PART - I

APPENDIX

A P P E N D I X

GEOLOGY AND CONSTRUCTION MATERIALS

（地質および建設材料）

A－1～A－10

GEOLOGY AND CONSTRUCTION MATERIALS

（地質および建設材料）

A－1～A－10

APPENDIX

A-1 Geologic Log of Drillholes
A-2 Core Photograph
A-3 Results of Permeability Test in Drillhole
A-4 Rock Foudation Test
A-5 Time-Distance Curve done by ICE
A-6 Seismic Profile done by ICE
A-7 Seismic Profile of Reanalysis
A-8 Laboratory Analysis of Rock Samples
A-9 Aero-photo Ineterpretation
A-10 Trenches

A-1 Geologic Log of Drillholes

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 1SP — (SHEET 1 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	70.70 m	COMMENCED	
ELEVATION	503.001 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Po	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.M)	DEPTH
	m			0 → 100%								Kgf/cm²						%		0m
										0.3 Non Core										
	1	Residual Soil	△		brown	5	5	5	>e	Brown, yellownish brown slime (silty - sandy) with a few brittle rock fragments. Core recovery very poor. 4.2										1
	5	Conglomerate	○		brown		5	5	>e	Strongly Weathered Brown - greyly brown slime (silty - sandy) with a few gravelish cores. 7.05										5
	7		○		brown	5	4 (3)	3	e	Strongly Weathered 8.05										7
	9		○		brownish gray		5 5	5 5	>e	Strongly Weathered 9.3										9
							(4)	(4)	e	9.7 Weathered rocks.										
	10		○		yellowish gray	4	3	2	d	Probably brittle cracky, and loosened rocks by weathering. Core loss in part, but almost sticky core.				11.00						10
	11		○											No Return						11
	12		○			(5)	(4)	(3)						12.50						12
	13		○							Partially discolored by weathering.										13
	14		○							14.8										14
	15		○			5	4	4	e	Generally very cracky (Apparently loosened rocks)										15
	16		○			(4)		(3)		17.2										16
	17		○			4	3	3 (2)	d	Generally cracky 18.5										17
	18		○		brownish gray	4	4	3	e	Possibly very cracky and somewhat loosened rocks.										18
	19		○			(5)	(3)	(4)												19
	20		○																	20

Core Lobo Test: 9.75

EPDC 49
ELECTRIC POWER DEVELOPMENT CO., LTD.

A-1 Geologic Log of Drillholes

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 1SP — (SHEET 1 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	70.70 m	COMMENCED	
ELEVATION	503.001 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 → 100%														%		0m
										0.3 Non Core										
	1–4	Residual Soil	△		brown	5	5	5	>e	Brown, yellownish brown slime (silty - sandy) with a few brittle rock fragments. Core recovery very poor. 4.2										1–4
	5–7	Conglomerate	○		brown		5	5	>e	Strongly Weathered Brown - greyly brown slime (silty - sandy) with a few gravelish 7.05 cores.										5–7
	7–8		○		brown	5	4 (3)	3	e	Strongly Weathered 8.05										7–8
	8–9		○		brownish gray		5	5	>e	Strongly Weathered 9.3										8–9
	9–10		○		brownish gray		5	5 (4)	e	9.7 Weathered rocks.						Core Labo. Test			9.75		9–10
	10–12		○		yellowish gray	4	3 (4)	2 (3)	d	Probably brittle cracky and loosened rocks by weathering. Core loss in part, but almost sticky core.				11.00				No Return	12.50	10–12
	12–15		○		yellowish gray					Partially discolored by weathering. 14.8										12–15
	15–17		○		yellowish gray	5 (4)	4	4 (3)	e	Generally very cracky (Apparently loosened rocks) 17.2										15–17
	17–18		○		yellowish gray	4	3	3 (2)	d	Generally cracky 18.5										17–18
	18–20		○		brownish gray	4 (5)	4 (3)	3 (4)	e	Possibly very cracky and somewhat loosened rocks.										18–20

EPDC — ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 1SP — (SHEET 2 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	70.70 m	COMMENCED	
ELEVATION	503.001 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	20m			0 → 100%	brownish gray	4	4	3	c	20.1		Kgf/cm²		20.00				×		0m
	21	Conglomerate				(5)	(3)	(4)		Generally cracky and somewhat weathered rocks				No Return 21.50			Core Labo. Test 20.50			1
	22									Somewhat massive and sticky core, but somewhat cracky in part.										2
	23					3	3													3
	24					(4)	(2)	2	c	Some cracks and/or joints are discolored along their planes. Sticky core somewhat weathered, but not so brittle.										4
	25																			5
	26																			6
	27																			7
	28						3	4		28.4										8
	29					4	(4)	(3)	e	29.0 Cores broken into small pieces in part.										9
	30									Some cracks and/or joints are rather discolored along their planes.				30.00						0
	31					3	3	3	d					No Return 31.50						1
	32	Sandstone			gray					32.6							Core Labo. Test 32.60			2
	33					3	3	4		32.8 Cracky part.										3
	34						(4)			Lithologically hard but cracky in general.										4
	35						3	2	c											5
	36	Conglomerate			light gray	3	(2)			35.6										6
	37						3	4		Some cracks with clayish materials, Somewhat cracky.										7
	38						3	2	d	38.2										8
	39						(2)	(3)	c	38.2-38.8m sandstone Generally hard compact										9
	40																			0

