

**CHAPTER 7**  
**GEOLOGY**

## ***GEOLOGY***

**Geologic Logs of Drill Holes**

**Photographs of Cores**

**Result of Permeability Test**

**Geologic Logs of Pits**

**Result of Seismic Prospecting**

**Result of Water Level Measurement in Drill Holes**

**Result of Laboratory Tests**

**Photographs of Rock Core Samples**

**Photographs of Soil Samples**

**Results of Petrographic Examination**

## **Geologic Logs of Drill Holes**

# GEOLOGIC LOG OF DRILL HOLE

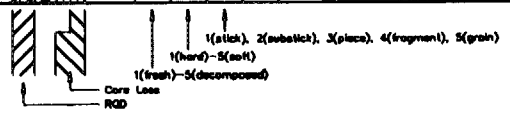
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-1

(SHEET 1 OF 3)

LOCATION Dam, Left Bank DEPTH OF HOLE 60.0 m COMMENCED 1999/11/16  
 ELEVATION 1,145.873 m DIRECTION OF HOLE vertical COMPLETED 1999/12/19  
 COORDINATE N1,073,183.854 CORE RECOVERY 88 % DRILLED BY Mr. Dorji, GSB  
E2,734,299.387 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	P <sub>max</sub>						
m	0m		0 → 100%								Lu	kgf/cm <sup>2</sup>				%		0m
	1		△							0.0-7.0 Colluvium								1
	2		△							1.1 to 1.35m, cobbles of gneiss								2
	3		△							2.25 to 2.35m, gravels of gneiss and pegmatite								3
	4		△							3.3 to 4.5m, boulder of gneiss								4
	5		△							4.5 to 5.0m, gravels and cobbles of gneiss								5
	6		△							5.0 to 7.0m, boulder of gneiss								6
1,140	7		△							7.0								7
	8									7.0-11.1 Banding of Gneiss and Pegmatite, unit thickness 10 to 20cm				7.8	7.8			8
	9	Gn / Pg								Gneiss: moderately weathered, fine to medium grained, gneissosity 30 to 40° Pegmatite: moderately weathered, coarse grained, crystal dia. 8 to 10 mm, massive	2.0							9
	10									Joint: 1) parallel with gneissosity 30° , oxide stained surface, planar 2) oblique to gneissosity 40° , oxide stained surface, rough breccia fillings at 8.2m (1cm thick)	<1	5.8	>5			none		10
	11									7.4-7.8m: highly jointed, oxide stained surfaces								11
	12									11.1								12
	13									11.1-18.2 Gneiss, fine to medium grained, highly foliated, gneissosity 30°	12.0							13
	14									Joint: 1) parallel with gneissosity 30° , oxide stained surface, planar 2) oblique to gneissosity 80° , oxide stained surface, rough dissolved cavity at 14.2 to 14.3m (2mm wide)								14
	15	Gn								12.0-12.4m: fragments of rock, oxide stained	8	10.9	>10					15
1,130	16																	16
	17																	17
	18	Pg								18.2								18
	19	Gn / Pg								18.2-18.8 Pegmatite, coarse grained, dia. 10mm or more massive, no joint	6	11.6	>10					19
	20									18.8-20.0 Irregular banding of Gneiss and Pegmatite, slightly to moderately jointed, oxide stained surfaces								20



# GEOLOGIC LOG OF DRILL HOLE

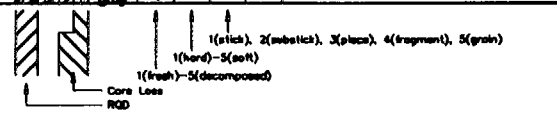
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-1

(SHEET 2 OF 3)

LOCATION	Dam, Left Bank	DEPTH OF HOLE	60.0 m	COMMENCED	1999/11/16
ELEVATION	1,145.873 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/12/19
COORDINATE	N1,073,183.854	CORE RECOVERY	88 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,299.387	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LU	Pmax	PC						
20m				0 → 100%							Lu	kgf/cm2					%		20m
21		Gn			dark gray	2	2	2	CH	20.0-22.6 Gneiss, medium grained, highly foliated, gneissosity 30 to 40° Joint: 1) parallel with gneissosity 30°, oxide stained surface, rough cavity along joint, dia. 2 to 4mm 2) 22.4m, dipping 60°	6	11.6	>10						21
22						2-3	2-3	3	CM	20.5 to 20.8 m, Pegmatite band, massive 22.1 to 22.2m, soil inferred to be derived from surface deposit	22.0								22
23										22.6-22.8m, core loss									23
24						2	2	3	CM	22.8-27.0 Gneiss, medium grained, highly foliated, gneissosity 40° Joint: 1) 22.8 to 24.2m, moderately jointed dipping 30° oxide stained surfaces, planar									24
25		Gn			dark gray	1		4	CH	2) 24.3 to 25.0m & 25.2 to 26.2m, slightly jointed, dipping 30° fresh surfaces	7	12.5	>10						25
26	1,120						2		CH	2) 26.2 to 27.0m, slightly jointed, dipping 30° and 50° oxide stained surface, rough									26
27						2-3			CH	24.0 to 24.3m, soil inferred to be derived from surface deposits, 25.0 to 25.2m, rock fragments	27.0			27.0	27.0				27
28		Gn / Pg			dark gray & grayish white	2-3	3	4	CL	27.1-27.4m, core loss									28
29						1	2	1	CH	27.4-28.7 Banding of Gneiss and Pegmatite, unit thickness 10 to 40cm Gneiss: medium grained, highly foliated, gneissosity 40° Pegmatite: slightly foliated,									29
30							2	2	CH	28.7-29.4m, core loss									30
31							2	2	CH	29.4-30.3 Gneiss, fine to medium grained, highly foliated, gneissosity 40° garnet contained, dia. 1 to 5mm, intercalated by Pegmatite band, Pegmatite band 2 to 20cm thick,									31
32							2	3	CM	Joint: 1) 29.9m, dipping 70° oxide stained surface, rough	32.0			32.0-32.8: 00-1-04					32
33							3	4	CL	2) 34.5m, dipping 70° oxide stained surface, irregular to stepped, 3) 34.7 to 34.75m, dipping 50° oxide stained surface, rough 4) 38.9m, dipping 80° oxide stained surface associated with small cavity (dia. 1mm), irregular									33
34		Gn			dark gray		1	2		30.8 to 32.0m, pieces 32.0 to 38.3m, long cores, slightly jointed									34
35							1	2											35
36	1,110					1	2		CH										36
37											37.0								37
38											no test								38
39		Gn/Pg			dark gray & grayish white		1	2		39.3-39.7 Banding of Gneiss and Pegmatite, unit thickness 5 to 30cm, Joint: 1) 39.6m, dipping 60°									39
40		Gn			dark gray		1			39.7 oxide stained surface, planar									40



# GEOLOGIC LOG OF DRILL HOLE

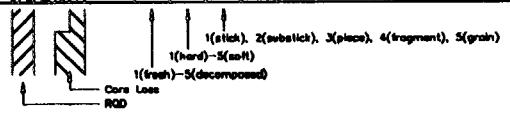
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-1

(SHEET 3 OF 3)

LOCATION	Dam, Left Bank	DEPTH OF HOLE	60.0 m	COMMENCED	1999/11/16
ELEVATION	1,145.873 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/12/19
COORDINATE	N1,073,183.854	CORE RECOVERY	88 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,299.387	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax						
	40m			0							Lu	kgf/cm2				%		40m
	41				dark gray					38.7-44.3 Gneiss, medium grained, highly foliated, gneissosity 40° garnet contained, dia. less than 1mm. Joint: 1) 43.8 to 43.7m, dipping 70°, oxide stained surface, rough tight, 41.4 to 41.5 m, Pegmatite band, massive								41
	42	Gn			dark gray	1	2	1	2	CH 44.3								42
	43				dark gray					44.3-45.1 Banding of Gneiss and Pegmatite, unit thickness 2 to 10cm, Joint: 1) 44.8m, 45.1m, 45.8m, 46.7m, dipping 40 to 50°, oxide stained surface, rough to planar	no test							43
	44				dark gray					2) 45.8m, dipping 30° oxide stained surface, planar								44
	45	Gn/Pg			dark gray	2	2-3	3	CM	45.1								45
	46	Gn			dark gray	1	2	1	2	CH 45.1-47.0 Gneiss, medium grained, highly foliated, gneissosity 40° garnet contained, dia. less than 1mm. 45.75 to 46.7 m, Garnet Gneiss, massive to slightly foliated garnet dia. 2 to 5mm								46
1,100	47	Gn			dark gray	2	3	3-4	CM	47.0								47
	48	Gn/Pg			grayish white					47.25-48.8 Banding of Gneiss and Pegmatite, unit thickness 1 to 8cm, 47.25 to 47.8m, pieces, rock surfaces are stained by iron oxide								48
	49				dark gray	1	2	1	2	CH 48.6								49
	50	Gn			dark gray					48.8-51.5 Gneiss, fine to medium grained, highly foliated, gneissosity 30 to 50° garnet contained, dia. less than 1mm. Joint: 1) 48.5m, dipping 80° oxide stained surface, rough, 49.5 to 50.5 m, Garnet Gneiss, massive to slightly foliated garnet dia. 2 to 6mm	5	13.1	>10					50
	51				dark gray					51.5								51
	52	Gn/Pg			grayish white	2	3	3-4	CM	51.5-52.2 Banding of Gneiss and Pegmatite, unit thickness 2 to 6cm, 52.2								52
	53				dark gray	1				52.2-55.2 Gneiss, fine to medium grained, highly foliated, gneissosity 50° garnet contained, dia. less than 3mm, Joint: 1) 52.4m, along gneissosity, dipping 40° oxide stained surface, planar, 2) 54.1m, along gneissosity, dipping 60° oxide stained surface, planar, 3) 57.7m, oblique to gneissosity, dipping 40° fresh surface, planar, 53.3 to 53.5 m, Pegmatite, massive								53
	54	Gn			dark gray	2				55.2	5	15.1	10.1					54
	55	Gn/Pg			grayish white	1				55.2-55.8 Banding of Gneiss and Pegmatite, unit thickness 5 to 10cm								55
1,090	56				dark gray					55.6								56
	57	Gn			dark gray					55.8-57.8 Gneiss, fine to medium grained, highly foliated, gneissosity 50° garnet contained, dia. less than 2mm								57
	58				dark gray					57.9								58
	59	Gn/Pg			grayish white	1	2	2	CH	57.9-60.0 Banding of Gneiss and Pegmatite, unit thickness 2 to 30cm, Gneiss, highly foliated, gneissosity 50° Pegmatite, slightly foliated 57.8 to 58.0m, pieces, rock surfaces are stained by iron oxide	8	15.1	10.1					59
	60																	60





