY 99 10%	SUPERVISION B	r w	HERN	ANDEZ
				1-	[L 477			OBSERVATION OF CORE	WATER TARIE -	√ √-		
		Ш	RECOVERY	ΒIŤ		<u>%</u>	က္က			WATER PRESSURI	TEST		Q.
Ιz		4AM	RQD	ဂ္ဂ်	œ	보	RES	<u>_</u>	DESCRIPTION	LEAKAGE OF DRILLIN		표	ELEVATION
DEPTH	g	ROCK NAME	,,,,,,	KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER	•	DEPTH	13
Ē	, Log	8	0 -> 100%	× 0	\vdash	5	Σ		IDEA MATERIAL DARATE dans for a made	0 LUGEON	40		
- -	, , ,		29%						IDEM MATERIAL; BASALT; dense, fine to medium grained and igneous, massive, close jointing, open, rough with manganese, mostly dip 0, 70° and 90° Some		ָ	- -	m
i -	! ; ;					_			parts the block sides is up to 35 cm in length		i	-	
31				}		2-3	2-3	2.3				31	
_	[;;]										,	_	
1	[;<;								31 5 m			_	
-	13.3		22%										
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32	'[; ;											32	
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	[, ,						ļ			8 Feb.		_	
33]				2003		33	
"	, , ,									Hole			
i -	;;							L ∣	33.40.m_				
i -	13		23%							Depth		-	
-										35 00 m		_	
34	ļ. ;									l	+ +	34	
	100	L .				2-3	2-3	2-3		1 .			
-		BASAL						``			i : I	_	
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35											- 	35	190 45
-											1	-	
-	ļ.;		39%									~	
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36	1				¥					25 0 L.	ן ו יַנ	36	'
-	<u> </u> ;;				Е				36 30 m			_	
_	[; ;				DARK GRAY							_	
]	> >				ል				From 3630 m to 42.50 m; some block size are from 10	,		_	
	ļ; ; l								to 25 cm			37	
37	[;;		 									٠,	
-	::											-	
-	.;;;		25%									-]	
_	[;;]			}								_ !	
38									38 9-39 5m reddish in part	5m		38	
	;;					3	3	_ا	•	8 Feb.			
-	[;:]									1		-	
-	· · ·									2003		-	
-	[::]									Hole		-	
39									A red band 2cm wide at 80° at 39.3m.	Depth		39	
										40 00 m		_	
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40	.[, ,		\$	1	1	ĺ	l	1 1				40	185 45

PROJEC	СТ	HYDROEL	ECTRIC	c ca	MPI			PLOGIC LOG OF DRILL HOLE OF THE TOROLA RIVER	CDB-5A SHEET	5 OF	7
		DAM SITE,						TH OF HOLE 70 00 m		2003/2	
LEVAT	TION	mosl (225	.45 m)					TH OF OVERBURDEN 7.5 m		2003/2/	
COORD	INA	E N 305,	355- E			5	LEN	GTH OF ROCK DRILLING 62 5 m		LLECILLOS	
NGLE	FRO	M HORIZON	TAL	90	2			AL LENGTH OF CORE 69 37 m	LOGGED BY L PE	REZ	
BEARIN	IG O	F ANGLE HO	LE				COF	RE RECOVERY 99 10%	SUPERVISION BY	W HERI	NANDE
\neg	Ţ		i				<u> </u>	OBSERVATION OF CORE			T
		CORE	FIE	T	ű				WATER TARIE -V		=
-	Ą	RECOVERY RQD	ا ا	_	WEATHERING	HARDNESS		- FOODINTION	WATER PRESSURE TEST		ELEVATION
2 g	¥	nup	KIND OF CASING	COLOR	Ĭ₹	Š	삗칠	DESCRIPTION	LEAKAGE OF DRILLING WATER	DEPTH	9
	ROCK NAME	0 -> 100%	≨ઉ	8	₹	¥	CORE CUTTING		0 LUGEON_	40	l ü
OT 41		0 → 100%		DARK GRAY	2 3	2 3	2-3 3 CC	IDEM MATERIAL; BASALT; dense, fine to medium grained and igneous, massive, close jointing, open, rough with manganese, mostly dip 0°, 70° and 90°. Some parts the block sides is up to 35 cm in length Porous down to 42 5m 42,50 m 44 8-45 8m: lined solution holes abou 1mm accros are observed	27.90 L U. 5 m 10 Dic 02 Hole Depth 45 m	41 - 42 - 43	m
	BASAI.	10%		LIGHT GRAY TO DARK GRAY	3	3-4	4	From 46.30m to 51.00m the rocks are broken, joints are open, rough and exhibit iron and manganese oxides	5 m 1 Feb. 2003 Hole Depth 50 m	45 - - 46 - - - 47 - 48 - - 49 - -	175