EPDC — ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 1SP — (SHEET 3 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	70.70 m	COMMENCED	
ELEVATION	503.001 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.K)	DEPTH
												Kgf/cm²		40.00				%		0m
	40	Conglomerate		0 ~ 100%	light gray	3	3 (2)	2 (3)	c	Somewhat cracky 40.9		No Return								
	41						4 (4)	4	d	41.4 Slightly cracky				41.50						1
	42							2		Somewhat cracky. 42.7										2
	43									Compact rather fresh										3
	44					3	3	2		Partially somewhat weathered along cracks										4
	45					(2)	(2)	(3)		and/or joints.										5
	46								c											6
	47									Slightly brittle as a whole. 47.9										7
	48					2		2		Slightly brittle at										8
	49					(3)				cracky parts. 50.0							Core Labo. Test 49.45			9
	50					3	2		d	Somewhat cracky as		No Return		50.00						0
	51				light gray	(2)				a whole. 51.5				51.50						1
	52						(3)			Generally massive and fresh.							Core Labo. Test 51.50			2
	53					2		2 (1)	b	with a few joints or cracks.										3
	54																			4
	55									55.1										5
	56					3	3 (4)	4 (3)	d	Somewhat cracky. Partially gravelish core at 56.8-57.4m.										6
	57									57.4										7
	58					2	2	2 (1)	b	Hard compact rather fresh Massive sticky core.							Core Labo. Test 58.00			8
	59																			9
	60																			0

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 1SP — (SHEET 4 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	70.70 m	COMMENCED	
ELEVATION	503.001 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Po	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	60m			0 ~ 100%								Kgf/cm²		60.00				%		0m
	61	Conglomerate			light gray	2	2	2	b	Hard compact rather fresh				No Return 61.50						1
	62							(1)		Massive sticky core somewhat cracky in part.										2
	63									64.0										3
	64					3	3	4	d	64.3 Cracky part										4
	65					2	2	2	b	Hard, compact rather fresh.					Core Lobo Test		64.75			5
	66							(1)		66.8										6
	67					3 (2)	3 (2)	3	c	Somewhat cracky. 67.75										7
	68													68.90						8
	69					2	2	2	b	Generally massive. Hard, compact rather fresh sticky core somewhat cracky in part.				No Return						9
	70													70.40						0
	1									Bottom of Hole at 70.70m										1
	2																			2
	3																			3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9																			9

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 2SP (SHEET 1 of 5)

LOCATION	DAMSITE	DEPTH OF HOLE	83.30 m	COMMENCED	
ELEVATION	510.332 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH (m)	ROCK NAME	LOG	CORE RECOVERY (0→100%)	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax (Kgf/cm²)	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN (%)	G.W.L (Opt.H)	DEPTH (m)
	0.5	Residual Soil	△		yellow	5	5	5		0.5 Non Core 1.0 Strongly Weathered										
	4.0	Conglomerate	○		light gray	3	3	2	c	Fresh core but oxide in crack in part Generally hard, compact sticky core.							Core Labo. Test 2.50			
	4.5									4.5 Non Core										
	6.1					3	4	5	e	5.0 Cores easily broken Somewhat cracky as a whole										
	9.4				light gray	3	3	3	d								Deformation Test 8.7			
	10.1					(2)	(2)	2	c	Generally somewhat cracky. Recovered some stick cores.										
	11.7				yellow	3	3	3	d	10.1 Cracky.				10.00						
	14.7					3	3	2	c	Cracky parts are discolored and slightly brittle				No Return 11.50			Core Labo. Test 11.10			
	15.0				light gray	2	2	1	b	Generally fresh. Hard, compact, massive sticky core. The longest length of core is nearly 1m. Conglomerate with well rounded gravel. Coarse sandstone in part, but bedding planes are not clear.							Core Labo. Test 14.70 Deformation Test 15.0 Deformation Test 15.5			
	20																Core Labo. Test 19.60			

EPDC — ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT. HOLE No. PHLL 2SP (SHEET 2 of 5)