# GEOLOGIC LOG OF DRILL HOLE

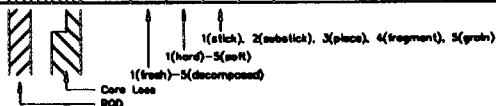
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-2

(SHEET 2 OF 2)

LOCATION	Dam, Left Bank	DEPTH OF HOLE	30.15 m	COMMENCED	1999/11/3
ELEVATION	1,145.873 m	DIRECTION OF HOLE	inclined 60 N60E	COMPLETED	1999/11/15
COORDINATE	N1,073,183.854	CORE RECOVERY	81 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,299.387	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH			
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax	Pc			CORE SAMPLE	BIT TYPE	CASING
	20m			0 → 100%							Lu	kgf/cm2				%	20m	
	21	Gn			dark gray	1				20.0-24.9 Gneiss, medium to coarse grained, moderately foliated, gneissosity 80° Joint: 1) 23.85m, dipping 30°, oxide stained surface, planar, tight 2) 24.06m, along gneissosity, dipping 80°, oxide stained surface, planar								21
	22					2												22
	23																	23
	24								CH	24.9-25.7 Pegmatite, massive, coarse grained, crystal dia. 10 to 20mm Joint: 1) 24.95m, 2 sets, dipping 45°, oxide stained surface, planar, tight 2) 25.1m, irregular oxide stained surface, rough								24
	25	Pg			grayish white	1					no test							25
	26	Gn / Pg			dark gray & grayish white	1				25.7-27.0 Banding of Gneiss and Pegmatite, unit thickness 1 to 10cm, Gneiss, coarse grained, slightly to moderately foliated.								26
	27					2				27.0-31.15 Gneiss, medium grained, highly foliated, gneissosity 50° Joint: 1) along gneissosity 50°, oxide stained surface, planar, tight 2) 28.3 to 28.7m, dipping 80°, oxide stained surface, rough, 28.1 to 29.7 m, slightly weathered								27
	28																	28
	29	Gn			dark gray	2	2	2	CM									29
						3	3	3	CH									
	30					1	1	2	CH									30
										30.15m, bottom of hole								



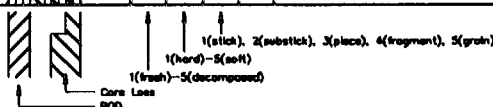


# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S HOLE No. DD-3 (SHEET 1 OF 3)

LOCATION	Dam, Left Bank	DEPTH OF HOLE	60.0 m	COMMENCED	2000/1/14
ELEVATION	1,106.602 m	DIRECTION OF HOLE	vertical	COMPLETED	2000/2/12
COORDINATE	N1,073,158.971	CORE RECOVERY	33 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,256.509	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH				
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax	Pc			CORE SAMPLE	BIT TYPE	CASING	CEMENTATION
m	0m			0 → 100%															0m
	1									0.0-20.0 Alluvium									1
	2									0.0 to 2.45m, gravels and cobbles of gneiss and pegmatite									2
	3									2.45 to 3.9m, boulder of gneiss									3
	4									5.7 to 6.2m and 6.35 to 7.3m, boulder of augen-gneiss									4
	5									7.3 to 7.8m, gravels of gneiss, pegmatite and metasedimentary rocks									5
	6									7.8 to 8.8m, boulder of gneiss									6
	7									8.8 to 10.5m, gravels and cobbles of gneiss									7
	8									10.5 to 10.9m, boulder of gneiss									8
	9									10.9 to 20.0m, gravels and cobbles of gneiss and pegmatite									9
1,100	10		Al							varicolored	no test								10
	11																		11
	12																		12
	13																		13
	14																		14
	15																		15
1,090	16																		16
	17																		17
	18																		18
	19																		19
	20																		20



# GEOLOGIC LOG OF DRILL HOLE

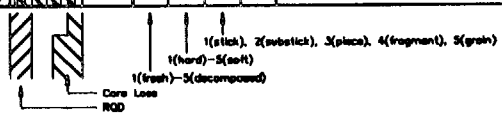
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-3

(SHEET 2 OF 3)

LOCATION	Dam, Left Bank	DEPTH OF HOLE	60.0 m	COMMENCED	2000/1/14
ELEVATION	1,106.602 m	DIRECTION OF HOLE	vertical	COMPLETED	2000/2/12
COORDINATE	N1,073,158.971	CORE RECOVERY	33 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,256.509	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax						
	20m			0 → 100%							Lu	kgf/cm <sup>2</sup>				%		20m
	21									20.0-40.0 Alluvium								21
	22									20.0 to 22.0m, gravels and cobbles of gneiss and pegmatite				84mm	none			22
	23									23.0 to 40.0m, gravels and cobbles of gneiss, pegmatite and metasedimentary rocks								23
	24													24.0	24.0			24
	25																	25
1,080	26																	26
	27																	27
	28																	28
	29																	29
	30	AI								varicolored	no test			Diamond Bit 76mm				30
	31													74mm	cemented	no water return		31
	32																	32
	33																	33
	34																	34
	35																	35
1,070	36																	36
	37																	37
	38																	38
	39																	39
	40																	40



# GEOLOGIC LOG OF DRILL HOLE

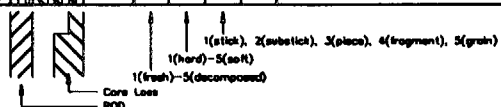
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-3

(SHEET 3 OF 3)

LOCATION Dam, Left Bank DEPTH OF HOLE 60.0 m COMMENCED 2000/1/14  
 ELEVATION 1,106.602 m DIRECTION OF HOLE vertical COMPLETED 2000/2/12  
 COORDINATE N1,073,158.971 CORE RECOVERY 33 % DRILLED BY Mr. Dorji, GSB  
E2,734,256.509 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE						TESTING				DEPTH				
					COLOR	WEATHER-ING	HARD-NESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>	P <sub>c</sub>	CORE SAMPLE		BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN
	40m			0 → 100%								Lu	kgf/cm <sup>2</sup>				%		40m
	41									40.0-60.0 Alluvium									41
	42									40.0 to 44.25m, gravels of gneiss and pagmatite									42
	43									44.25 to 46.0m, boulder of gneiss									43
	44									46.9 to 53.8m, gravels, cobbles and boulders of gneiss									44
	45									53.8 to 60.0m, gravels and cobbles of gneiss and pagmatite									45
1,060	46																		46
	47																		47
	48																		48
	49																		49
	50	Al								varicolored									50
	51																		51
	52																		52
	53																		53
	54																		54
	55																		55
1,050	56																		56
	57																		57
	58																		58
	59																		59
	60																		60



# GEOLOGIC LOG OF DRILL HOLE

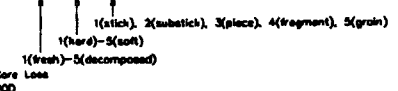
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-4

(SHEET 1 OF 3)

LOCATION Dam, Right Bank DEPTH OF HOLE 50.0 m COMMENCED 1999/12/27  
 ELEVATION 1,101.393 m DIRECTION OF HOLE vertical COMPLETED 2000/1/17  
 COORDINATE N1,073,118.698 CORE RECOVERY 80 % DRILLED BY Mr. Singye Dorji, GSB  
E2,734,187.112 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE				TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON						
m	0m			0 → 100%													0m
1,100	1																1
	2																2
	3																3
	4																4
	5																5
	6	Al			varicolored												6
	7																7
	8																8
	9																9
	10																10
1,090	11																11
	12																12
	13	Gn			dark gray	2	2	1	CH								13
	14																14
	15																15
	16	Gn			dark gray	1	2	3	CM								16
	17																17
	18	Gn			dark gray	1	2	2	CH								18
	19																19
	20																20



# GEOLOGIC LOG OF DRILL HOLE

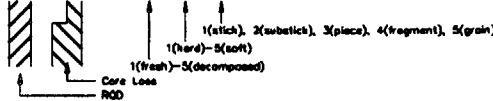
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-4