									LOGIC LOG OF DRILL HOLE	CDB 54 outer		
							EX (_	THE TOROLA RIVER	CDB-5A SHEET		<u>7</u>
LOC			DAM SITE		MARG	ilN			TH OF OVERBURDEN 75 m		003/2/ 03/2/1	
			mosl (22 E N 30		560	005	_	_	TH OF OVERBURDEN 7.5 m GTH OF ROCK DRILLING 62.5 m	COMPLETED . 20 DRILLED BY : JOSE VALL		U
			M HORIZO		909		-		AL LENGTH OF CORE 69 37 m	LOGGED BY L. PER		
			ANGLE H					_	RE RECOVERY 99 10%		V HERN	ANDE7
			CORE	ii.		ச			OBSERVATION OF CORE	WATER TARIEVV-	-	7
		ΛĒ	RECOVER'				SS			WATER PRESSURE TEST	_	ELEVATION
[J		Ϋ́	RQD	O S	8		DNE	g	DESCRIPTION	LEAKAGE OF DRILLING	DEPTH	EVA
DEPTH	100	HOCK NAME		KIND OF	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER 1 HIGEON 4		띮
\dashv	, ,	щ	0 - 100	% <u> </u>		2-3	2-3	၁၀	IDEM MATERIAL; BASALT; dense, fine to medium	230207	' 	
-		_			GRAY	Ŕ	6	"	grained and igneous, massive, close jointing, open	1 1	-	m
-	:	BASALT			ច្ច				rough with manganese, mostly dip 0, 70° and 90° Some	23 20 L.U.	-	
_	> >	BA			LIGHT				parts the block sides is up to 35 cm in length		-	
51	(3.5)				=				51 00 m] ! '	51	
1		-			Z				TUFF; fine grained, moderately cemented, with basal			
-	: ::				ŏ	၉	3-4	5	clast up to 10 cm in size	 		
-					BH	"	Ċ	4	·		-	
-	· · ·			11	REDDISH BROWN				51 0-51 6m sandy and stratified		-	
52	::								51 6-52 2m silty		52	
_					2	Ш			52.20 m	[_	
									LAPPILI TUFF			
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-						ြ		6			-	
53				11		2-3	3	2-3		5 m	53	
-										1 Feb. 2003	-	
_	4	LL.			Æ					Hole Depth 55 m	_	
	Ť	TUFF			DARK GRAY			1				
 		ľ			ARI						54	
54											"	
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_	3.3										-	
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55											55	170 48
-	٠,٠				1				BASALT; hard rock, massive, strong, joints are closed	1 '	-	
	33								mostly dip 30°, 45° and 90°	1 ' ' ! ' ' '	-	
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58	;·;			44							58	
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_				1						2 Feb. 2003	-	
	;;:			Н						Hole Depth 60 m		
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ROJE						LEX		R THE TOROLA RIVER PTH OF HOLE 70 00 m		7 OF 2003/2/	7
		DAM SITE, I mosl (225		vi/AFIC	AIN.			PTH OF HOLE 70 00 m PTH OF OVERBURDEN 7.5 m		003/2/ 003/2/	
		TE N 305,		569	99	5	-	IGTH OF ROCK DRILLING 62 5 m	DRILLED BY JOSE VAL		
		M HORIZON		909	_		_	TAL LENGTH OF CORE 69 37 m	LOGGED BY: L. PER		
		F ANGLE HO			_		 	RE RECOVERY 99 10%	SUPERVISION BY	W HEAN	IAND:
								<u> </u>			
			<u> </u>		7.5	1	r –	OBSERVATION OF CORE	WATER TARIF -	_	
	Ш	CORE RECOVERY	BIT :	ŀ	WEATHERING	တ္တ			WATER PRESSURE TEST		FVATION
.	₹	RQD	ဝီဇ္	뜻	里	NES	ष्ट्र	DESCRIPTION	LEAKAGE OF DRILLING	Į	TAV
၂ ဖွ	ROCK NAME		KIND OF CASING	COLOR	1	HARDNESS	CORE		WATER	DEPTH	Ū
2	<u>, </u>	0 -> 100%	- × ·	۲	=	T T	88		0 LUGEON -	10	
-};	:							IDEM MATERIAL BASALT; hard rock, massive, strong,		-	r
- ::	•	44%		₹				joints are closed, rough, containe calcite and iron oxides	20,5L U.	-	
	, 'F			DARK GRAY				and manganese, mostly dip 30°, 45° and 90°		_	
, ; ;	BASAL		ļ	¥	2	2	2-3			61	
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		24%		1						-	
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ζ,	;]		l	DARK GRAY AND REDDISH GRAY					3 Feb. 2003		
٠,	: 5		1	표					Hole Depth 65 m		
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٠,٠	.				- }			BASALT; hard rock, strong to very strong, close to wide			
ς,								close jointing, joints are close, contains iron oxides and	. 1 1 1		
ं		/////24%			-			manganese, dip 0°, 45° and 90°	' 	-	
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3	BASAL			DARK GRAY			1		Hole Depth 70 m	-	
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					G	ΕO	LOGIC LOG OF DRILL HOLE		<u> </u>	_	
PROJECT	HYDROEL	ECTRIC	CO	MPI	EX	OVE	R THE TOROLA RIVER		B-6A SHEET	1 OF	
LOCATION		E, RIGHT	MAI	RGIN			TH OF HOLE 70 00 m	_		2003/1/ <u>2</u>	
ELEVATION	mosl (21		70.4			_	PTH OF OVERBURDEN 13.5 m			2003/2/3	
COORDINATI			70,1 90º		_		GTH OF ROCK DRILLING 56.5 m AL LENGTH OF CORE 68.60 m	-		VALLEÇIL REZ	
ANGLE FROM	_		30-				RE RECOVERY 98 00%		PERVISION BY W		ndez
							OBSERVATION OF CORE				
1 1	CORE	늚		ធ្វ		Ŋ.			TER TARLE	<u>~ </u>	z
	RECOVERY ROD		ا ـ ا	EB	ESS	Ę	DESCRIPTION		TER PRESSURE TES	[┰] │ _┲ │	ATIC
DEPTH LOG ROCK NAME	1100	KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WA7	KAGE OF DRILLING TER	рертн	ELEVATION
F	0 -> 100%	ΣΩ	ŏ	₹	<u> </u>	<u>Q</u>		a	LUGEON	40	
OLLUWAL DEPOSIT OR RESIDUAL SOIL			LIGHT BROWN BLACK BROWN - BLACK				CLAYEY SILT (OVERBURDEN); moderate to high water content, medium plasticity, high dry strength, contains few and scattered weathered rock fragments and organic material 5 00 m			1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10	215 48

PRO	OJEC	T·	HYDROE	LECTRI	c cc	MP	LEX	OVE	ER THE TOROLA RIVER	CDB	-6A SHEET	2 OF	7
	CATIC		-	ITE, RIGI					PTH OF HOLE 70 00 m	СОММ		2003/1/	
ELE	VAT	ION	mosl (2	219 m)				DEF	PTH OF OVERBURDEN 13.5 m	COMP		2003/2	/3
			E N 305,					-	IGTH OF ROCK DRILLING 56 5 m	DRILLE		E VALLEC	ILLOS
			M HORIZON		909	2		_	TAL LENGTH OF CORE 68 60 m	LOGGE		EREZ	
зEА	ARIN(3 OF	ANGLE H	DLE				COF	RE RECOVERY 98 00%	SUPEF	RVISION BY \	v. Herna	ınaez
									OBSERVATION OF CORE	WATER	TARIF -	√	
		ш	CORE RECOVERY	<u>₩</u>		Į Σ	S	TING		WATER	PRESSURE TE	ST	S
:		VAM	RQD	p &	æ	 デ	NES	5	DESCRIPTION		E OF DRILLING	ິ່ ≢	ELEVATION
į	50	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER		DEPTH	
- - - 11		COLLUVIAL DEPOSIT OR RESIDUAL SOIL RC	0 -> 1009	6 20		5	Ξ.	33	IDEM MATERIAL; CLAYEY SILT (OVERBURDEN); moderate to high water content, medium plasticity, high dry strength, contains few and scattered weathered rock fragments and organic material A few hard fragments are contained		LUGEON	- - - - 11	m
		ş			Ιz				12-12 4m, 10cm long basalt core				
-	[:-]	Q:0			§				12-12 mil, Touristiong basait core			-	
-	<u>[</u>]	E E			HB.	5	5		j			-	
	FE	Ĕ			LIGHT BROWN							-	
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١									Weathered rocks Tuff or lapilli tuff			-	1
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ŀ	$\cdot \cdot \cdot $				돟			t					
ľ	$\langle \cdot $				REDDISH BROWN				From 18 80-24 9m reddish. Contains lapilli tuff fragments (~10cm across)			-	
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							G	ΕO	LOGIC LOG OF DRILL HOLE				
									• •		6A_SHEET		
	ATIC			TE, RIGH	T MA	RGIN	7		TH OF HOLE 70 00 m	COMME		2003/1/2	
	VATI		mosl (2 E N 305,3		70 4	IEO			TH OF OVERBURDEN 13 5 m GTH OF ROCK DRILLING 56 5 m	COMPL DRILLE		2003/2/ SE VALLECI	
			M HORIZON		909				AL LENGTH OF CORE : 68 60 m	LOGGE		PEREZ	LLUS
		_	ANGLE HO						RE RECOVERY 98 00%		VISION BY		ndez
			-						OBSERVATION OF CORE	WATER	TARIF -	\^-	
			CORE	FII		Ö	-	5NI.		1			2
r		ROCK NAME	RECOVERY RQD	្ត្រី	_	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	1	PRESSURE T	EST	ELEVATION
DEPTH	_	X	TIGE	KIND OF CASING	COLOR	ΑŢ	, RD	₹.	BESSIA IION	LEAKAGI WATER	E OF DRILLING	DEPTH	<u> </u>
۵	10G	ROC	0 -> 100%	2 2	ŏ	š	Ħ	COF		0	LUGEON	40	
21 - 22					WN BROWN - LIGHT GRAY	4-5	4-5		IDEM MATERIAL; TUFF; very weak, consist of andestic and basalitic highly weathered clasts up to 2 cm in size in a tuffaceous matrix, poorly cemented, jointing cannot be determinated	1		21 - 22	m
23 24 24 25 25 26		TUFF	C. C. C. C. C. C. C. C. C. C. C. C. C. C		DARK GRAY-BROWN REDDISH BROWN	2	4-5	2				23 - - 24 - - 25 - - 26	195 48
27 27 28 28 29						4-5	4-5	4-5	28.2 m TUFF. 24.9-30.2m greenish grey tuff inside the			- 27 - - 28 - - 29 -	
	$V \sim V$			1	D.G.				core.	I 1		30	190 4