LOCATION	DAMSITE	DEPTH OF HOLE	83.30 m	COMMENCED	
ELEVATION	510.332 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0→100%								Kgf/cm²		20.00				%		0m
	20									Somewhat hard and compact as a whole. Generally fresh and massive sticky core.		No Return		21.50						1
	21																			
	22																			2
	23																			3
	24				light gray		2	1	b	The longest length of core is nearly 1m. Conglomerate with well rounded gravel. Coarse sandstone in part, but bedding planes are not clear.											4
	25													Core Labo. Test 24.40						5
	26													Deformation Test 25.0						
	27													Deformation Test 25.4						6
	28	Conglomerate																		7
	28.4				gray	2	3													8
	29						(2)	3	c	29.1 somewhat massive										9
	30									Partially slightly brittle.				30.00						0
	31				light gray			2		Partially a few oblique joints with very slightly discolored planes.		No Return		Core Labo. Test 30.70						1
	32													31.50						2
	33						2		b											3
	34							1		Generally fresh, hard compact and massive sticky core.										4
	35																			5
	36																			6
	36.9																			
	37				gray	2	2	3	c	37.55 part alternate										7
						(3)	(3)	(2)												
	38				light gray	2	2	1	b	Generally hard. Fresh hard compact and massive. Somewhat cracky in part.										8
	39							1												9
	40							(2)												0

core loss
ROD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PALL 2SP (SHEET 3 of 5)

LOCATION	DAMSITE	DEPTH OF HOLE	83.30 m	COMMENCED	
ELEVATION	510.332 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY (0→100%)	COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	LUGEON	Pmax (Kgf/cm²)	Pe	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	40m	Conglomerate			light gray	2	2	1 (2)	b	Compact, and fresh and somewhat cracky in part. 43.3	No Return			40.00 – 41.50				×		0m
	43.3–43.8				yellow	3 (4)	3	3	d	43.8 Somewhat weathered rocks										
	43.8–45.2				gray	2 (3)	2 (3)	2 (3)	c	Partially somewhat cracky. 45.2										
	45.2–60				light gray	2	2	1	b	Generally hard and compact. Fresh and massive sticky core. Somewhat cracky in part with horizontal or gentle dip cracks. Conglomerate with well rounded gravel. Gravel size is cobble to granule. Coarse sandstone in part, but bedding planes are not clear. Rock species of gravel are sedimentary rocks (ex. conglomerate or sandstone) and some volcanic rocks.	No Return			50.00 – 51.50						
	60																			

Depth scale: 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60 m (right: 0m, 1–9, 0, 1–9, 0)

Legend: Core loss; RQD; 1 fresh – 5 decomposed; 1 hard – 5 soft; 1 slight, 2 medium, 3 planar, 4 fragments, 5 grain

EPDC — ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHIL 2SP (SHEET 4 of 5)

LOCATION	DAMSITE	DEPTH OF HOLE	83.30 m	COMMENCED	
ELEVATION	510.332 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	60m			0 ≈ 100%								Kgf/cm²		60.00				%		0m
	61	Conglomerate			yellow light gray	2	2 (3)	1 (2)	b c	Hard and compact. 60.9 slightly cracky. Somewhat hard and compact. 63.1				No Return 61.50						1
	62																			2
	63					3 (4)	3	4 (3)	d	63.3										3
	64									Lithologically hard and compact										4
	65																			5
	66				light gray		2	1	b	Fresh and massive sticky core with horizontal or gentle dip cracks in part. 68.8										6
	67					2														7
	68																			8
	69						2 (3)	3	c	Cracky and somewhat brittle as a whole. 69.4										9
	70							2		slightly cracky. Generally compact and massive.										0
	71						2	(1)	b	71.1										1
	72				yellowish gray	3	3	2 (3)	d	Generally cracky, Most of crack/joint planes are discolored by weathering.										2
	73																			3
	74					(4)				75.1				74.90						4
	75						4													5
	76				yellow light gray	4	(3) (3)	4 5	e	Somewhat cracky as a whole. 76.2		12.59		0 76.40						6
	77					3	3 (2)	2 (3)	c	slightly cracky. Generally gravelish core. 78.3				77.50						7
	78																			8
	79				yellowish gray	4 (3)	4 (3)	4 (3)	e	Generally cracky, moderatly weathered along cracks 80.0		19.85		0						9
	80																			0

EPDC | 電発
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 2SP — (SHEET 5 of 5)

LOCATION	DAMSITE	DEPTH OF HOLE	83.30 m	COMMENCED	
ELEVATION	510.332 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.C	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Opt.H)	DEPTH
	80			0 ~ 100%																0m
	81	Conglomerate	O		light gray	2 (3)	2 (3)	1 (2)	b	Generally hard and compact but slightly crack as a whole. Fresh sticky core.				81.50						1
	82		O											No Return						2
	83													83.00						3
										Bottom of Hole at 83.30m										4
																				5
																				6
																				7
																				8
																				9
																				0
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9