(SHEET 2 OF 3)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	50.0 m	COMMENCED	1999/12/27
ELEVATION	1,101.393 m	DIRECTION OF HOLE	vertical	COMPLETED	2000/1/17
COORDINATE	N1,073,118.698	CORE RECOVERY	80 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,187.112	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH	
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	P <sub>max</sub>							P <sub>C</sub>
	20m			0 → 100%								Lu	kgf/cm <sup>2</sup>					20m	
1,080	21									20.0-27.0 Gneiss, medium to coarse grained, highly foliated, gneissosity 30 to 35° garnet contained, dia. less than 1mm	10	10.6	>10					21	
	22							1		Joint: 1) 21.9m, irregular dipping oxide stained surface, rough 2) 26.4 to 27.0m, along gneissosity, dipping 30° highly weathered, more than 3sets, 3) 26.4 to 27.0m, sub-vertical, out by joints parallel with gneissosity, oxide stained surfaces	22.0							22	
	23	Gn			dark gray	1-2		2	CH		13	10.7	>10					23	
	24									20.0 to 20.7m, garnet crystal, dia 3 to 8mm slightly foliated to massive 22.7 to 22.8m, 23.5 to 23.6 m, 25.3 to 25.6m Pegmatite band, grayish white, massive biotite contained 28.2 to 28.4m, biotite concentrated part 28.4 to 27.0m, highly jointed, moderately weathered	24.0								24
	25							2			N/A	N/A	N/A					25	
	26							1			26.0							26	
	27							3	3	4	CL	27.0						27	
	28										28.0							28	
	29									28.0-32.6 Gneiss, coarse grained, highly to moderately foliated, gneissosity 30 to 40° garnet contained, dia. less than 1mm, Joint: 1) 28.0 to 31.0m, moderately jointed, more than 17sets, along gneissosity, dipping 35° oxide stained surface, planar to rough 2) 28.0 to 31.0m, dipping sub-vertical, out by joints parallel with gneissosity, oxide stained surface, irregular 3) 31.7m, dipping 70° oxide stained surface, irregular 4) 32.5m, dipping 80° oxide stained surface, rough	7	10.6	>10						29
	30	Gn			dark gray	3	3	3	CM		30.0							30	
1,070	31							2	2	2	CH	5	11.0	>10				31	
	32							2	2	3	CH	32.0			32.0	32.0		32	
	33							3	3	CM	32.6							33	
	34										33.0							34	
	35							2	3	3	CM	34.0						35	
	36	Gn			dark gray	2		2	3	CH	35.0							36	
	37									33.0-40.0 Gneiss, coarse grained, slightly to moderately foliated, gneissosity 20 to 35° garnet contained, dia. 1 to 2mm, Joint: 1) 33.1m, dipping 70° oxide stained surface, irregular 2) 33.8m, dipping 80° oxide stained surface, irregular to rough 3) 35.75m, dipping 25° along gneissosity, undulating	8	10.9	>10					37	
	38							1	2	2	CH	36.0						38	
	39									33.4 to 33.8m, Pegmatite band, massive 35.3 to 36.0m, Migmatite 37.1 to 37.6m, Migmatite, biotite concentrated at 37.4m, 4cm thick 37.6 to 38.95m, Garnet Gneiss, garnet dia. 2 to 4mm	7	10.9	>10					39	
	40										38.0							40	

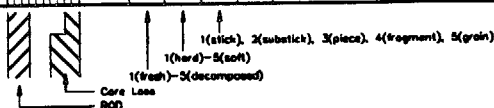


# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S HOLE No. DD-4 (SHEET 3 OF 3)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	50.0 m	COMMENCED	1999/12/27
ELEVATION	1,101.393 m	DIRECTION OF HOLE	vertical	COMPLETED	2000/1/17
COORDINATE	N1,073,118.698	CORE RECOVERY	80 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,187.112	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH	
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LU	Pmax	Pc							CORE SAMPLE
	40m			0 → 100%							Lu	kgf/cm <sup>2</sup>					%		40m	
1,060	41				1	2	1	CH		40.0-49.0 Gneiss, medium grained, moderately foliated, gneissosity 40 to 50° garnet contained, dia. 1 to 8mm	7	10.9	>10						41	
	42				2	3	3	CH CM		Joint: 1) 40.8m and 40.9m, dipping 55° outside stained surface, planar 2) 41.2m, dipping 90° slightly weathered, planar 3) 43.85m and 44.8m, dipping 50° outside stained surface, planar 4) 44.7m, along gneissosity, dipping 40° outside stained surface, planar to rough 5) 44.7 to 44.9m, sub-vertical outside stained surface, rough 6) 48.5 to 48.8m, along gneissosity, Sests, dipping 40° outside stained surface, rough	42.0									42
	43										8	11.0	>10						43	
	44										44.0								44	
	45	Gn			1	2	1	CH			8	10.9	>10		none	none			45	
	46				1	2	2	CH		Crack 1) 41.5 to 41.8m, sub-vertical, outside stained, irregular	46.0								46	
	47									42.5 to 42.6 m, pieces 42.6 to 43.1m, Pagnatite, biotite concentrated part is observed	3	10.9	>10						47	
	48				3	3	3	CH CM		45.4 to 48.3m, Pagnatite band biotite concentrated part is observed, 5 to 10cm thick	48.0								48	
	49				2	2	1	CH		47.4 to 48.0m, pieces 48.7 to 48.8m, pieces to short core									49	
	49				3	3	3	CM		49.0 49.5 49.5	5	10.9	>10						49	
	50	Gn			2	2-3	2-3	CH-CM		49.5-50.0 Gneiss, coarse grained, moderately foliated, gneissosity 30°	50.0								50	
										50.0m, bottom of hole										

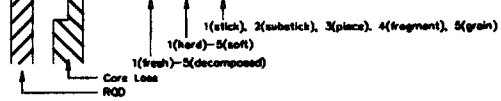


# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S HOLE No. DD-5 (SHEET 1 OF 3)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	60.0 m	COMMENCED	1999/12/6
ELEVATION	1,101.393 m	DIRECTION OF HOLE	inclined 60° N60E	COMPLETED	1999/12/24
COORDINATE	N1,073,118.698	CORE RECOVERY	55 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,187.112	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				DEPTH					
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax	Pc		CORE SAMPLE	BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN
m	0m			0 → 100%															0m
1,100	1									0.0 - 60.8 Alluvium									1
	2									0.0 to 12.0m, gravels of gneiss and pegmatite gravel dia. 3 to 30cm									2
	3									12.0 to 13.8m, boulder of gneiss									3
	4									14.5 to 18.8m, boulder of gneiss									4
	5									17.2 to 18.5m, boulder of gneiss									5
	6																		6
	7																		7
	8																		8
	9																		9
	10		AI								no test								10
	11																		11
	12																		12
1,090	13																		13
	14																		14
	15																		15
	16																		16
	17																		17
	18																		18
	19																		19
	20																		20



# GEOLOGIC LOG OF DRILL HOLE

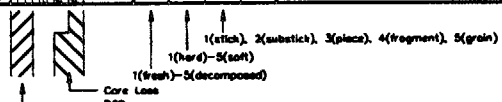
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-5

(SHEET 2 OF 3)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	60.0 m	COMMENCED	1999/12/6
ELEVATION	1,101.393 m	DIRECTION OF HOLE	inclined 60 N60E	COMPLETED	1999/12/24
COORDINATE	N1,073,118.698	CORE RECOVERY	55 %	DRILLED BY	Mr. Singye Dorji, CSB
	E2,734,187.112	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax						
	20m			0 → 100%							Lu	kgf/cm <sup>2</sup>				%		20m
	20.0 to 23.5m									20.0-40.0 Alluvium								
	21									20.0 to 23.5m, boulder of gneiss								21
	22									23.5 to 24.5m, boulder of gneiss								22
	23									25.4 to 27.0m, boulder of gneiss								23
	24									27.0 to 27.6m, gravels and cobbles of gneiss								24
	25									28.3 to 30.2m, gravels and cobbles of gneiss								25
	26									31.0 to 32.7m, boulder of gneiss								26
	27									33.5 to 34.9m, cobbles and boulders of gneiss								27
	28									34.46m, soil								28
	29									36.0 to 37.9m, boulder of gneiss								29
	30									38.0 to 38.45m, gravels of gneiss								30
1,080	31	AI								varicolored	no test			Diamond Bit 86mm	84mm	none		31
	32																	32
	33																	33
	34																	34
	35																	35
1,070	36																	36
	37																	37
	38																	38
	39																	39
	40																	40







# GEOLOGIC LOG OF DRILL HOLE

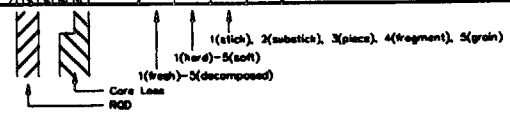
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-6

(SHEET 1 OF 4)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	80.0 m	COMMENCED	2000/1/24
ELEVATION	1,129.499 m	DIRECTION OF HOLE	vertical	COMPLETED	2000/2/25
COORDINATE	N1,073,037.539	CORE RECOVERY	65 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,204.415	DRILLING MACHINE	Tone THC-1	LOGGED BY	EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH				
					COLOR	WEATHER-ING	HARD-NESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax	Pc			CORE SAMPLE	BIT TYPE	CASING	CEMENTATION
	0m			0 - 100%															0m
	1		△							0.0-18.9 Colluvium									1
	2		△							1.0 to 1.85m, gravels and cobbles of gneiss									2
	3		△							1.85 to 3.35m, gravels, cobbles and boulders of gneiss									3
	4		△							6.0 to 6.0m, boulder of gneiss									4
	5		△							6.0 to 6.55m, gravels and cobbles of gneiss									5
	6		△							7.0 to 11.0m, gravels and cobbles of gneiss and pegmatite									6
	7		△							11.0 to 11.4m, boulder of gneiss									7
	8		△							11.4 to 12.55m, gravels and cobbles of gneiss									8
	9		△							14.0 to 15.55m, gravels and cobbles of gneiss									9
1,120	10	Co	△							17.0 to 18.0m, gravels and cobbles of gneiss and pegmatite									10
	11		△																11
	12		△																12
	13		△																13
	14		△																14
	15		△																15
	16		△																16
	17		△																17
	18		△																18
1,110	19		△																19
	20		△																20