							G	EC	LOGIC LOG OF DRILL HOLE				
PRO	DJEC	т	HYDROEL	ECTRIC	ccc	MP	LEX	OVI	ER THE TOROLA RIVER	CDB	-6A SHEET	4 OF	7
LOC	ATIC	N	DAM SIT	E, RIGH	TMA	RGI	N	DE	PTH OF HOLE 70 00 m	СОММ		2003/1/	
	VATI		mosl (21			. = =		+	PTH OF OVERBURDEN 13 5 m	-		2003/2	· ·
			E N 305,3		_				IGTH OF ROCK DRILLING 56.5 m	DRILLE		VALLEC REZ	ILLOS
_			M HORIZONT		909				FAL LENGTH OF CORE 68 60 m RE RECOVERY 98 00%	LOGGE	RVISION BY W		ndez
BEA	MINU	a Or	ANGLE HOL	LE				001	RE RECOVERY 98 00%	JOURER	TAIDIOIADI AA	. 1101110	IIIGGZ
								L	OBSERVATION OF CORE	1	^ /		
			CORE	BIF		ğ		ΰ		1	TARIF	ŀ	2
_		ROCK NAME	RECOVERY	PO P		WEATHERING	HARDNESS	CORE CUTTING	DECODIPTION	į.	PRESSURE TES	T	ELEVATION
DEPTH		ž	RQD	KIND OF CASING	COLOR	¥	NG.	l D	DESCRIPTION	LEAKAG WATER	E OF DRILLING	БЕРТН	LEV.
=	8	8	0 -> 100%	⊉ છ	8	🖁	¥	6		0	LUGEON	40] "]
					Γ			_	TUFF; greenish grey-yellowish grey				m
_	[: ,	щ.						ا				"	
] -		큐				5.5	4.5	4-5				-	
-					Æ				31 00 m	,		-	
31					DARK GRAY	├				1		31	
-		İ			Ä				LAPILLI TUFF;			-	
_					"	3-4	4	4	31 3-31.7m yellowish, like sheared zone.			-	
_ ا										111		- -	1 1
32									32 00 m			32	1
	, ,			•	₹						11.1	L	
_					8				From 32 00 m to 49.90 m BASALT; AGGLOMERATIC;		0.9 L U		
-	$\cdot \cdot$				DARK BROWN - GRAY				slightly weathered to fresh, massive, moderate strength		at Pe=2.54	-	1
-		ľ		;	õ				to strong, joints are open, rough, with calcile veins,	1 !	Pc=6 54	33	
33	3.5	ŀ			R							~	
-	33				후				mostly dip 0º, 45º and 90º			-	
Ì -			66%								i '	-	
					ر ت]]_]]
34	**						2-3	1-2				34	1 1
	S)				TE/					'.	'4 m]_	
	33				CLED WITH WHITE AND					,	30 Jan 200	3 _	
					王					I , ⊾	lole Depth 36	m	
35	;;,	5			<u>×</u>					1 1		35	185 48
33	: i	MEHATI			[월]					1 1	' : :		
-	1	$\sim \nu$			꽁							-	1 1
-		Ş K	56%		SPE						i '	-	1 1
-	33	Ę			Z	۸,				' '	1	-	
36		BASALT, AGGLO			õ	1-2					+ +	36	
_	;;]	_			표							-	
	$\langle \cdot \rangle$		3294		LIGHT BROWN SPECK		က	3-4					
					Ţ						0.1 L.U.	_	
37	$\langle \cdot \rangle$				TS							37	
"	$ \cdot $				ΑH								
-					Ϋ́							-	
-			71%		§							-]]
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38	31				호	ŀ		ļ				38	
_	31				G	-			•	$ \ \ $		-	
_	; ;[띰		2-3	2	1		5m	-	
			<i> </i>		Θ̈́		ά	.,		3	0 Jan 2003	_	
39	ं				DARK GRAY WITH SOME REDDISH BROWN PARTS	J				1 '	Depth 41 m	39	
~[₹	J							
-					¥							-	
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40	۲.	12			رف	丄						40	180 48

					-		G	EC	LOGIC LOG OF DRILL HOLE			
PRC	JEC	т	HYDROEL	ECTRIC	o co	MP			R THE TOROLA RIVER	CDB-6A SHEET 5	oF	7
LOC			DAM SIT					_	TH OF HOLE 70 00 m		03/1/2	
			- mosl (21						TH OF OVERBURDEN 13 5 m	1	03/2/	
			E N 305,3		_			 	GTH OF ROCK DRILLING 56 5 m	DRILLED BY JOSE VA		LLOS
-			M HORIZONT FANGLE HOI		909				AL LENGTH OF CORE 68 60 m E RECOVERY 98 00%	LOGGED BY L. PER SUPERVISION BY . W H		ndoz
BEA	III	J (I	- ANGLE HOL	LE				COr	E RECOVERY 90 00%	SUPERVISION BY . W F	теппа	naez
									OBSERVATION OF CORE	WATER TARLE		
		ш	CORE RECOVERY	⊞		SNS S	္က	TING		WATER PRESSURE TEST		8
F		NAM	RQD	្ខតិ	<u>٣</u>	뿔	NES	150 TJ	DESCRIPTION	LEAKAGE OF DRILLING	DEPTH	ELEVATION
DEPTH	100	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER		EE
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	æ	0> 100%		\vdash	-	┝	Ö	IDEM MATERIAL; AGGLOMERATIC; slightl	D LUGEON 4	21	m
-	S								weathered to fresh, massive, moderate strength to		-	111
-	; ;		46%						strong, joints are open, rough, with calcite veins, mosti		-	
-	3								dip 0°, 45° and 90°		-	
41											41	
-	3										-	
-			62%								-	
-	, ;										-	
42											42	
-	, ;										-	
_	; ;		32%							158LU	-	
-							ŀ			at Pe=5 55	_	
43	::				RTS					Pe=5 55	43	
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_		AGGLOMERATIC			R						_	
44	$\langle \cdot \rangle$	OME			쟢		Ì				44	
_		GGL			Ü						_	
	3.5				WITH SOME REDDISH BROWN PARTS						L	
_	3	BASALT			ő						_]
45		8			Ŧ					'5 m	45	175 48
										10 Dic 02	L	
	\{\}				Æ	2	2-3	2-3		Hole Depth 46 m		
_	33				DARK GRAY							
46					PA						46	
_											_	
	.									12.3 L.U		
			/// 517							,		
47	3										47	
	, ;											
										,	_	
-	, ',		23%						•		-	
48										'	- 48	
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-	;;										-	
-	; ;		28%			[-	
-	`;;								,		-	
49	;;;	}								4 m	49	
-	` .								40.50	1 Feb. 2003	-	
-	7.5	ᅱ	25%		<u> </u>			 	49 50 m BASALT; fine grained and igneous, massive, moderate	Hole Depth 50 m	-	
-	;;;	SASALI			D. G.	2-3	3	3-4	strength, very close to close jointing, joints are open		-	
50	> >	BA			<u> </u>			┖ݐݐ⅃	rough, contains calcite, chrolite and clay minerals.	<u> </u>	50	170.48