EPDC ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 3SP — (SHEET 1 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	80.0 m	COMMENCED	
ELEVATION	493.922 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: JUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 ~ 100%								Kgf/cm²						%		0m
										Non Core 1.0										
	1	Conglomerate			brownish gray	4 (5)	4	4 (5)	e	Cracks and/or joints with discolored planes due to weathering. 4.0										1
	2					4 (3)	3 (4)	3												2
	3																			3
	4																			4
	5				light gray	3 (2)	3 (2)	3 (2)	c	sligtly, brittle Discolored along crack and/or joint planes. 7.05				Core Labo. Test			4.70			5
	6													Core Labo. Test 7.00						6
	7													Deformation Test			7.0			7
	8					2 (3)	3	3	d	Generally rather cracky. 7.8				Deformation Test			8.0			8
	9									Generally hard and compact but cracky and weathered along most of cracks and/or joints.				8.50						9
	10											No Return		10.00						10
	11							2						Core Labo. Test			10.80			11
	12							(1)												12
	13						2			Generally cracks and/or joints dip horizontal or gentle.										13
	14				gray	2	(3)		b					Core Labo. Test			14.34			14
	15									Conglomerate with well rounded gravel.										15
	16																			16
	17							2		slightly cracky.				17.75						17
	18							(3)		Weathered along planes of cracks.		13.88		1						18
	19									19.25				19.50						19
	20							2	b	Lithologically hard.										20

ROD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 3SP — (SHEET 2 of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	80.0 m	COMMENCED	
ELEVATION	493.922 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm	Pa	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Dpt.H)	DEPTH
	m			0 → 100 %																0m
	20									Somewhat brittle at cracky part.							Core Labo Test			
																	20.30			
	21						2							21.50						1
	22				gray	2	(3)	2	b	Most of cracks and/or joints are discolored due to weathering.		14.25'		3						2
	23													23.00						3
					yellow	4	5	5		23.8							Core Labo Test			
	24					(5)	(4)	(4)	v	23.9							24.50			4
																	Deformation Test			
																	24.5			
	25									Hard, compact and fresh in lithologic.							Deformation Test			5
																	25.0			
	26																			6
	27																			7
	28						2			Cracky parts somewhat weathered and brittle.										8
	29							2		Some parallel cracks with oblique dip at 34.2-34.5, 35.1-35.5, 36.7-36.9m, with gentle to horizontal dip at 31.0-31.6m, 38.2-38.5m.										9
							(3)													
	30													30.35			Core Labo Test			0
																	30.15			
	31	Conglomerate			gray	2			b			15.14		9						1
														31.85						
	32																			2
	33																			3
	34									Conglomerate with well rounded gravel. Gravel size is cobble to granule.				34.30						4
	35											15.53		3						5
														35.80						
	36													36.30						6
																	Core Labo Test			
	37				light gray		2	1				15.73		7			36.75			7
														37.80						
	38							(2)												8
																	Deformation Test			
	39																39.3			9
																	Deformation Test			
	40																39.8			0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 3SP — (SHEET 3of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	80.0 m	COMMENCED	
ELEVATION	493.922 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pa	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	40m			0 → 100%								Kgf/cm²						%		0m
	41	Conglomerate			light gray	2	2	1 (2)	b	Generally massive. Hard, compact and fresh sticky core, with a few horizontal to gentle dip cracks. Coarse sandstone in part. 45.6										
	42																			
	43																			
	44																			
	45																			
	46					3	4	5	e	46.0 Weathered and cracky zone.										
	47				gray	2	2	2	b	Somewhat massive and compact. 46.8				46.50						
	48				yellow	3 (4)		4 (5)	d	47.5 Slightly discolored		16.75		3 48.00						
	49				gray		3	2	b	Compact and fresh. Generally massive and hard sticky core with a few horizontal to gentle dip cracks. Conglomerate with well rounded gravel. Coarse sandstone in part. 54.6										
	50					2		(1)												
	51																			
	52																			
	53																			
	54																			
	55					3	4	5	e	Sheared part. 54.7										
	56					2	3	2 (1)	b	Partially cracky but rather massive as a whole. 57.1										
	57				yellow	3	3	2	c	57.7 Rather cracky as a whole.										
	58				gray	2	2	1 (2)	b	Rather massive part and slightly cracky part are alternated.										
	59																			
	60																			

Core Labo. Test 40.00

Core Labo. Test 45.80

Core Labo. Test 51.25

Core Labo. Test 53.60

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 3SP — (SHEET 4of 4)