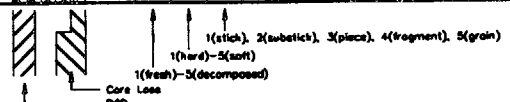


# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S HOLE No. DD-6 (SHEET 3 OF 4)

LOCATION Dam, Right Bank DEPTH OF HOLE 80.0 m COMMENCED 2000/1/24  
 ELEVATION 1,129.499 m DIRECTION OF HOLE vertical COMPLETED 2000/2/25  
 COORDINATE N1,073,037.539 CORE RECOVERY 65 % DRILLED BY Mr. Singye Dorji, GSB  
E2,734,204.415 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LU	Pmax	Pc						
m	40m			0 → 100%							Lu	kgf/cm <sup>2</sup>					%	40m	
	41	Gn			dark gray	2	2	3	CM	30.3-42.1 Gneiss, medium grained, highly foliated, gneissosity 30° garnet contained, dia. less than 1mm Joint: 1) 40.3m, along gneissosity, dipping 30° moderately weathered surface, 4mm thick 2) 41.2 to 42.1m, along gneissosity, highly jointed, dipping 30° moderately weathered surface	N/A	8.2	>5						41
	42								CL	42.1-42.7 core loss	42.0							42	
	43	Gn			dark gray	2	3	3	CM	42.7-44.0 Gneiss, fine to medium grained, highly foliated, gneissosity 40° Joint: 1) 42.7m, along gneissosity, dipping 35° moderately weathered surface, 8mm thick, planar 2) 42.8m and 43.0m, dipping 55 to 60° moderately weathered surface, filled with black-colored mineral, planar 3) 43.8m, along gneissosity, dipping 40° outside stained surface, planar to rough	5.8	7.3	>5						43
	44									44.0-45.9 core loss	44.0							44	
	45									45.9-48.45 core loss	N/A	8.5	>5					45	
	46	Gn/Pg			dark gray & grayish white	2	3	3	CM	45.9-48.45 Banding of Gneiss and Pegmatite, Gneiss: fine grained, highly foliated, gneissosity 30°, no garnet Pegmatite: coarse grained, massive, biotite and hornblende are contained Crack: 1) 48.1m, moderately weathered, irregular	46.0								46
	47									48.0-48.45 core loss								47	
	48									48.0-48.45 Gneiss, medium grained, highly foliated, gneissosity 30 to 40° Joint: 1) 48.5m, dipping 70° outside stained surface, rough to planar 2) 48.7 to 48.8m, dipping 80° outside stained surface, rough 3) 48.85m, along gneissosity, dipping 30° fresh, slickensided surface, planar									48
1,080	49	Gn			dark gray	2	3	3	CM	48.45-49.45 core loss								49	
	50								CL	49.45-50.8 core loss								50	
	51	Gn			dark gray	2	3	3	CM	50.8-51.45 Gneiss, medium grained, highly foliated, gneissosity 50° Joint: 1) 50.8m, dipping 20° fresh, slickensided surface, planar	no test							51	
	52									51.45-52.6 core loss								52	
	53	Gn			dark gray	2	3	3	CM	52.6-54.0 Gneiss, medium to coarse grained, moderately foliated, gneissosity 40° Joint: 1) 52.8m, along gneissosity, dipping 40° slickensided surface, planar 2) 53.1m, 53.5m and 53.8m, dipping 80 to 85° outside stained surface									53
	54									54.0-55.0 core loss								54	
	55	Gn			dark gray	2	3	3	CM	55.0-56.0 Gneiss, fine to medium grained, highly foliated, gneissosity 40° Joint: 1) 55.3m, dipping 70° outside stained surface, planar 2) 55.5m, dipping 50°, fresh, planar	56.0							55	
	56									56.0-56.4 core loss								56	
	57									56.4-58.0 Gneiss, medium grained, highly foliated, gneissosity 40° garnet contained, dia. less than 1mm Joint: 1) 56.5m, 58.4m and 58.5m, dipping 80 to 70° outside stained surface, planar to rough 2) 58.7m, 58.0m, 58.7m and 58.8m, along gneissosity, dipping 30 to 40° moderately weathered, 2 to 20mm thick, rough	N/A	13.7	>10						57
	58	Gn			dark gray	2	3	3	CH	58.0-59.0 core loss	58.0							58	
	59									59.0-60.0 core loss	no test							59	
1,070	60									60.0-60.0 core loss								60	













# GEOLOGIC LOG OF DRILL HOLE

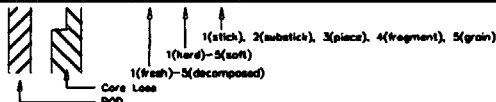
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-7

(SHEET 4 OF 5)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	100.0 m	COMMENCED	1999/11/1
ELEVATION	1,187.070 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/11/20
COORDINATE	N1,073,072.552	CORE RECOVERY	84 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,128.125	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			G.W.L. (Dpt.H)	DEPTH				
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	P <sub>max</sub>			P <sub>c</sub>	CORE SAMPLE	BIT TYPE	CASING
m	60m			0 → 100%							Lu	kgf/cm <sup>2</sup>				%	60m	
	61	Gn / Pg			dark gray & grayish white	2	2	2	3	CM								61
	62																	62
	63																	63
	64				dark gray	3	2	3	3	CM								64
	65	Gn																65
	66				dark gray	2	2	2	2	CH								66
1,120	67					3	3	3	3	CM								67
	68					2			1	CH								68
	69																	69
	70	Pg			grayish white	2	1	3			no test							70
	71								3	CM								71
	72																	72
	73					1	2											73
	74								1	CH								74
	75	Gn			dark gray													75
	76								2	CM								76
1,110	77								3	CH								77
	78					1	2		1	CH								78
	79					2	3		2	CH								79
	80																	80



# GEOLOGIC LOG OF DRILL HOLE

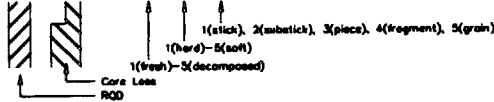
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-7

(SHEET 5 OF 5)

LOCATION Dam, Right Bank DEPTH OF HOLE 100.0 m COMMENCED 1999/11/1  
 ELEVATION 1,187.070 m DIRECTION OF HOLE vertical COMPLETED 1999/11/20  
 COORDINATE N1,073,072.552 CORE RECOVERY 84 % DRILLED BY Mr. Singye Dorji,  
E2,734,128.125 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo,  
EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>						
m	80m			0 → 100%							Lu	kgf/cm <sup>2</sup>				%		80m
	81							2										81
	82																	82
	83	Gn			dark gray	1		2	CH									83
	84					2		1										84
	85							2										85
	86							3	3-4	CL								86
	87					2		2	CM									87
1,100	88							3	CH									88
	89							1	CH									89
	90							3	CM									90
	91							2	CH									91
	92							2	CH									92
	93	Gn / Pg			dark gray & grayish white			3	CM									93
	94					1		2										94
	95							2										95
	96							2										96
1,090	97								CH									97
	98							1										98
	99							2										99
	100																	100



# GEOLOGIC LOG OF DRILL HOLE

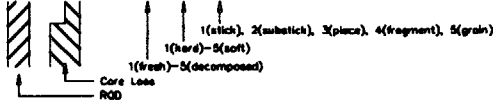
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-8

(SHEET 1 OF 3)

LOCATION Dam, Right Bank DEPTH OF HOLE 50.2 m COMMENCED 1999/11/22  
 ELEVATION 1,187.070 m DIRECTION OF HOLE inclined 60 S60W COMPLETED 1999/11/29  
 COORDINATE N1,073,072.552 CORE RECOVERY 53 % DRILLED BY Mr. Singye Dorji, GSB  
E2,734,128.125 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH				
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	Pmax	Pc			CORE SAMPLE	BIT TYPE	CASING	CEMENTATION
m	0m			0 → 100%															0m
	1		△							0.0-20.0 Colluvium									1
	2		△							0.0 to 1.65m, gravels and cobbles of gneiss, dia. 2 to 18cm									2
	3		△							2.6 to 3.15m, gravels and cobbles of gneiss and pegmatite, dia. 8 to 14cm									3
	4		△							4.0 to 4.5m, boulder of gneiss									4
	5		△							6.3 to 6.7m, boulder of gneiss									5
	6		△							8.0 to 8.3m, boulder of gneiss									6
	7		△							12.0 to 12.3m, gravels of gneiss									7
	8		△							15.0 to 15.7m, gravels and cobbles of gneiss and pegmatite, dia. 2 to 10cm									8
1,180	9		△							16.5 to 16.9m, gravels of gneiss									9
	10	Co	△							16.9 to 20.2m, boulder of gneiss									10
	11		△																11
	12		△																12
	13		△																13
	14		△																14
	15		△																15
	16		△																16
	17		△																17
	18		△																18
	19		△																19
1,170	20		△																20



# GEOLOGIC LOG OF DRILL HOLE

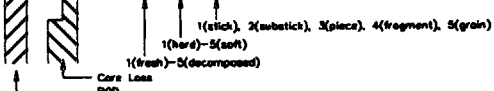
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DD-8

(SHEET 2 OF 3)