							G	EC	LOGIC LOG OF DRILL HOLE			
PRO	JEC	T	HYDROEL	ECTRIC	c cc	MP	LEX	OVE	R THE TOROLA RIVER		6 OF	
	ATIC		DAM SIT		T MA	RGI	N	 -	TH OF HOLE 70 00 m		03/1/2	
	VAT		mosi (21		70	150			PTH OF OVERBURDEN 13.5 m		003/2/	
		_	E N 305,3		90°			_	GTH OF ROCK DRILLING 56 5 m AL LENGTH OF CORE 68 60 m	DRILLED BY JOSE VA		LLUS
			M HORIZON ANGLE HO		J U*				AL LENGTH OF CORE 68 60 m RE RECOVERY 98 00%	SUPERVISION BY W		ndez
בבת	u mvi	J ()	ATOLL HO									
			0000	E		1 /5		Ø	OBSERVATION OF CORE	WATER TARIF	-	
		Ų	CORE RECOVERY	F BIT		₩	တ္တ	Ž		WATER PRESSURE TEST		ELEVATION
Ŧ		Š	RQD	ōg	HO.	置	Ň	5	DESCRIPTION	LEAKAGE OF DRILLING	DEPTH	×
DEPTH	-00	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER AUGEON 4	│ [□]	==
	7,7	Ě	0 -> 100%		\vdash	ŕ	 - -	قا	IDEM MATERIAL; BASALT; fine grained and igneous,		-	m
-	> > > >								massive, moderate strength, very close to close jointing,	8.6 L U	-	'''
-	;\;\								joints are open, rough, contains calcite, chrolite and clay		-	
-									minerals	at Pe=6.4	-	
51										Pc=6 4	51	
_	;;										-	
_	[;;]										-	
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52	; .:										52	1
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53					1					5 m	53	1
_	> >									1 Feb. 2003	-	1
_										Hole Depth 55 m	-	
_	;;;										J-]
54	[;;]										54	
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_	; ;,										_	1
-	<u>;;</u>	ارًا										
- 86	$\langle \cdot \rangle$	BASALT			Α	2-3		3-4			55	165 48
55					K GRAY	2	3	["]	55 4-56 4m clinker like, brittle		Ĺ	
-					DARK				CO . OO IIII OMINGI MING			
-	> > > >									6.0 L U.	_	
- 56										at Pe= 2.3	56	
	; :						4			Pc=6.25		
-											Γ	
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57	; ;										57	
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_	$\langle \cdot \rangle$		65%				İ		1		-	
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58	::\			ļ							58	
[;;									5 m	_	
_	;;									2 Feb. 2003	L	
-	;;					l			58 7-59 1m, purplish, clinker like	Hole Depth 60 m	[
	::										- 50	
59	;;	ė	<u> </u>			:	ŀ				59	
[;:,		<u> </u>								-	
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- 1	$\langle \cdot \rangle$	E		ĺ		ĺ		ĺ			60	160 48

				<u>-</u>			G	ΕO	LOGIC LOG OF DRILL HOLE			
PRC	JEC	т	HYDROEL	ECTRIC	co	MPI			ER THE TOROLA RIVER	CDB-6A SHEET 7	OF	,
LOC			DAM SIT						PTH OF HOLE 70 00 m		3/1/2	
ELE			mosl (21					-	PTH OF OVERBURDEN 13.5 m		03/2/3	
COC	PDI	TAN	E N 305,3	20- E 5				LEN	IGTH OF ROCK DRILLING 56 5 m	DRILLED BY JOSE VA		LOS
ANG	LE	RO	M HORIZONT	ΓAĹ	90º			TOT	AL LENGTH OF CORE 68 60 m	LOGGED BY L. PERI		
BEA	RIN	G OI	ANGLE HOL	LE				COF	RE RECOVERY 98 00%	SUPERVISION BY . W. H	lernar	ndez
	<u> </u>								OBSERVATION OF CORE	WATER TARIE		
			CORE	ВІТ		ρÑ		ING				ᇫ
₋		ROCK NAME	RECOVERY RQD	ភ្គ	۳.	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	Ŧ	ELEVATION
оертн		X	NQU	KIND OF	COLOR	ļģ		Ę.	DESCRIPTION	LEAKAGE OF DRILLING WATER	DEPTH	Fe
<u> </u>	201	30	0 -> 100%	\$ \$	ರ	3	¥	COF		0 LUGEON 40		
_					_				IDEM MATERIAL; BASALT; fine grained and igneous,		-	m
_	 ;;;	ALT			ĕ	23	ю	က	massive, moderate strength, very close to close jointing, joints are open, rough, contains calcite, chrolite and clay		_	
{	[, -;	BASALT	24%		×				minerals	at Pe= 6.16		
61	! ::	[-			DARK GRAY				61 00 m	Pc=6.16	61	
"	<u> </u>				1	Н		\vdash	TUFF; fine grained, weak, moderate cemented, very		ا ا	
-		1							close jointing, joints content abundant manganese and		-	
	:				1				calcite stains		-	
]				Banded at 25° upper portion is finer and reddish		<u> </u> _	
62	\cdots				ļ						62	
					z							
		판			REDDISH BROWN	2-3	3-4	2				
-		F			8	Ö	မှ	4-5			-	
-					돐						_	1
63					ğ				63 0 m		63	
	, ‹,				끭					3 Feb 2003	L	
"	! ::									Hole Depth 65 m		
-	 ;;										_	
-								-			-	
64	\ \?		7777					L			64	
]	 								BASALT; AGGLOMERATIC; moderate strength to		_	
	, ,					2-3	2-3	2-3	strong, massive, consists of andesitic and basaltic clasts up to 10 cm in length, joints are open, rough and dip 0°,		_	
	l:?		54%			1	''		30° and 90°			
	> >				_						- 65	155 48
65	; ;				NW0	Н					55	133 46
-	 }				Įξ	2.3	3-4	3-4			-	
_			55%		ᇎ		· ·				-	
_	,;;		38%		Ιğ					4 1 L.U.		
66	 ;;				띺					at Pe=2 46	66	
	Į\\;	ပ္			DARK GRAY - REDDISH BR]				Pc=6 43		
-	· .>	₩	g		Į¥́						Γ	
-	 ;;	BASALT, AGGLOMERATIC	10%		X]	~	
-	ļ.;	G.	8		Ι¥	_					-	
67	1:	Ą				2-3	2-3	2-3			67	
_	ļ. ',	Ą.									<u> </u>	
	 ';';	3AS								' ' ; '	L	
-		-	52%								<u> </u>	
-	.;÷					[-	
68	[`<;	1									68	
-	} <i>\</i> ?	i							68 30 m	5 m	 -	
_	Ĭ,					П				3 Feb 2003	_	
_	ļ.;;		31%							Hole Depth 70 m	L	
	[`·;				_				BASALT; massive, medium grained and igneous, close		- 69	
69	[: :>	_			A A	က	6	2-3	jointing, joints are open, rough, and contains chrolite,			
-	ļ.;.	SAL			Ω	2-3	2-3	4	calcite, iron oxides and manganese, dip 0°, 45° and 90°		-	
-	[·<;	A A	///		DARK GRAY						-	ļ
_	: :			ĺ	۵]					_	
70	ļ.;;								70.00 m END OF BORING		70	150 48
70	٠.	1	V////	I	ــــــــــــــــــــــــــــــــــــــ	1	_	1	I	 		

		EP	DC			·			swissbering			С	EL	
PRO	OJE	ст ·	HYDROR	ELECT	RIC (COM			LOGIC LOG OF DRILL HOLE VER THE TOROLA RIVER	C	DB-7	SHEET	1 OF	5
LOC			POWER		SITE			-	PTH OF HOLE 50 00 m	-	MECED			1/12/11
-		TION	· · · · · · · · · · · · · · · · · · ·	5 M 221 m		69 65			PTH OF OVERBURDEN 7 87 m NGTH OF ROCK DRILLING 42 13 m	4	IPLETED	91		1/12/13 ORING
			M HORIZOI		90º)		TAL LENGTH OF CORE		GED BY			Perez
 			F ANGLE H					_	RE RECOVERY ·	SUP	ERVISION	BY Walte		
-	Ţ	1	<u></u>	,				1	OBSERVATION OF CORE			_^^_	I	
	 		Core			ľ		g			FR TARI F			
	ROCK NAME		Recovery and	KIND OF BIT CASING		WEATHERING	SS	CORE CUTTING	DECORPORTION.		'ER PRESS' (AGE OF DRIL		_	ELEVATION
DEPTH	Ş	g	RQD	P S	COLOR	I E	HARDNESS	[::	DESCRIPTION	WAT		LING	DEPTH	👸
8	본	109	0	ASI N	8	ΜĒ	₹	l g		o	LUGEON	/ALUE 40		<u> </u>
	\vdash	> .				T		 					_	m
- 1 1 - 2 - 3 - 3 - 5 - 7 - 8 8 - 8	HIGHLY WEATHERED ROCK			ROD	Dark Brown	ly.	ر. د	S	Residual soil, highly weathered rock, low water content, moderate plasticity, moderate dry strenght, consists of sithy clay, contains weathered rock fragments up to 10 00 cm in size 7 95 m Basalt, fresh to moderate weathered, with voids				- 1 - 2 3 4 5 6 7 8 8	179 06
9_	BASALT		18 %		Light Gray	3 to 4	3 to 4	3 pu	joints are planar, rough and contains clay minerals and iron oxides, joints dips 40° to 60° some joints are subhorizontal				- - _9 -	
10		,; <u>,</u>				L							_10	174 06