LOCATION	DAMSITE	DEPTH OF HOLE	80.0 m	COMMENCED	
ELEVATION	493.922 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Dpt.H)	DEPTH
	60m			0→100%																0m
	61									Generally hard, compact and fresh. Massive sticky core with few horizontal to gentle dip cracks. Some parallel and oblique cracks at 70.4-70.6m, 74.5-74.8m and 77.5-77.8m. Almost planes of cracks are not oxidized nor weathered.										1
	62													Core Labo. Test 61.90						2
	63																			3
	64																			4
	65													Core Labo. Test 65.55						5
	66																			6
	67																			7
	68													Core Labo. Test 68.80						8
	69							1						68.90						9
	70	Conglomerate			gray	2	2		b	Conglomerate with well rounded gravel. Gravel size are cobble to granule. Coarse sandstone in part, but bedding planes are not clear. Rock species of gravel are sedimentary rocks (ex. conglomerate or sandstone) and some volcanic rocks.		18.99		3 70.40						0
	71							(2)												1
	72																			2
	73																			3
	74													Core Labo. Test 74.50						4
	75																			5
	76																			6
	77																			7
	78																			8
	79																			9
	80									Bottom of Hole at 80.00m				Core Labo. Test 80.00						0

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 4SP — (SHEET 1 of 3)

LOCATION	DAMSITE	DEPTH OF HOLE	60.0 m	COMMENCED	
ELEVATION	453.755 m	DIRECTION OF HOLE	70/300	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt. H)	DEPTH
	m			0 ~ 100%								Kgf/cm²						%		m
										0.3 Concrete										
	1				brownish gray	4	4	4		Core recovery poor in general.										1
	2									(Probably strongly weathered rocks										2
	3					(5)	(5)	(5)		with rather hard blocks in part)										3
	4																			4
	5								e	Almost gravelish core.										5
	6				gray	4				Some fresh and										6
	7					(3)	4	3		compact part are probably residual										7
	8				brownish gray					from weathering.										8
	9					4	4	5												9
	10	Conglomerate					(5)	(4)		9.1										10
	11							2		Most of crack/joint				10.40						11
	12					3		(3)		planes are more or less, discolored				No Return						12
	13					(2)	3		d	due to weathering.				11.90						13
	14							3		Generally cracky		13.29		37 Core Lab. Test						14
	15				gray					with horizontal to gentle dip cracks.				13.40				12.75		15
	16									14.6				14.70						16
	17					2	2	1		Cracky and somewhat brittle.		13.57		23						17
	18					(3)		(2)	b	Generally fresh, compact and hard sticky core.				16.20						18
	19									The longest length of core is nearly 1m.										19
	20																			20

RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 4SP — (SHEET 2 of 3)

LOCATION	DAMSITE	DEPTH OF HOLE	60.0 m	COMMENCED	
ELEVATION	453.755 m	DIRECTION OF HOLE	70/300	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.M)	DEPTH
	20m			0→100%										Deformation Test						0m
	21													20.1						
														Core Labo. Test						
	22													20.80						1
	23					2	2 (3)	1 (2)	b	Cracky and somewhat brittle. Generally fresh, compact sticky core.										2
	24					3	3 (4)	4	d	22.8 23.3 Somewhat cracky.										3
	25									Rather hard and compact but cracked moderately as whole.										4
	26													Core Labo. Test						5
	27					2	2 (3)	1 (2)	b	Generally fresh and massive sticky core with few horizontal to gentle dip cracks.				26.00						6
	28																			7
	29													Core Labo. Test						8
	30									29.8				29.00						9
	31	Conglomerate			gray	2	3 (3)	3 (2)	c	Partially hard and compact, but generally rather cracky.		15.1		Deformation Test 29.95						0
	32						2 (3)	2 (3)		Planes of cracks are not oxidized nor weathered.				10Deformation Test 31.45						1
	33									34.0				29.7						2
	34													30.7						3
	35					2	2 (2)	1 (2)	b	Hard and compact but somewhat cracky in part. Fresh and massive sticky core with few cracks gentle to horizontal dip. Replacement of matrix to silicate minerals in part.										4
	36													Core Labo. Test						5
	37													36.00						6
	38																			7
	39													Core Labo. Test						8
	40													40.00						9
														Deformation Test						
														40.0						0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 4SP — (SHEET 3 of 3)