LOCATION	Dam, Right Bank	DEPTH OF HOLE	50.2 m	COMMENCED	1999/11/22
ELEVATION	1,187.070 m	DIRECTION OF HOLE	inclined 60 S60W	COMPLETED	1999/11/29
COORDINATE	N1,073,072.552	CORE RECOVERY	53 %	DRILLED BY	Mr. Singye Dorji, GSB
	E2,734,128.125	DRILLING MACHINE	Tone THC-1	LOGGED BY	EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			G.W.L. (Dpt.H)	DEPTH		
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax			Pc	CORE SAMPLE
m	20m			0 → 100%							Lu	kgf/cm <sup>2</sup>			%	20m
	20.0-28.4									20.0-28.4 Colluvium						
	21.0 to 21.8m									21.0 to 21.8m, gravels of gneiss and pegmatite dia. 3 to 8cm						21
	21.9 to 24.0m									21.9 to 24.0m, boulder of gneiss						22
	24.5 to 24.8m									24.5 to 24.8m, gravels and cobbles of gneiss and pegmatite, dia. 1 to 8cm						23
	24.9 to 25.45m									24.9 to 25.45m, boulder of gneiss						24
	25.7 to 27.4m									25.7 to 27.4m, boulders of gneiss and basic rock						25
	28.4									28.4						26
	28.4-34.6									28.4-34.6 Gneiss, medium grained, highly foliated, gneissosity 40° garnet contained, dia. 1 to 2mm						27
	no joint									no joint						28
	28.8m									28.8m: intercalation of Pegmatite, 8cm thick						29
	30.5 to 30.8m									30.5 to 30.8m: Migmatite						30
	32.6m									32.6m: intercalation of Pegmatite, 5cm thick						31
1,160		Gn								dark gray						32
										varicolored						33
										1 2						34
										2 1						35
										CH						36
										34.6						37
										34.6-38.0 Banding of Gneiss and Pegmatite, gneiss is dominant						38
										Gneiss: fine to medium grained, highly foliated, gneissosity 40° garnet contained, dia. 1 to 3mm						39
										Pegmatite: massive to slightly foliated, biotite concentrated part is observed, unit thickness 2 to 8cm						40
										Joint 1) 37.2m, dipping 50° outside stained surface, planar to rough						
										38.0 to 38.8m: boundary of gneiss and pegmatite is irregular						
										37.8 to 38.15m: boundary of gneiss and pegmatite is irregular						
										38.8 to 39.0m: biotite concentrated part						
										39.0						
										39.0-40.0 Gneiss, medium grained, highly foliated, gneissosity 40° garnet contained, dia. 1 to 3mm						





# GEOLOGIC LOG OF DRILL HOLE

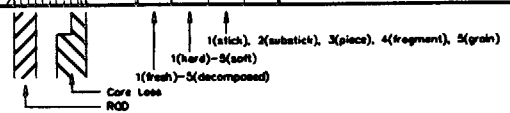
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DB-1

(SHEET 1 OF 3)

LOCATION	Intake	DEPTH OF HOLE	50.05 m	COMMENCED	1999/12/27
ELEVATION	1,147.473 m	DIRECTION OF HOLE	inclined 60 N82E	COMPLETED	2000/1/9
COORDINATE	N1,073,270.738	CORE RECOVERY	86 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,251.427	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE						TESTING				G.W.L. (Dpt.H)	DEPTH		
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>	P <sub>c</sub>	CORE SAMPLE			BIT TYPE	CASING
m	0m			0-100%								Lu	kgf/cm <sup>2</sup>				%	0m
	1		△							0.0-20.0 Colluvium								1
	2		△							0.0 to 2.4m, gravels of gneiss and pegmatite								2
	3		△							2.8 to 4.0m, boulder of gneiss								3
	4		△							4.0 to 6.0m, boulder of migmatite								4
	5		△							6.0 to 6.3m, cobble of gneiss								5
	6		△							6.3 to 6.8m, boulder of gneiss								6
	7		△							6.8 to 6.7m, boulder of gneiss								7
	8		△							6.7 to 10.3m, cobbles of gneiss								8
	9		△							10.3 to 12.0m, boulder of gneiss								9
1,140	10	Co	△							12.0 to 13.0m, gravels and cobbles of gneiss								10
	11		△							13.0 to 13.8m, boulder of gneiss								11
	12		△							13.8 to 14.1m, gravels and cobbles of gneiss								12
	13		△							14.1 to 17.2m, boulder of gneiss								13
	14		△							17.2 to 20.0m, boulder of gneiss								14
	15		△															15
	16		△															16
	17		△															17
	18		△															18
	19		△															19
	20		△															20



# GEOLOGIC LOG OF DRILL HOLE

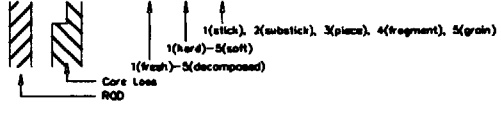
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DB-1

(SHEET 2 OF 3)

LOCATION	Intake	DEPTH OF HOLE	50.05 m	COMMENCED	1999/12/27
ELEVATION	1,147.473 m	DIRECTION OF HOLE	inclined 60° N82E	COMPLETED	2000/1/9
COORDINATE	N1,073,270.738	CORE RECOVERY	86 %	DRILLED BY	Mr. Dorji, GSB
	E2,734,251.427	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				DEPTH							
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	Pmax	Pc		CORE SAMPLE	BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	
1,130	20m			0 → 100%																20m	
	20.0-21.0	Co																			21
	21.0-30.8	Gn			dark gray																21-28
	21.0																				21
	22.0																				22
	23.0																				23
	24.0																				24
	25.0																				25
	26.0																				26
	27.0																				27
	28.0																				28
	29.0																				29
	30.0																				30
	31.0																				31
1,120	31.0-35.6	Gn/Pg			dark gray & grayish white																31-35
	31.0																				31
	32.0																				32
	33.0																				33
	34.0																				34
	35.0																				35
	36.0																				36
	37.0																				37
	38.0																				38
	39.0																				39
	40.0																				40

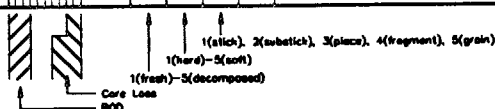


# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S HOLE No. DB-1 (SHEET 3 OF 3)

LOCATION Intake DEPTH OF HOLE 50.05 m COMMENCED 1999/12/27  
 ELEVATION 1,147.473 m DIRECTION OF HOLE inclined 60 N82E COMPLETED 2000/1/9  
 COORDINATE N1,073,270.738 CORE RECOVERY 86 % DRILLED BY Mr. Dorji, GSB  
E2,734,251.427 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	Pmax						
	40m			0														40m
	41	Gn			dark gray		3	3	CM	40.0-42.9 Gneiss, coarse grained, slightly to moderately foliated, gneissosity 50 to 55° garnet contained, dia. less than 1mm.								41
	42									Minor Fault: 1) 40.3 to 40.7m, dipping 80° slickensided surface, pale bluish gray clay on surface, 2mm thick								42
1,110	43	Pg			white			1	2	42.9-43.8 Pegmatite, massive to slightly foliated, biotite concentrated part from 43.2 to 43.4m. Orisk: 1) 43.2m, dipping 15° oxide stained surface, rough								43
	44							1	2	43.8-43.8								44
	45					1		2	CH	43.8-50.05 Gneiss, coarse grained, moderately foliated, gneissosity 50 to 55° garnet contained, dia. 1 to 2mm.	no test			none				45
	46				dark gray					Joint: 1) 46.4m, dipping 35° slightly weathered surface, rough 2) 47.0m, dipping 40° oxide stained surface, planar 3) 47.5m, dipping 50° oxide stained surface, planar to rough 4) 48.0 to 48.4m, dipping 80° oxide stained surface, rough 5) 48.4m, dipping 80° oxide stained surface, planar								46
	47	Gn							1									47
	48								1	2								48
	49						2	3	3	CM								49
	50						1	2	3	CH								50
	50.05m									50.05m, bottom of hole								





# GEOLOGIC LOG OF DRILL HOLE

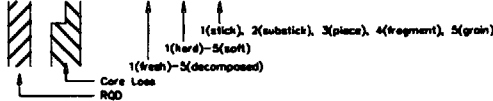
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 1 OF 9)

LOCATION	Powerhouse	DEPTH OF HOLE	180.1 m	COMMENCED	1999/10/28
ELEVATION	1,070.575 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/12/31
COORDINATE	N1,066,305.563	CORE RECOVERY	63 %	DRILLED BY	Mr. Ngawang Norbu, GSB
	E2,737,235.033	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION m	DEPTH 0m	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			G.W.L. (Dpt.H)	DEPTH					
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>			P <sub>c</sub>	CORE SAMPLE	BIT TYPE	CASING	CEMENTATION
1,070	0			0 → 100%						0.0-3.35 Colluvium	Lu	kgf/cm <sup>2</sup>						0m	
	1	Co	△		varicolored					0.0 to 1.8m, Decomposed soil 1.8 to 3.35m, Core loss								1	
	2		△															2	
	3		△							3.35								3	
	4	Pg			grayish white	3	3	4	CL	3.35-5.5 Pegmatite, coarse grained, crystal dia. 5 to 8mm slightly foliated, gneissosity unclear  rock fragments stained by iron oxide								4	
	5	Gn			dark gray					5.5								5	
	6									5.5-8.0 Augen Gneiss, augen dia. 10 to 25mm, gneissosity 40° 6.0								6	
	7	Pg			grayish white	3	3	4	CM	8.0-8.2 Pegmatite, coarse grained, crystal dia. 3 to 12mm moderately foliated, gneissosity 60° Joint: 8.3m, oblique to gneissosity 70° slightly weathered surface, oxide stained, planar 8.5: intercalation of gneiss, 10cm thick								7	
	8					2	2	4	CL	8.2								8	
	9	Gn			dark gray				2	8.2-10.9 Augen Gneiss, coarse grained, augen dia. 10 to 30mm gneissosity 25 to 30° Joint: 1) 9.1 to 9.3m, dipping 70° fresh surface, rough 2) 9.4m, dipping 60° 9.8m, dipping 80° 10.1m, dipping 75° 10.8 to 11.2m, dipping 80° slightly weathered surfaces, planar	no test							9	
1,060	10					2	3	4	CL	10.9								10	
	11	Pg			grayish white	3	3	4	CL	10.9-12.0 Pegmatite, coarse grained, slightly weathered crystal dia. 5 to 15mm, massive to slightly foliated								11	
	12					2	2	2	CH	12.0								12	
	13	Gn			dark gray				3	12.0-15.9 Augen Gneiss, coarse grained, augen dia. 5 to 40mm slightly weathered, moderately foliated, gneissosity 40° Joint: 1) 12.1m, dipping 85° slightly weathered surface, rough to planar 2) 14.4m, dipping 70° oxide stained surface, rough to planar 3) 15.6 to 15.85m, highly jointed 2 sets, dipping 60° slightly weathered, planar 4) 15.8 to 15.85m, dipping 70 to 80° slightly weathered surfaces, irregular							15.1		13
	14					2	3	3	CM	15.9								14	
	15	Gn			dark gray	2	2	2	CM	15.9-17.6 Banding of Augen Gneiss and Pegmatite, unit thickness 10 to 30cm Gneiss: coarse grained, moderately foliated gneissosity 40° Pegmatite: massive to slightly foliated foliation 40 to 55°								15	
	16	Gn / Pg			dark gray & grayish white	2	2	3	CH	17.6								16	
	17					2	2	3	CH	17.6								17	
	18									17.6-18.5 Core Loss								18	
	19	Gn / Pg			dark gray & grayish white	2	3	3	CM	18.5								19	
	20					2-3	2-3	2-3	CL	18.5-22.1 Banding of Augen Gneiss and Pegmatite, unit thickness 20 to 50cm Joint: 19.6 to 20.2m, dipping 80° oxide stained surface, rough to planar								20	