The recovery value will only be shown if it is below 100%

EPDC						swissboring		ΞL
PROJECT HYDRO	DRELECT	RIC C	ОМ			LOGIC LOG OF DRILL HOLE VER THE TOROLA RIVER	CDB-7 SHEET	2 OF 5
	R HOUSE	SITE			DE	PTH OF HOLE: 50 00 m	COMMECED ·	2001/12/11
	.06 m				+	PTH OF OVERBURDEN 7 87 m	COMPLETED .	2001/12/13
	305 221 m	E 56	9 65	1 m		GTH OF ROCK DRILLING 42 13 m		VISSBORING
ANGLE FROM HORIZ BEARING OF ANGLE		90-				ALLENGTH OF CORERE RECOVERY	SUPERVISION BY · Walter	L Perez Hernandez
					<u> </u>	OBSERVATION OF CORE		
DEPTH ROCK NAME LOG BEOOK NAME COLOG BEO	CASING	COLOR	WEATHERING	HARDNESS	CORE	DESCRIPTION	WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LUGEON VALUE 40	DEPTH
11_			2	2 to 3	2 to 3	Same as 7 95 to 11 00 m		_ m - 11_
12			1 to 2		4			12_
13					3 3 to	Basalt joints are planar, rough and contain clay minerals and iron oxides, slightly to highly water content	24.3 L.U	- 13_ -
14_			2 to 3		2 to	joints dip 40° to 60°, some joints are subhorizontal		- 14_ -
- 46 % - 15 18 B R S H T - 29		Light Gray			1 to 2		10 25 dic 12 Hole depth 15 00 m	_ 15_ 169 06
- AB 3 3 % 16 16 16 16 16 16 16 16 16 16 16 16 16		Ligh	3	1 to 2	3 to 4			 16 -
17. 55 64%							13 2 L.U	17_
18_			1 to 2		1 to 2			- - 18_
19_								- - - 19_
20				2			9 75 dic 12 Hole depth 20 00 m	- - 20_ 164 06

	J	ΕP	DC				_			swissboring	(DEL	
1								G	EC	LOGIC LOG OF DRILL HOLE			
PRO	OJE	СТ	HYDR	ORE	LECT	TRIC	CON	#PLE	EX O	VER THE TOROLA RIVER	CDB-7 SHEET	3 OF	5
-		ION ·			OUSE	SITE			+	PTH OF HOLE 50 00 m	COMMECED	2001	1/12/11
_	_	TION		1 06						PTH OF OVERBURDEN 7 87 m	COMPLETED		1/12/13
-		INAT	MHOR		221 m			51 m	_	NGTH OF ROCK DRILLING 42 13 m TAL LENGTH OF CORE	DRILLED BY LOGGED BY	SWISSBO	Perez
			FANGL						4	RE RECOVERY	SUPERVISION BY Wal		
l	1		Cor	e	<u> </u>		T	_		OBSERVATION OF CORE	WATER TARIE	_	
	ROCK NAME		Recov	•	BIT		WEATHERING	ပ္တ			WATER PRESSURE TEST		ELEVATION
DEPTH	\rangle S	/5	and RQI		KIND OF CASING	뜅	뿔	HARDNESS	9	DESCRIPTION	LEAKAGE OF DRILLING	ОЕРТН	EVA1
B	Ê	100			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	COLOR	ă	₩¥	CORE		WATER		ELE
\vdash	┢	2,2	0	100%		-	Ŧ	╀	00		LUGEON VALUE	40	m
-		[;;;	75 %							Same as 11 00 to 28 20 m			
_						Į						_	
21_	-		П				Ì	-				21_	
-	ł	, ,			1				ľ			-	1
_		, ,	44 %									-	
22_		[; ;				İ						22_	
		; ·;											
-	1						to 2	3 to 4	2 to 3			-	- 1
-	1	, ,	24 %				-	60	21		1910	-	
23_	1					}						23	
_		; ;											
[_]	[ß	[[][]					ĺ				_[
-						<u>8</u>	·l					-	
24_						Light Gray	•					24_	ļ
-			20%] 3	ď				10 25 dic 12		
		``				1					Hole depth 25 00 m		
25_	S A	;`;	_[25_	159 06
-	BA BA	; ;]										-	
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-	Ī					3ddis	-			clay minerals, joints dip 90°	1105 1:-10	-	
-	Ē					๕				29 6	11 05 dic 12 5 Hole depth 30 00 m	-	
30_	Ī	:					\vdash	\dashv	一十		Thole depth 30 00 m	30 1	154 06

swissboring **EPDC** CEL **GEOLOGIC LOG OF DRILL HOLE** PROJECT · HYDRORELECTRIC COMPLEX OVER THE TOROLA RIVER CDB-7 SHEET 4 OF LOCATION · POWER HOUSE SITE DEPTH OF HOLE 50 00 m COMMECED: 2001/12/11 184.06 m ELEVATION DEPTH OF OVERBURDEN COMPLETED 2001/12/13 7 87 m COORDINATE · N 305 221 m LENGTH OF ROCK DRILLING DRILLED BY SWISSBORING 42 13 m E 569 651 m ANGLE FROM HORIZONTAL LOGGED BY L. Perez TOTAL LENGTH OF CORE · BEARING OF ANGLE HOLE SUPERVISION BY Walter Hernandez CORE RECOVERY · OBSERVATION OF CORE WATER TARIE -VV-Core WEATHERING 믊 ROCK NAME ELEVATION Recovery HARDNESS WATER PRESSURE TEST KIND OF CASING and DEPTH COLOR CORE DESCRIPTION LEAKAGE OF DRILLING LOG RQD 100% m Same from 29 65 to 36 10 m 39 Basalt, massive, hard with voids, up to 0 03m in size, fractures are close, rough, with iron oxide, and some 31 31_ contains clya minerals 32 ო Reddish Brown 168 LU 33 N Dark 34 4 to 31 25 dic 13 Hole depth 35 00 m 35 149 06 35_ BASAL 6 36 36 ıО 36 10 m 31 % 37 37 15 9 LU 88% Medium Gray Basalt; massive, hard, joints are planar, rough and 38_ 38 က contains manganese oxides and clay minerals joints dip 0°, 20° and 30° 39 39 100 % 28 45 dic 13 Hole depth 40 00 m