LOCATION	DAMSITE	DEPTH OF HOLE	60.0 m	COMMENCED	
ELEVATION	453.755 m	DIRECTION OF HOLE	70/300	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cd	Po	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Opt.H)	DEPTH
	40			0 → 100%										40.30						0m
	41	Conglomerate			gray	2	2	1 (2)	b	Hard, compact, fresh and rather massive		12.13		55						1
	42									42.9				41.80						2
	43	Conglomerate Sandstone			dark gray	2	2	2	b	43.4 Somewhat massive.										3
	44				gray	2	2	2	b	Cracky part are somewhat discolored										4
	45									45.4				45.20						5
	46	Conglomerate Sandstone			dark gray	2 (3)	3 (2)	4	d	Somewhat separatable 46.5along bedding plane		16.62		0 46.60						6
	47				gray	2	2	2	b	Somewhat hard and 47.7 fresh.		16.76		46.70 1						7
	48					3	3	3 (4)	d	Somewhat cracky 48.5 as a whole.				48.10						8
	49	Conglomerate				2	2 (3)	2 (1)	b	Generally fresh, compact, hard and massive sticky core.				Core Labo. Test 49.70						9
	50	Sandstone								50.4				Deformation Test 49.8						0
	51				dark gray	2	2	2		50.8 Cracky along bedding plane				Deformation Test 50.3						1
	52																			2
	53	Conglomerate			gray	2 (1)	2	1 (2)	a	Generally hard, compact and fresh sticky core with few oblique cracks in part. Planes of cracks are not oxidized nor weathered. Conglomerate with well rounded gravel. Coarse sandstone in part.				Core Labo. Test 53.80						3
	54																			4
	55																			5
	56																			6
	57																			7
	58																			8
	59													Core Labo. Test 59.50						9
	60									Bottom of Hole at 60.0m										0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 5CM — (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	30.00 m	COMMENCED	
ELEVATION	97.503 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 → 100 %								Kgf/cm²						%		m
										0.35 Non Core										
	1	Talus Deposits	△		brown	5	5	5	e	Mostly slime (silt and/or sand) with a few gravels. Core recovery is very poor.										1
	2		△																	2
	3																			3
	4		△							4.35										4
	5	Mudstone (Marl)			brown	5	4	4 (5)	e	Strongly Weathered Cores broken into small pieces in part.									4.65	5
	6									7.35										6
	7																			7
	8																			8
	9																			9
	10																			0
	11				bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										1
	12																			2
	13																			3
	14																			4
	15																			5
	16																			6
	17																			7
	18																			8
	19																			9
	20																			0

EPDC — ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 5CH (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	30.00 m	COMMENCED	
ELEVATION	97.503 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.m)	DEPTH
	m			0 → 100 %								Kgf/cm²						×		0m
	20	Mudstone (Marl)			bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										
	30									Bottom of Hole at 30.00m										

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-6CM — (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	24.30 m
ELEVATION	95.540 ± m	DIRECTION OF HOLE	V.
COORDINATE		CORE RECOVERY	%
		DRILLING MACHINE	

COMMENCED
COMPLETED
DRILLED BY
LOGGED BY

ELEVATION	DEPTH	ROCK NAME	L·O·G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Po	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 ~ 100%								Kgf/cm²						×		0m
										0.2 Non Core										
	1	Talus Deposits	△		brown	5	5	5	>e	Gravelish cores only. with some slime.									▽	1
	2									2.2									1.3	2
	3									Detail Condition of Core are unknown because of crumbling										3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9					2	5	5	d											9
	10	Mudstone (Marl)			bluish gray	(?)	(?)	(?)	(?)											0
	11																			1
	12																			2
	13																			3
	14																			4
	15																			5
	16																			6
	17																			7
	18																			8
	19																			9
	20																			0

Core Loss
RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-6CM (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	24.30 m	COMMENCED	
ELEVATION	95.540 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Po	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 → 100%								Kgf/cm²						%		0m
	20	Mudstone (Marl)			bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										1
	21																			2
	22																			3
	23																			4
	24									Botton of Hole at 24.30m										5
	25																			6
	26																			7
	27																			8
	28																			9
	29																			0
	30																			1
	31																			2
	32																			3
	33																			4
	34																			5
	35																			6
	36																			7
	37																			8
	38																			9
	39																			0

RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-7CM (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	28.00 m	COMMENCED	
ELEVATION	95.086 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATES		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0→100%								Kgf/cm²						%		0m
										0.4 Non Core										
	1	Conglomerate			brown	5	5	5	>e	Strongly Weathered Weathered rocks. Cores easily broken into pieces. Green colored Montmorillonite at 4.1m Mostly gravelish and discolored cores. Core recovery is very poor.										
	2																			
	3																			
	4																		▽ 3.90	
	5																			
	6																			
	7																			
	8																			
	9									9.6										
	10				brownish gray	4	4	3	e	Somewhat weathered but not so sheared. Core recovery poor in general. Almost core length is less than 5cm. Original rock structure are hard to identify.										
	11																			
	12																			
	13						(3)	(4)												
	14																			
	15																			
	16																			
	17				greenish gray	5	5	5		17.35 Sheared										
	18	Mudstone (Marl)			bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										
	19																			
	20																			