# GEOLOGIC LOG OF DRILL HOLE

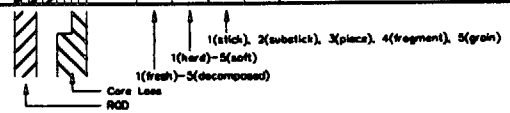
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 2 OF 9)

LOCATION <u>Powerhouse</u>	DEPTH OF HOLE <u>180.1 m</u>	COMMENCED <u>1999/10/28</u>
ELEVATION <u>1,070.575 m</u>	DIRECTION OF HOLE <u>vertical</u>	COMPLETED <u>1999/12/31</u>
COORDINATE <u>N1,066,305.563</u>	CORE RECOVERY <u>63 %</u>	DRILLED BY <u>Mr. Ngawang Norbu,</u>
<u>E2,737,235.033</u>	DRILLING MACHINE <u>Tone THC-1</u>	LOGGED BY <u>EPDC</u>

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH		
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>	P <sub>c</sub>			CORE SAMPLE	BIT TYPE
m	20m			0 → 100%							Lu	kgf/cm <sup>2</sup>			%	20m	
1,050	21	Gn / Pg			dark gray & grayish white	2	2	2	CM	18.5-22.1 Banding of Augen Gneiss and Pegmatite, unit thickness 20 to 50cm Joint: 1) 20.55m, dipping 55° planar to slickensided 2) 21.8 to 21.8m, dipping 70° oxide stained surface, planar							21
	22					2	2	2	CH	21.45 to 21.8m rock fragments							22
	23	Gn			dark gray	3	3	3	CM	22.1-24.2 Augen Gneiss, coarse grained, augen dia. 5 to 100mm moderately foliated, gneissosity 40 to 50°							23
	24					4	4	4	CL	Joint: 1) 23.2 to 23.5m, dipping 70° oxide stained surface, planar							24
	25					2	1-2	1-2	CH	24.2							25
	26	Gn			dark gray	2	2	2	CH	24.2-25.8 Core Loss							26
	27					3	3-4	3-4	CL	25.6							27
	28					2	2	2	CH	22.1-24.2 Augen Gneiss, coarse grained, augen dia. 2 to 40mm moderately foliated, gneissosity 30 to 40°							28
	29					3	3-4	3-4	CL	Joint: 1) 26.3 to 28.8m, dipping 70° oxide stained surface, planar							29
	30					2	2	2	CH	26.8							30
1,040	31					3	4	4	CL	26.8-31.0 Core Loss							31
	32					2-3	3	3	CM	31.0							32
	33	Gn			dark gray	2	2	2	CM	31.0-35.0 Augen Gneiss, coarse grained, augen dia. 2 to 45mm moderately foliated, gneissosity 30°							33
	34					2	2	2	CH	Joint: 1) 33.2m, dipping 45° fresh surface, rough to planar 2) 32.8 to 33.1m, dipping 75° fresh surface, rough 3) 33.3 to 33.8m, dipping 75° fresh surface, rough, tight							34
	35					2	2	2	CH	31.0 to 31.45m: rock fragments 31.45 to 32.3m: pieces 32.3 to 35.0m: mainly short cores							35
	36									35.0							36
	37	Gn			dark gray	2	3	4	CL	36.25							37
	38									36.25-37.7 Augen Gneiss, coarse grained, augen dia. 3 to 48mm moderately foliated, gneissosity dips 30 to 40° rock fragments, partially oxide stained							38
	39	Gn			dark gray	2	2-3	3	CM	37.7							39
	40					2	1-2	1-2	CH	38.15							40



# GEOLOGIC LOG OF DRILL HOLE

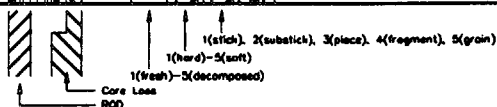
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 3 OF 9)

LOCATION	Powerhouse	DEPTH OF HOLE	180.1 m	COMMENCED	1999/10/28
ELEVATION	1,070.575 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/12/31
COORDINATE	N1,066,305.563	CORE RECOVERY	63 %	DRILLED BY	Mr. Ngawang Norbu, GSB
	E2,737,235.033	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH			
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LUGEON	Pmax	Pc							CORE SAMPLE		
1,030	40m			0 → 100%															40m			
	41	Gn			dark gray	2	2	1	2	CH	40.0-42.7 Augen Gneiss, coarse grained, augen dia. 2 to 82mm, moderately foliated, gneissosity 40° Joint: 1) 41.0 to 41.3m, dipping 75° slightly weathered, rough, thight 2) 41.4 to 41.6m, dipping 85° slightly weathered, planar, thight										41	
	42	Pg			grayish white	2-3	3	4	4	CL	42.7m: Boundary between Gneiss and Pegmatite: smooth and thight 42.7-42.8 Pegmatite 42.8-43.0 Core Loss 43.0-45.3 Pegmatite, coarse grained, crystal dia. 2 to 10mm massive to slightly foliated, dippings of gneissosity are unclear Joint: 1) 43.5 to 44.1m, dipping 70 to 80° fresh to slightly weathered surface, rough, thight 2) 44.45 to 44.6m, 2 sets, dippings 80° fresh surfaces, planar, thight											42
	43																		43			
	44	Pg			grayish white	1	1	1	2	CH	45.3-48.4 Augen Gneiss, coarse grained, augen dia. 3 to 80mm moderately foliated, gneissosity 20 to 30° Joint: 1) 47.2m, dipping 50° slightly weathered surface, planar, thight 2) 47.3 to 47.8m, moderately jointed, dippings 85°, rough, thight, oxide stained surfaces 3) 47.8 to 48.4m: moderately to highly jointed, dippings 85°, rough moderately weathered surfaces										44	
	45					2	3	4	4	CL	48.25-49.25 Core Loss 49.25-50.1 Augen Gneiss, coarse grained, weathered rock fragments 50.1-52.0 Core Loss									45		
	46	Gn			dark gray	2	2	2	3	CH	52.0-52.8 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear Joint: 1) 55.5 to 56.4m, dipping 75 to 80° fresh surface, planar 2) 57.4 to 58.0m, dipping 75° fresh surface, planar 3) 58.8 to 58.9m, dipping 85° fresh surface, planar										46	
	47					2	3	3	4	CL	52.6-53.7 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear									47		
	48	Gn			dark gray	2-3	3	4	4	CL	53.7-55.2 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear									48		
	49																		49			
	50	Gn			dark gray	2-3	3	4	4	CL	55.2-55.5 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear									50		
1,020	51																		51			
	52	Gn			dark gray	2	3	4	4	CL	55.5-57.4 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear									52		
	53																		53			
	54																		54			
	55	Pg			grayish white	1	2	3	3	CM	57.4-58.0 Augen Gneiss, coarse grained, augen dia. 3 to 42mm moderately foliated, gneissosity 40° 38.25-37.7 Pegmatite, coarse grained, crystal dia. 3 to 5mm massive to slightly foliated, gneissosity is unclear									55		
	56					1	1	1	2	CH	58.0-58.8m: pieces to rock fragments								56			
	57																		57			
	58																		58			
	59																		59			
	60																		60			



# GEOLOGIC LOG OF DRILL HOLE

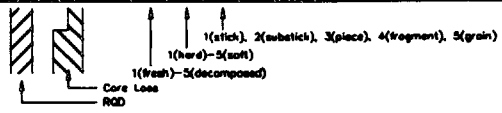
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 4 OF 9)