<u> </u>		EP	DC						swissboring				 EL	
							G	E	DLOGIC LOG OF DRILL HOLE					
PRO	OJE	CT_	HYDRORE	ELECT	TRIC	COM	IPL I	ξX C	OVER THE TOROLA RIVER		CDB-7	HEET	5 OF	5
	<u> </u>	ON.			SITE				PTH OF HOLE 50 00 m	_	COMMECED			/12/11
		ION	. 184.06 E · N 305.				F4	+-	EPTH OF OVERBURDEN 7 87 m	4	COMPLETED ·			/12/13
			M HORIZON		909		51 m	 	NGTH OF ROCK DRILLING 42 13 m OTAL LENGTH OF CORE	{	LOGGED BY :	SV	VISSBO	Perez
_			ANGLE HO			_			DRE RECOVERY	_	SUPERVISION BY	/ Walter		
<u> </u>	Ţ	Γ		Τ-				<u></u>	OBSERVATION OF CORE	+				
	١		Core		Ī	/5	T	T _o		٦	WATER TARIE -	/	ĺĺ	
	ROCK NAME		Recovery	<u> </u>	{	WEATHERING	SS	CORE CUTTING		ĺ	WATER PRESSURE	TEST		ELEVATION
DEPTH	송		and RQD	မြီး	, g	置		₹	DESCRIPTION	-	LEAKAGE OF DRILLING	3	рертн	ξ¥.
=	&	106	0 ->100%	KIND OF I	COLOŘ	N. W.	HARDNESS	8		I,			, ,	E
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46_	ĺ				Reddish Grayw/ Black and White			ĺ		7			46_	- 1
-{	' [;	iii		}					-	1		-	
-	•	3	82 %		irayw/ E White	3 to 4	2 to 3	20	Basalt, massive, moderately strength, joints are open, rough, contains oxides, joints dip 0° to 30°]]]	-}	j
47_	Į	3	32 %		B ≥	3.5	2 t	-	Todgii, contains oxides, joints dip o to so				47	
"-	ŀ	::			dish		,						~"-}	
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48_	ļ	, <u>*</u> }	53 %	l					Basalt joints are planar, rough and contain clay	ا			48_	
-	ļ	$\langle \cdot \rangle$	1)	Ì					minerals, joints dip 40°, 50° and subhorizontally,				-	Į
-		· ;, -	╼╥┽╎╿╿╽		ìray				from 49 00 m to 50 00 m basaft is vesicular				-[
- 49_	[3		1	Dark Gray	7	္က	က			1		- 49_	- 1
]			34	ľ	ا ۵		2 to3				} }			
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50	!:	<u>```</u>							End of Boring	1_			50_ 1	34 06

							G	EC	LOGIC LOG OF DRILL HOLE			
PRO									ER THE TOROLA RIVER		1 OF	5
LOC				E, RIGH		RGI	<u> </u>	-	PTH OF HOLE 50 00 m		02/12	
ELE			mosl (20 E N 305,			901			PTH OF OVERBURDEN 1 00 m NGTH OF ROCK DRILLING 49 00 m		02/12/	
			M HORIZON		909			-	NGTH OF ROCK DRILLING 49 00 m TAL LENGTH OF CORE 37 00 m	DRILLED BY E HERRERA LOGGED BY L PEF		HA.
			ANGLE HO				_		RE RECOVERY 74 00%	SUPERVISION BY W		Z
├		Г		ī				<u> </u>	OBSERVATION OF CORE		-	
	, ,	AME	CORE	Ħ		5 NG	တ္တ	SNIF F	OBSERVATION OF CORE	WATER PRESSURE TEST		NO.
рертн	LOG	ROCK NAME	RQD 0 → 100%	KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	LEAKAGE OF DRILLING WATER 111GFON	DEPTH	ELEVATION
1_	1101011111	COLLUVIAL D	100%		DARK BROWN			0	CLAYEY SILT (COLLUVIAL DEPOSIT); moderate water content, low plasticity, high dry strength, contains few and scattered weathered rock fragments up to 3cm in length 1.00 m BASALT; highly weathered, core is like soil with rock fragments		- - - - -1	m
2_ 2_ - - 3_					REDDISH BROWN	5	5	S	rragments		- - 2 - - - - 3	
4		BASALT	40 35 40 40		LIGHT GRAY TO DARK GRAY	3-4	3.4	4-5	BASALT; massive,weathered, weak, fine grained and igneous, jointings cannot be determinated Several weathered materials was not recovered		- 4 5 6 7	199 33
- 8_ - - 9_			30			2-3	2-3	3-4	7 70 m From 7.70 m to 9.20 m; very close jointing, joints are open, rough, contains clay minerals and iron oxides		_ _ _ _ _ _ _ _ _	
- - 10	* * * * * * * * * * * * * * * * * * *		19 75	į		2	2	2	9 20 m From 9.20 m to 11.00 m; close jointing, joints are open, rough, contains clay minerals and iron oxides and dip 0°, 60° and 90°		- - - _10	194 33