RCD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-7CM (SHEET 2of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	28.00 m	COMMENCED	
ELEVATION	95.086 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cd	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Opt.H)	DEPTH
	20 m	Mudstone (Marl)		0 → 100 %	bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										0m
	21																			1
	22																			2
	23																			3
	24																			4
	25																			5
	26																			6
	27																			7
	28									Bottom of Hole at 28.00m										8
	9																			9
	0																			0
	1																			1
	2																			2
	3																			3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9																			9
																				0

RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-8CM — (SHEET 1 of 1)

LOCATION	POWERHOUSE	DEPTH OF HOLE	20.10 m	COMMENCED	
ELEVATION	86.146 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pa	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	m			0 → 100%								Kgf/cm²						%		0m
										0.25 Non Core										
	1	Terrace Deposits			brown	5	5	5	>e	Core recovery is very poor. Slime with some gravelish core. Slime are sand and silt. Some sticky core are probably derived from gravel.									▽	1
	2																			2
	3																		2.85	3
	4																			4
	5																			5
	6																			6
	7																			7
	8									8.1										8
	9	Mudstone (Marl)			bluish gray	2 (?)	5 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										9
	10																			0
	11																			1
	12																			2
	13																			3
	14																			4
	15																			5
	16																			6
	17																			7
	18																			8
	19																			9
	20									Bottom of Hole at 20.0m										0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 9CM — (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	31.50 m	COMMENCED	
ELEVATION	88.296 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 → 100 %														%		0m
										0.4 Non Core										
	1	Terrace Deposits			brown	5	5	5	>e	Core recovery is very poor. Only gravelish core with some slimes (sand and sandy silt). Some sticky core are probably derived from gravels.										1
	2																			2
	3																			3
	4																		▽	4
	5																		4.40	5
	6																			6
	7									7.45										7
	8	Mudstone (Marl)			bluish gray	2 (?)	4 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										8
	9																			9
	10																			0
	11																			1
	12																			2
	13																			3
	14																			4
	15													15.75						5
	16											6.68		5 / 16.50						6
	17													17.25						7
	18											9.75		0						8
	19													18.00						9
	20																			0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL 9CM — (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	31.50 m	COMMENCED	
ELEVATION	88.296 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Opt.H)	DEPTH
	m			0 → 100%								Kgf/cm²								0m
	20	Mudstone (Marl)			bluish gray	2 (?)	4 (?)	5 (?)	d (?)	Detail Condition of Core are unknown because of crumbling										1
	21																			2
	22																			3
	23																			4
	24																			5
	25																			6
	26																			7
	27																			8
	28																			9
	29																			0
	30																			1
	31									Bottom of Hole at 31.50m										2
	2																			3
	3																			4
	4																			5
	5																			6
	6																			7
	7																			8
	8																			9
	9																			0

RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT. HOLE No. PHLL 10TO (SHEET 1 of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	36.40 m	COMMENCED	
ELEVATION	148.463 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH (m)	ROCK NAME	LOG	CORE RECOVERY (0 ~ 100%)	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax (Kg/cm²)	Po	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN (%)	G.W.L (Dpt.M)	DEPTH (m)
	0	Residual Soil								0.3 Non Core										0
	1									1.8										1
	2	Conglomerate			brown	5	5	5	>e	Strongly Weathered Core recovery is very poor. 3.6										2
	3									3.85 Non Core										3
	4				brown	5	5	5	>e	4.2 Strongly Weathered 4.5 Non Core										4
	5	Conglomerate			brown	5	5	5	>e	Strongly Weathered Core recovery is very poor. 6.9										5
	6																			6
	7									7.4 Non Core										7
	8																		▽ 7.80	8
	9																			9
	10				brown	5	4	4	e	Strongly Weathered Core recovery is poor, but rather better compared with shallower than 6.9m.										10
	11					(4)	(5)													11
	12	Conglomerate								Weathered and loosened rock. Partially discolored 14.1				Core Labo. Tes 11.88						12
	13																			13
	14																			14
	15				dark gray	3	4	3	d	Recovered some stick cores. Generally cracky and weathered core. 17.8										15
	16						(3)	(4)						Core Labo. Tes 16.35						16
	17													Core Labo. Tes 17.10						17
	18				brown	4	5	4	e	Strongly weathered. 18.8										18
	19					(5)	(4)	(5)												19
	20				dark gray	2	2	2	b	Rather massive part and slightly cracky										20