LOCATION Powerhouse DEPTH OF HOLE 180.1 m COMMENCED 1999/10/28  
 ELEVATION 1,070.575 m DIRECTION OF HOLE vertical COMPLETED 1999/12/31  
 COORDINATE N1,066,305.563 CORE RECOVERY 63 % DRILLED BY Mr. Ngawang Norbu, GSB  
E2,737,235.033 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LUCEON	Pmax	Pc						
1,010	60m			0-100%							Lu	kg/cm <sup>2</sup>							60m
	61	Pg			grayish white	1-2	1-2	CH		80.0-82.3 Pegmatite, coarse grained, crystal dia. 3 to 5mm, massive to slightly foliated, gneissosity 40 to 45°									61
	62				grayish white	1	3	CM		Joint: 1) 80.8 to 81.2m, dipping 80° fresh surface, undulated, tight 82.3m: Boundary between Pegmatite and Gneiss: gradual									62
	63	Gn / Pg			grayish white	2	2	CM		82.3-83.3 Thin bands of Gneiss and Pegmatite, unit thickness less than 5cm, moderately foliated, gneissosity 40°									63
	64									83.3-84.0 Core Loss									64
	65	Gn / Pg			dark gray / grayish white	1	3	CM		84.0-88.0 Thin bands of Gneiss and Pegmatite, unit thickness less than 3cm, moderately foliated, gneissosity 40°									65
	66									84.0 to 84.4m, 85.0 to 88.0m: rock fragments									66
	67									86.0-88.5 Core Loss									66
	68									88.5-73.1 Thin bands of Gneiss and Pegmatite, unit thickness less than 4cm, slightly foliated, gneissosity 30 to 40° augen of feldspar, dia. 5 to 40mm garnet contained, dia. less than 3mm									67
	69									Joint: 1) 88.1 to 89.8m, dipping 70 to 80° outside stained surface, planar 2) 70.0 to 70.5m, dipping 85° outside stained surface, planar 3) 70.8 to 71.0m, dipping 50° fresh surface, planar, tight 4) 71.85 to 72.2m, dipping 80° outside stained surface, planar 5) 72.8 to 72.8m, dipping 80° outside stained surface, planar									68
	70	Gn / Pg			dark gray & grayish white	2	3	CM			no test								70
1,000	71									71.8 to 72.2m: moderately weathered rock fragments									71
	72																		72
	73																		73
	74																		74
	75																		75
	76									75.1-78.3 Augen Gneiss, coarse grained, augen dia. 2 to 20mm, moderately foliated, gneissosity 30 to 35°									76
	77	Gn			dark gray	2	3	CM		Joint: 1) 77.1m, dipping 45° slightly weathered surface, planar, slickensided 2) 78.4 to 78.8m, dipping 80 to 80° outside stained surface, undulated, tight									77
	78																		78
	79																		79
	80									79.3-80.0 Core Loss									80



# GEOLOGIC LOG OF DRILL HOLE

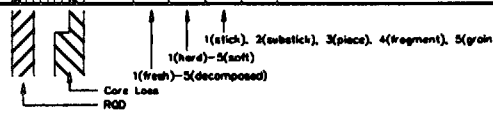
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 5 OF 9)

LOCATION	Powerhouse	DEPTH OF HOLE	180.1 m	COMMENCED	1999/10/28
ELEVATION	1,070.575 m	DIRECTION OF HOLE	vertical	COMPLETED	1999/12/31
COORDINATE	N1,066,305.563	CORE RECOVERY	63 %	DRILLED BY	Mr. Ngawang Norbu, GSB
	E2,737,235.033	DRILLING MACHINE	Tone THC-1	LOGGED BY	Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LU	Pmax	Pc						
990	80m	Gn		0-100%	dark gray	1-2	4	4	0	80.0-80.3 Augen Gneiss, augen dia. 2 to 18mm, moderately foliated, highly fractured, dipping of gneissosity is unclear due to rock fragments	Lu	kgf/cm2							80m
	81									80.3									81
	82									80.3-84.0 Core Loss									82
	83																		83
	84									84.0									84
	85	Gn			dark gray	1	3	3	CL	84.0-85.6 Augen Gneiss, coarse grained, augen dia. 5 to 30mm, moderately foliated, gneissosity 30 to 40°									85
	86					2	4	4	D	Joint 1) 85.45m and 84.7m, dipping 40 to 45°									86
	87	Gn			dark gray	1-2	3	3	CM	85.6									87
	88									85.6-87.1 Core Loss									88
	89	Gn			dark gray	1-2	3	3-4	CM	87.1									89
	90	Gn			dark gray	1-2	4	4	D	87.1-87.35 Augen Gneiss, augen dia. 5 to 20mm, moderately foliated, gneissosity 30°									90
	91									87.35									91
	92									88.5									92
	93									88.5-89.0 Augen Gneiss, augen dia. 2 to 16mm, moderately foliated, gneissosity 30 to 40°									93
	94									89.0									94
	95									89.0-90.2 Core Loss									95
	96	Gn			dark gray	1-2	4	4	D	90.2									96
	97									90.5									97
	98									90.5-92.3 Core Loss									98
	99									92.3									99
	100									92.3-100.0 Augen Gneiss, augen dia. 3 to 46mm, slightly to moderately foliated, mostly rock fragments, attitudes of gneissosity are quite variable,									100



# GEOLOGIC LOG OF DRILL HOLE

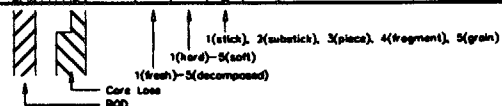
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 6 OF 9)

LOCATION Powerhouse DEPTH OF HOLE 180.1 m COMMENCED 1999/10/28  
 ELEVATION 1,070.575 m DIRECTION OF HOLE vertical COMPLETED 1999/12/31  
 COORDINATE N1,066,305.563 CORE RECOVERY 63 % DRILLED BY Mr. Ngawang Norbu, GSB  
E2,737,235.033 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LUCEON	P <sub>max</sub>	P <sub>c</sub>						
970	100m			0 → 100%															100m
	101	Gn			dark gray	1 2	4	4	D	100.0-102.0 Augen Gneiss, coarse grained, augen dia. 2 to 10mm, rock fragments, fragments are moderately fractured									101
	102									102.0 102.0-103.3 Core Loss									102
	103									103.3 103.3-106.0 Augen Gneiss, coarse grained, augen dia. 4 to 28mm, slightly to moderately foliated, gneissosity 30°									103
	104	Gn			dark gray	1 4	3 4	3 4	CL D	103.3 to 104.8m: pieces to fragments, rock is moderately fractured									104
	105				dark gray	1 2	4	5	D	104.8 to 106.0m: fragments, rock is moderately to highly fractured, chlorite on rock fragments									105
	106									106.0 106.0-106.65 Core Loss									106
	107	Gn			dark gray	1 2	3 4	3 4	CL D	106.65-108.4 Augen Gneiss, coarse grained, augen dia. 2 to 48mm, slightly foliated, gneissosity 30°									107
	108				dark gray	1 2	4	4	D	pieces to fragments, rock is moderately fractured, slickensided surfaces are observed									108
	109									108.4-114.9 Core Loss									109
960	110										no test								110
	111																		111
	112																		112
	113																		113
	114																		114
	115	(Fault)			dark gray & pale bluish gray	5	4 5	5	D	114.9 Fractured zone, inferred to be fault 115.0 to 116.1m: pale bluish gray color, clay and breccia, 116.1 to 116.6m: fragments of gneissose rock, rock is highly fractured, pale bluish gray clay is contained, slickensided surface is observed on rock fragments									115
	116									116.6 116.6-120.0 Augen Gneiss, coarse grained, augen dia. 4 to 22mm, moderately foliated, gneissosity 40 to 50°									116
	117				dark gray	1	3	3 4	CL	rock is moderately fractured slickensided surfaces are observed along gneissosity, pieces to fragments, Joint 1) 118.7m, dipping 80° slightly weathered surface, planar to rough, chlorite stained 117.8m, chlorite on rock fragments 118.5m, clay and brecciated material (Zorn)									117
	118	Gn																	118
	119																		119
	120																		120



# GEOLOGIC LOG OF DRILL HOLE

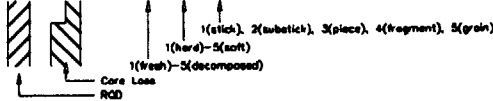
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 7 OF 9)

LOCATION Powerhouse DEPTH OF HOLE 180.1 m COMMENCED 1999/10/28  
 ELEVATION 1,070.575 m DIRECTION OF HOLE vertical COMPLETED 1999/12/31  
 COORDINATE N1,066,305.563 CORE RECOVERY 63 % DRILLED BY Mr.Ngawang Norbu, GSB  
E2,737,235.033 DRILLING MACHINE Tone THC-1 LOGGED BY Mr.Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS		LUGEON	Pmax	Pc						
950	120			0-100%															120m
	121	Gn			dark gray	1	3	3	CM	120.0-123.7 Augen Gneiss, coarse grained, augen dia. 3 to 50mm, moderately foliated, gneissosity 30° moderately to slightly fractured, chlorite mottled partially, some slickensided surfaces are observed along gneissosity									121
	122									Joint 1) 120.6m, dipping 55° fresh surface, rough 2) 121.45m, dipping 45° fresh surface, undulated									122
	123																		123
	124									123.7									124
	125									125.0									125
	126	Gn			dark gray	1	3	3	CL	125.0-128.0 Augen Gneiss, coarse grained, augen dia. 3 to 28mm, moderately foliated, gneissosity 40° moderately fractured, some slickensided surfaces are observed along gneissosity mainly rock fragments, chlorite stained									126
	127																		127
	128									128.0									128
	129	Gn			dark gray	1	3	3	CL	129.0									129
	130									129.0-130.0 Augen Gneiss, coarse grained, moderately foliated, gneissosity 35° highly fractured, chlorite mottled along gneissosity and fractures, mainly rock fragments	no test								130
940	131									130.0									131
	132									130.0-133.15 Core Loss									132
	133									133.15									133
	134	(Fault)			pale bluish gray	5	5	5	D	133.15-136.0 Fine sand of altered feldspathic minerals, inferred to be a fault zone, pale bluish gray color,									134
	135																		135
	136									136.0									136
	137	Gn			dark gray	1	3	4	CL	136.0-140.0 Augen Gneiss, coarse grained, augen dia. 2 to 50mm, moderately foliated, gneissosity 40° moderately fractured, chlorite mottled, some slickensided surfaces are observed along gneissosity									137
	138									138.4 to 142.8m, highly fractured into small fragments, (less than 1cm dia.) surfaces of rock fragments are stained by chlorite									138
	139																		139
	140																		140



# GEOLOGIC LOG OF DRILL HOLE

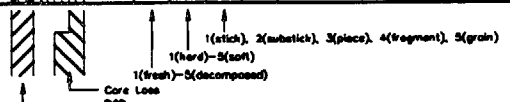
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 8 OF 9)

LOCATION Powerhouse DEPTH OF HOLE 180.1 m COMMENCED 1999/10/28  
 ELEVATION 1,070.575 m DIRECTION OF HOLE vertical COMPLETED 1999/12/31  
 COORDINATE N1,066,305.563 CORE RECOVERY 63 % DRILLED BY Mr. Ngawang Norbu, CSB  
E2,737,235.033 DRILLING MACHINE Tone THC-1 LOGGED BY EPDC, Mr. Seiji Hongo.