						-	G	EC	LOGIC LOG OF DRILL HOLE				
PRO	JEC	<u> </u>	HYDROE	LECTRIC	c cc	ЭМР			ER THE TOROLA RIVER	CDB-8	SHEET	2 OF	Ę
LOC	ATIO		DAM SI	TE, RIGH	T MA				PTH OF HOLE: 50 00 m	COMMECE		002/12	
ELE				04.33 n				,	PTH OF OVERBURDEN: 1 00 m	COMPLETE		02/12	
	_		E N 305				2	, 	NGTH OF ROCK DRILLING 49 00 m		Y HERRERA		Α
			A HORIZON		909	2			TAL LENGTH OF CORE 37 00 m	LOGGED B		REZ	
BEA	RIN	G OF	ANGLE HO	DLE				CO	RE RECOVERY 74 00%	SUPERVIS	ION BY		
									OBSERVATION OF CORE	WATER TAR	# -\\	_	T
		₩.	CORE RECOVERY	BIT		2	, s	18			SSURE TEST		l 8
Ξ		\$	RQD	ဝ္ပ်	ی ا	Ή	SE SE	5	DESCRIPTION			₹	₹
DEPTH	100	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		LEAKAGE OF WATER	PULLING	DEPTH	ELEVATION
		֡֡֡֡֡֞֞֞֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡	0 -> 100%	X Q	ļ°	₹	ĮΞ̈́			o Lu	GEON	40	<u> </u>
-			14				2	5-3	IDEM MATERIAL; BASALT; weak to moderate strength, massive, fine grained and igneous, very close to close jointing, fractures are open, rough and exhibit clay minerals and iron oxides	1 1 1		- - - 11	m
-							2.3	3-4				-	
_						2-3] 				-	
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	,												
13) 							13	
-	, ,										1 1 1	<u> </u> -	1
-	3,3	- [12		 				13 60 m BASALT; strong, massive, fresh,			-	
14									DAOALI, SHUNG, IIIGSIVE, HESH,			14	
		T							From 13.60 m to 15.70 m; close to moderate close jointing, joints are close, rough with iron oxides and dip 0°, 30°, and 45°			_	
-		BASAL'					ان.	2				-	
15					GRAY		1-2	1-2				15	189 33
-			60		Y			l			17 2 L.U.	-	
16:					LIGHT GRAY TO DAR		-	-	15.70 m From 15.70 m to 17.50 m; very close to close jointing.			- 16	
, ,		Ħ			GRA				fractures are open, rough, exhibit iron oxides and dip 20°,45°, and 60°.].]
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17	; ;					-				-		17]
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-[29]	J	}	-	-	From17.50 m to 21.40 m; close to moderate jointing.	+		-	
18	*								joints are open, rough, contains clay minerals and dip 0° and 30°	' [18	
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PRO			HYDROEL	ECTRIC	cc	MP	LEX	OVI	ER THE TOROLA RIVER	CDB-8 si		OF	5
roc		_	DAM SIT		_	RGI	N	+	PTH OF HOLE : 50 00 m	COMMECED		2/12/	
			mosl (20 E N 305,0			801			PTH OF OVERBURDEN 1 00 m IGTH OF ROCK DRILLING 49 00 m	COMPLETED		2/12/ ⁻	- 1
$\overline{}$			M HORIZONT		909	_		1	TAL LENGTH OF CORE 37 00 m	DRILLED BY HI	L PERE		
			ANGLE HOL					-	RE RECOVERY 74 00%	SUPERVISION		 -	
	_				_								}
									OBSERVATION OF CORE	WATER TARIE	-^^~		
		ME	CORE RECOVERY	BIT		WEATHERING	S	CORE CUTTING		WATER PRESSL	•	ļ	Z
Ξ		Ž	BUD	Q. GG	Œ	뿔	SÄ	5	DESCRIPTION	LEAKAGE OF DRIL		₽	Į¥
рертн	LOG	ROCK NAME		KIND OF CASING	COLOR	3	HARDNESS	RE (WATER	UNG	ОЕРТН	ELEVATION
	,	1	0 → 100%	70	0	3	主	8		• LUGEO	ON 40		
	2.5					l		İ	IDEM MATERIAL; BASALT; massive, fresh, moderate		Hole	_	m
_			76		 	}	각	1-2	strength to strong, very close to close jointing, fractures		Depth	 -	1
<u> </u>	, ,								are open, rough, contains clay minerals		21.0 m	_	
21) }								i		1	21	
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i -i	. ;;				Ĭ	Ì			23 40 m		1	-	}
-	> >		60		┢	1			BASALT, with voids, fine to medium grained and			- i	
\	```	į				1			igneous, weak to moderate strength, very close jointing,		5m	-	
24	` `				¥		2-3	3.4	joints are open, rough, contains clay minerals and iron oxides and dip 30°, 45° and 90°		5 Dic.	24	
_	; ;				REDDISH GRAY	į			United and tip 60 , 45 and 36		2002		
	, ,		[]]]]]]]]]]		180			l :			Hole		
[~	` `;					i		ĺ			Depth	<u>-</u>	
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25									25 00 m		25 00 m	25	179 33
-	٠. ا								TUFF; fine grained, weak, weathered poorly cemented, with few and scattered andesite fragments		\downarrow \downarrow \downarrow	-	
-		ĺ	1115%			ĺ			with few and scattered andesite fragments				
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28	\cdots				DARK GRAY							28	ĺ
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[; ;								DACALT, Sing proposed and appears week to recolority		\ \ \ \	_	1
	; :\	BASALT				2-3	3-4	4.5	BASALT; fine grained and igneous, weak to moderate strength, with voids up to 1cm in size			_	
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	-						G	E	LOGIC LOG OF DRILL HOLE			
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_	ATIO		DAM SIT			ARGI	N	-	PTH OF HOLE 50 00 m		2002/12	
	VAT		mosi (20 E . N 305,			200		+	PTH OF OVERBURDEN 1 00 m		002/12	
_			M HORIZON		90		<u> </u>	_	NGTH OF ROCK DRILLING 49 00 m TAL LENGTH OF CORE 37.00 m	DRILLED BY HERRER, LOGGED BY L. PE		Α
			ANGLE HO		_90				TAL LENGTH OF CORE 37.00 m RE RECOVERY 74.00%	SUPERVISION BY		
						_	_					
						7-			OBSERVATION OF CORE	WATER TARIE	$\overline{}$	
		₩.	CORE RECOVERY	BIT		S S	S	CORE CUTTING		WATER PRESSURE TEST		Š
Ε		Ž	RQD	ក្ខភិ	۳ ا	量	RES	[5	DESCRIPTION	LEAKAGE OF DRILLING		ELEVATION
DEPTH	LOG	ROCK NAME	. 1	KIND OF CASING	COLOR	WEATHERING	HARDNESS	H H		WATER	рертн	1 2
			0 - 100%	¥ 0	۲	5	Ξ.	8	<u> </u>	O LUGEON	40	
31 - 32 - 33 33 34			50 50 18 26 26		DISH GRAY	e	3-4	4-5	BASALT; massive, moderate strength, fine grained and igneous, with voids up to 1cm in size, some voids are		- 31 - 32 - 33 - 33	m
-)		DARK GRAY AND REDDISH GRAY			3			- - -	
35	`.`	BASALI			2				35 00 m		35	169 33
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								LOGIC LOG OF DRILL HOLE	000	_			
								R THE TOROLA RIVER		8 SHEE			5
OCATI	_	DAM SITI mosl (20			HĢII	<u>\</u>		TH OF HOLE 50 00 m TH OF OVERBURDEN 1 00 m	COMPLE		2002		
		TE N 305,3			,802	2		GTH OF ROCK DRILLING 49 00 m	DRILLED				
NGLE	FRC	M HORIZONT	AL.	90⁰	!		TOT	AL LENGTH OF CORE 37 00 m	LOGGED		PERE:	Z	
BEARIN	GO	F ANGLE HOL	E				COF	RE RECOVERY , 74.00%	SUPERVI	SION BY			
	Τ	T						OBSERVATION OF CORE	WATER T	ARIE -	_\		
	Ш	CORE RECOVERY	ВП		NG	'n	NG.				1		≥
=	N N	RQD	០០	Œ	Ή	VES	틹	DESCRIPTION		RESSURE 1 OF DRILLING	ESI	Ŧ	ELEVATION
DEPTH LOG	ROCK NAME		KIND OF CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER	P DRILLING		DEPTH	[E
,,	Ë	0 100%		-	3	<u> </u>	8	BASALT; AGGLOMERATIC; weak, massive, fine		UGEON	40		
-{;};					ر ا	4	,	grained and igneous, with voids under 1cm diameter,				-	m
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-{;;;				GRAY						1 1	\	-	}
41[::				٣_				41 00 m			4	11	
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- [;;					İ			The contact at 45 70 m is gradual					
-{\;`;	1			ļ]			45 70 m	{	.			
	L]		L]	TUFF; fine grained, moderate strength, strongly				-	ĺ
6		<u> </u>	•	} _				cemented Sandy in upper portion and silty in lower portion				16	
	1			BROWN	~	4	2-3	•					l
7:::	٦,]		-"	46 60 m				•	
	1	1 33		m		\vdash						•	}
- ;;; 7 ;;;								BASALT; AGGLOMERATIC; massive, strong, fine				7	
ļ. S	1					_	1-2	grained and igneous, contains some layers of fine aggregates with andesitic clasts up to 2cm in length,					}
╎⊹							-	close to moderate close jointing, joints are open, rough,				•	
- , ;	1			}			}	contains clay minerals and dip 0º, 30º, 45º and 90º, No iron oxides				•	
;;								TOTI OXIGES	[18	
B[.;												~	
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200		_' '	DC					_		swissbering				C	EL	
								•	_	LOGIC LOG OF DRILL HOLE		CGB	4 0			_ 4
LOC	_		BORROW	_		HIC C	OM	PLE		VER THE TOROLA RIVER PTH OF HOLE 10 00 m	7	OMMEC		HEET	2001	<u>/12/16</u>
	_	TON	148 3						_	PTH OF SAND WITH GRAVEL. 2 20 m	_	OMPLET				/12/16
		TANI				E :	570	590	_	IGTH OF ROCK DRILLING 780 m	⊣ `	RILLED		S		BORING
ANG	LE!	FRO	M HORIZO	NTA	AL.	90⁰			-	FAL LENGTH OF CORE 10 0 m	L	OGGED	BY		L.	Perez
BEA	RIN	G O	ANGLE H	HOLE	E				co	RE RECOVERY	SUPERVISION BY			Walte	er Hern	andez
		Π	<u> </u>	I					! 	OBSERVATION OF CORE	٠,,	VATER TA	P1 F	^^-		
	#		Core Recover		18		Ş		NG					•		3
<u> </u>	ROCK NAME		and	, 5	KIND OF CASING	ا	WEATHERING	HARDNESS	[<u>E</u>	DESCRIPTION	1	VATER PF EAKAGE O			1 =	ELEVATION
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_]						Light brown with white	ĺ			Sand from 0 00 to 0 70 m consists of sand quartz		1 1		1	 -	
-	SAND	: .					1	[medium to coarse grained, from 0 70 to 1 50 m sand	İ	1 1	11		-	
1_	တ်			-	- 1	Brown				is fine to medium grained, with traces of gravel up			1 1		_1	
-						Bro		'		to 0 03m in size					-	
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<u>-</u>	¥			Ц	c5					Gravel and sand consists of volcanine gravel ranging in size from 7 cm to 20 cm, sand is fine grained, contains	ļ	1 1			_	
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		:			ĺ	퓵		ĺ		Tuff, dark gray, fresh to slightly weathered, moderate strenght, massive, water laid, joints are plannar, close	1				<u>-</u>	
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PRO	OJE	CT ·	ŀ	ΙYD	ROF	RE	LECT	RIC C	юм	_	_	LOGIC LOG OF DRILL HOLE VER THE TOROLA RIVER		CGB-	2 SHE		1 OF	
LOC	AT	ION	· B				REA				DEF	PTH OF HOLE: 10 00 m		OMMECE			2001/	
_	_	TION			<u>48.9</u>	_						TH OF OVERBURDEN 0 60 m		OMPLET.			2001/	
	_	ANIC		_			415 m TAL :	90º	70.71	8 m		<u>IGTH OF ROCK DRILLING 10 0 m</u> (AL LENGTH OF CORE · 10 0 m	-	RILLED E OGGED E		<u> </u>	WISSB I	OHING Perez
_	_		_	_	SLEF	_		90-				FAL LENGTH OF CORE · 10 0 m	_		ION BY	Walte		
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	ROCK NAME		'		over ind	У	BIT	ĺ	WEATHERING	SS	CORE CUTTING	DESCRIPTION	'	TAILMIN	LOOGIL		l _	ELEVATION
DEPTH	18	(5			QD		KIND OF CASING	COLOR	胃	HARDNESS	딍	J. J. J. J. J. J. J. J. J. J. J. J. J. J		.EAKAGE OF VATER	DAILTING		DEPTH	¥
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	€	_ : *	7		100	%	- _C	-	-	┝	٥	Sand and gravel;up to 0.03m in size, sand is medium	╬	LUGE	ON VALUE	- 4	╫-	m
_	Sand with	Grave	1			Щ		Light Brown	[(coarse grained	-	1	1	-		
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		12				Ш	>	Medium Gray				Gravel and sand, consists of volcanic blocks,					j-	
-	- 8	$\dot{\tilde{\gamma}}$					ź				ł	subrounded to rounded, ranging in size from 0 05m to 0 50m in lenght, sand is medium grained, loose	1		1 1		2	
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The recovery value will only be shown if it is below 100%.