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>						
m	140m			0 → 100%							Lu	kgf/cm <sup>2</sup>				%		140m
930	140									140.0-142.8 Augen Gneiss, coarse grained, augen dia. 4 to 22mm, moderately foliated, rock fragments, highly fractured, surfaces of fragments are stained by chlorite.								141
	141							4	5	D								142
	142																	143
	143									142.8-145.05 Augen Gneiss, coarse grained, augen dia. 2 to 30mm, moderately foliated, gneissosity 30° moderately fractured, chlorite mottled along gneissosity, some sphenoidal surfaces are observed								144
	144	Gn						3	3	CM								145
	145									Fracture 1) 143.45m, dipping 25° filled with chlorite, 2mm thick								146
	146							4	5	D								147
	147									145.05-145.6 highly fractured into fragments, no chlorite contained								148
	148									145.6-146.4 moderately to highly fractured into pieces, coin-like shape no chlorite contained								149
	149									146.4-148.5 Augen Gneiss, coarse grained, augen dia. 2 to 22mm, moderately foliated, gneissosity 30° slightly fractured, garnet contained.								150
	150									Joint 1) 147.8m, dipping 80° fresh surface, rough								151
920	151	Gn								2) 148.35m, dipping 80° fresh surface, planar								152
	152	Gn/Pg								148.5-154.7 Banding of Augen Gneiss and Pegmatite, unit thickness 2 to 25cm, rocks are slightly fractured chlorite mottled along gneissosity								153
	153									Augen Gneiss: coarse grained, augen dia. 4 to 40mm, slightly to moderately foliated, gneissosity 30°								154
	154									Pegmatite: massive to slightly foliated								155
	155									Joint 1) 148.8m, dipping 80° filled with chlorite, 1mm thick								156
	156									2) 151.45m, dipping 45° chlorite stained, planar								157
	157									3) 151.6m, dipping 46° chlorite stained, planar								158
	158									150.8 to 153.6m, pieces some sphenoidal surfaces are observed along gneissosity								159
	159									154.7								160
	160									154.7-155.0 Pg-1-10								160
										155.7-156.0 Pg-1-11								160





# GEOLOGIC LOG OF DRILL HOLE

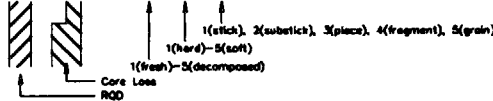
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DP-1

(SHEET 9 OF 9)

LOCATION Powerhouse DEPTH OF HOLE 180.1 m COMMENCED 1999/10/28  
 ELEVATION 1,070.575 m DIRECTION OF HOLE vertical COMPLETED 1999/12/31  
 COORDINATE N1,066,305.563 CORE RECOVERY 63 % DRILLED BY Mr. Ngawang Norbu, GSB  
E2,737,235.033 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING			CASING	CEMENTATION	DRILL FLUID RETURN	G.W.L. (Dpt.H)	DEPTH
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>					
m 160				0 → 100%							Lu	kgf/cm <sup>2</sup>				%	160m
910	161							3	CM	180.0-182.2 Augen Gneiss, coarse grained, augen dia. 3 to 40mm, moderately foliated, gneissosity 20 to 30° not fractured.							161
	162									181.1 to 182.2m, slightly foliated							162
	163							2	CH	182.2-183.7 Augen Gneiss, coarse grained, augen dia. 2 to 36mm, slightly to moderately foliated, gneissosity 25° no joint							163
	164									183.7-188.7 Augen Gneiss, coarse grained, augen dia. 2 to 22mm, moderately foliated, gneissosity 20°							164
	165							3	CM	Joint 1) 185.8 to 188.2m, dipping 50° chlorite stained surface, highly to moderately jointed							165
	166									2) 188.5m, dipping 60° fresh surface, rough							166
	167							2		188.7-171.1 Augen Gneiss, coarse grained, augen dia. 2 to 40mm, slightly to moderately foliated, gneissosity 10 to 20°							167
	168									Joint 1) 187.4 to 188.0m, dipping 75° fresh surface, rough to planar tight							168
	169							1	CH								169
	170	Gn			dark gray	1		2									170
900	171									171.1-173.9 Augen Gneiss, coarse grained, augen dia. more than 5mm, slightly foliated, gneissosity 20°							171
	172							2	CM	Joint 1) 172.2m, dipping 40° fresh surface, rough, tight							172
	173							3	CH								173
	174							2		173.9-178.0 Augen Gneiss, coarse grained, augen dia. 3 to 18mm, moderately foliated, gneissosity 20 to 25°							174
	175							3	CM	Joint 1) 174.1m and 174.2m, dipping 40° fresh surface, planar, tight							175
	176									2) 174.35m, dipping 30° filled with zeolite, less than 1mm							176
	177									3) 174.65m, dipping 40° fresh surface, planar, tight							177
	178							2	CH	174.8 to 175.7m, slightly fractured							178
	179							3	CM	175.0m, gneissosity is undulated							179
	180							2	2-3	178.0-178.9 Augen Gneiss, coarse grained, augen dia. 2 to 18mm, slightly to moderately foliated, gneissosity 25°							180
										Joint 1) 178.6m, dipping 70° fresh surface, rough, tight							
										178.9-180.0 Augen Gneiss, coarse grained, augen dia. 2 to 26mm, moderately foliated, gneissosity 20°							
										Joint 1) 180.0m, dipping 65° fresh, rough							



# GEOLOGIC LOG OF DRILL HOLE

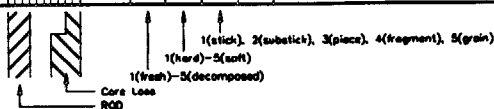
Puna Tsang Chhu Hydropower Project F/S

HOLE No. DQ-1

(SHEET 1 OF 1)

LOCATION Quarry DEPTH OF HOLE 10.0 m COMMENCED 2000/2/17  
 ELEVATION \_\_\_\_\_ DIRECTION OF HOLE vertical COMPLETED 2000/2/19  
 COORDINATE \_\_\_\_\_ CORE RECOVERY 24 % DRILLED BY Mr. Ngawang Norbu,  
 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo,  
 EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				G.W.L. (Dpt.H)	DEPTH					
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUCEON	P <sub>max</sub>	P <sub>c</sub>			CORE SAMPLE	BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN
m	0m			0 → 100%															0m	
	1	AI			varicolored					0.0-1.4 Alluvium gravels and cobbles of gneiss, pegmatite, granite and metasedimentary rocks					Diamond Bit 113mm	113mm				1
	2									1.4-2.0 core loss										2
	3	AI			varicolored					2.0-3.6 Alluvium gravels and cobbles of gneiss, pegmatite, granite and metasedimentary rocks					89mm					3
	4									3.6-10.0 core loss										4
	5										no test						none			5
	6																			6
	7																			7
	8																			8
	9																			9
	10									10.0m, bottom of hole										10





# GEOLOGIC LOG OF DRILL HOLE

Puna Tsang Chhu Hydropower Project F/S

HOLE No. DQ-3

(SHEET 1 OF 1)

LOCATION Quarry DEPTH OF HOLE 10.0 m COMMENCED 2000/1/29  
 ELEVATION \_\_\_\_\_ DIRECTION OF HOLE vertical COMPLETED 2000/2/9  
 COORDINATE \_\_\_\_\_ CORE RECOVERY 31 % DRILLED BY Mr. Ngawang Norbu, GSB  
 DRILLING MACHINE Tone THC-1 LOGGED BY Mr. Seiji Hongo, EPDC

ELEVATION	DEPTH	ROCK TYPE	LOG	CORE RECOVERY	OBSERVATION OF CORE					TESTING				DEPTH					
					COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK CLASS	DESCRIPTION	LUGEON	P <sub>max</sub>	P <sub>c</sub>		CORE SAMPLE	BIT TYPE	CASING	CEMENTATION	DRILL FLUID RETURN
3	0m			0 → 100%															0m
	1									0.0-1.7 core loss									1
	2									1.7									2
	3									0.0-10.0 Alluvium									3
	4									1.7 to 8.0m: gravels and cobbles of gneiss and pegmatite wood fragment is observed at 3.3m									4
	5									8.0 to 10.0m: fine grained sand									5
	6									varicolored									6
	7									light gray									7
	8																		8
	9																		9
	10									10.0m, bottom of hole									10