	E	ΕΡΙ	DC						swissboring				CEL				
						-				LOGIC LOG OF DRI	LL HOLE		^~-	^			
						RIC C	OM	PLE		VER THE TOROLA RIVER			CGB.			1 OF	
ELE	_		BORI	146					,	PTH OF HOLE · PTH OF OVERBURDEN ·	10 00 m 1 70 m		IMECEI IPLETE		2001/12/17 2001/12/17		
			E · N			Σ: 57	0.8	46 n		IGTH OF BOCK DRILLING	0 00 m	DRILLED BY SWISSBORII					
					ITAL					TAL LENGTH OF CORE	1 70 m	LOG	GED B	Υ·			
BEA	RIN	G OF	ANG	LE HO	DLE .				co	RE RECOVERY	90%	SUPERVISION BY			· Walte	r Herna	ndez
										OBSERVATION OF CORE		WATI	FR TAR	IF —	^		
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1_	ROCK NAME	ĺ		overy nd	<u> </u>	l _	WEATHERING	SSS	Ę	DESCRIPTION		1	ER PRE				ELEVATION
DEPTH	ğ	501		QD	P S	COLOR	AH.	HARDNESS	[전	DESCRIPTION		LEAK WATE	age of i	DRILLING	S	ОЕРТН	Ē
1 2	ĭ	의	o 🚽	► 100%	KIND OF BIT CASING	8	₹	₹	CORE CUTTING			0	LUGEO	N VALL	JE 40		<u>ы</u>
-	ЯIT	ά Ω				Light Brown				Sand, fine to medium grained, contain subrounded, up to 0 02 m diameter	ns gravel,					_	m
 1_	ALLUVIAL DEPOSIT	غين صدة				Light Gray				Rock Block, fresh to slightly weathere size	ed up to 0 20 m in]				- - _1	'
-	ALLUV	6.60				Light				Sand and gravel block up to0 05m in the material consist of Aglomeratic Tu						- -	
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The recovery value will only be shown if it is below 100%.

			(EC	LOGIC LOG OF DRILL HOLE						
PROJECT · HYDROELE	CTRIC C	СОМ				HOLE No CGB-4	SHEET	1 <u>OF</u> 1			
LOCATION BORROW	AREA, RI	GHT	SIDE	_	PTH OF HOLE 10 m		/12/18				
ELEVATION :				~	PTH OF OVERBURDEN 6.50 m		/12/18				
COORDINATE: N-304 317		E.571	.067 m	$\overline{}$	NGTH OF ROCK DRILLING 3.50 m		VERA				
ANGLE FROM HORIZONTA BEARING OF ANGLE HOLI		30×		$\overline{}$	TAL LENGTH OF CORE 4.70 m RE RECOVERY . 47 %	LOGGED BY R ALV		ID 6-7			
DEARING OF ANGLE HOLD	<u>-</u>			700	THE RECOVERT 1.47 %	SUPERVISION BY W. HERNANDEZ					
	F	-	/B		OBSERVATION OF CORE	WATER TARIE	_	•			
NOCK NAME CORE	TIM :		ξ χ			WATER PRESSURE TEST	}	<u>S</u>			
F RECOVERY	Ög	<u>ا ڄ</u>	F K	\ <u>\alpha</u>	DESCRIPTION	LEAKAGE OF DRILLING	Ĭ	¥			
HECOVERY NOW RECOVERY	KIND OF CASING	COLOR	WEATHERING	CORE		WATER	DEPTH	ELEVATION			
0 → 100%		+	~ -	<u> </u>		0 LUGEON	40	├—			
Q O O O O O O O O O O O O O O O O O O O	Drilled with NQ wire line system double tube core barrel with diamond bit and water	GRAY	4-5		GRAVEL AND SAND; consists of subangular basaltic and andesitic fragments up to 40 cm in length, fine material was not recovered			m			
45%	WIFE	+	\perp	-	6.50 m		-				
7_ - - - 8_		GREENISH GRAY	4-5	5	LITHIC TUFF; consists of fine grained tuff, water laid, indeterminate bedding, tuffaceous debris, highly weathered to clay minerals		- 7 - - 8				
9_ - - - - - - - - - - - - - - - - - - -		GREE			From 8.30 m to 10 00 material was not recovered 10.00 m END OF BORING		- - -9 - -				

									LOGIC LOG OF DRILL HOLE			
PRC								_	ER THE TOROLA RIVER	HOLE No CGB- 5		1 OF 1
LOC		_		AREA,	RIGH	IT SI	DE		PTH OF HOLE 10.00 m PTH OF OVERBURDEN 1 00 m		03/12/16 03/12/16	
_			ΓΕ · N· 304.1	83 m	F·5	71.20	00 m	+	GTH OF ROCK DRILLING . 9 00 m		RIVERA	
			M HORIZON		909				TAL LENGTH OF CORE: 65 m		VARADO	
			F ANGLE HO					+	RE RECOVERY 65 %	SUPERVISION BY . W	HERNAN	IDEZ
—	<u> </u>	Т		ı——-	—	_		L	OBSERVATION OF CORE			r^-
		<u> </u>	CORE	HB B	T	ŋ	T	ā	OBSERVATION OF CORE	WATER TARIF -V	√ -	z
	ŀ	ROCK NAME			İ	WEATHERING	SS	<u>É</u>		WATER PRESSURE TES		ELEVATION
DEPTH		용	RECOVERY	KIND OF CASING	COLOR	H	HARDNESS	딩	DESCRIPTION	LEAKAGE OF DRILLING	DEPTH	Si Si
핌	90	2	0 → 100%	₹Š	8	WE] \	CORE CUTTING		WATER 0 LUGEON	40	ឃ
	.	<u> </u>			+-		-	0	GRAVEL AND SAND; consists of subangular basaltic	500	T -	
-	. 0	ALLUVIAL DEP					[and andesitic fragments up to 15 cm in length, fine		-	m
-	Ŏ.	[₫	40%		GRAY	က			material was not recovered		-]
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1_	Ο.	14			<u>_</u>	<u> </u>			1.00 m		_1	1
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-	.				-]			indeterminate bedding, tuffaceous debris, highly		j j -	J
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-	$ \cdot $	Ę	40%			┷┽		-	TUFF, fine to medium grained, water laid, contains			
[:::				вноми	3-4	က	္က	agglomeratic material under 0.5 cm, poorly cemented		-	
10_[::.	_ 6			<u> </u>	(5)		***	10.00 m END OF BORING		_10	