EPDC
ELECTRIC POWER DEVELOPMENT CO. LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 10TO (SHEET 2 of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	36.40 m
ELEVATION	148.463 m	DIRECTION OF HOLE	V.
COORDINATE		CORE RECOVERY	%
		DRILLING MACHINE	
		COMMENCED	
		COMPLETED	
		DRILLED BY	
		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Dpt.H)	DEPTH
	20m			0 → 100%																0m
	21									Rather hard and compact but cracked moderately as whole. Core recovery is rather well with some sticky core. Gravels in conglomerate are derived from volcanic rocks.					Core Labo. Test					1
	22														20.25					2
	23					2	2	2	b											3
	24																			4
	25																			5
	26																			6
	27	Conglomerate			dark gray										Core Labo. Test					7
										27.65					26.75					
	28					2 (3)	3	4 (3)	d	Generally cracky 28.65										8
	29									Partially hard and compact, but generally rather cracky. Core recovery is not so poor, with some sticky core.										9
	30					2	2 (3)	2	c						Core Labo. Test					0
	31														30.25					1
	32																			2
	33									33.0										3
						3	3 (4)	4	e	33.4 Carbenate(?) Veinlet					Core Labo. Test					
	34									Somewhat cracky as a whole.					33.50					4
						2	2 (3)	2	c											
	35									35.5										5
					brown	4	3	5	e	35.7 Loosened core.										
	36					2	2 (3)	3	c	Somewhat cracky										6
										Bottom of Hole at 36.40m										
	7																			7
	8																			8
	9																			9

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT　　HOLE No. PHLL 11TP　　(SHEET 1 of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	30.80 m	COMMENCED	
ELEVATION	278.718 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt. H)	DEPTH
	m			0 ≈ 100%								Kgf/cm²						%		0m
		Residual Soil								0.3 Non Core										
					brown	5	5	5	>e	0.7										
					brown	5 (4)	5	5	>e	Strongly Weathered 2.2										
		Conglomerate			dark gray	2	2	1	a	In shallow part are breccia without sharp boundary of lithology Hard, compact, fresh and rather massive with some sticky core. Cracks dip gentle to horizontal. 9.3										
						2 (3)	3	2 (2)	b	Hard and compact, but somewhat cracky in part. ex.) 10.4-11.9m in depth. Generally somewhat fresh and massive with some sticky core. Gravels in conglomerate are derived from volcanic rocks.				Core Labo. Test 9.52 Core Labo. Test 13.42 Core Labo. Test 16.00 Core Labo. Test 17.10						
	20																			

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL 11TP — (SHEET 2 of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	30.80 m
ELEVATION	278.718 m	DIRECTION OF HOLE	V.
COORDINATE		CORE RECOVERY	%
		DRILLING MACHINE	
		COMMENCED	
		COMPLETED	
		DRILLED BY	
		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
												Kgf/cm²						x		0m
	20	Conglomerate		0 50 100 %	dark gray	2 (3)	3	2 (3)	b	Partially cracky but rather massive as a whole. 22.6							Core Lobo. Test 21.40			1
	23					3	4	4	e	23.1										3
	26					2	2 (3)	2	b	Many gravels of andesite and some silicate gravels Generally hard and compact but slightly cracky. Some cracks dip oblique to gentle.				Core Lobo. Test 26.25						6
	30									Bottom of Hole at 30.80m										0

EPDC | ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-12CM — (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	30.85 m	COMMENCED	
ELEVATION	101.276 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH (m)	ROCK NAME	LOG	CORE RECOVERY (0 → 100 %)	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax (Kgf/cm²)	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN (%)	G.W.L (Opt.m)	DEPTH (0m)
										0.3 Non Core										
		Residual Soil / Talus Deposits								0.75										
	1		▽							Gravelish cores only.										
	2		△		brown	5	5	5	>e	Core recovery is very poor.										
	3		△							3.95										
	4				brown	4 (5)	4 (3)	4 (5)	e	Possibly very cracky and somewhat loosened rocks.										
	5		○							5.55										
	6				dark gray	3 (2)	3 (4)	2 (3)	c	Somewhat cracky as a whole. Core recovery is not so well. Somewhat weathered rock with some gravelish core.				Core Labo. Test			6.40			
	7		○							10.7										
	8																			
	9		○																	
	10																			
	11		○			3	4 (3)	3	d	Slightly brittle at cracky parts.										
	12									12.2				Core Labo. Test			12.20			
	13	Conglomerate								Probably sheared Weak and loosened core. Easily broken.										
	14		○			4 (3)	4 (5)	5 (4)	e											
	15									15.35										
	16									Generally somewhat cracky. Cracky parts are discolored and slightly brittle Somewhat weathered.										
	17		○			3	3	3	d											
	18																			
	19				brownish gray	3	4	4	e	19.9				Core Labo. Test			19.28			
	20																			

EPDC — ELECTRIC POWER DEVELOPMENT CO. LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 12CM — (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	30.85 m	COMMENCED	
ELEVATION	101.276 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L-O-G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
												Kgf/cm²						×		0m
	20	Conglomerate		0 ≈ 100%	brownish gray	3 (4)	4	4 (3)	e	Weak and loosened core. 21.25										1
	21																			
	22									Generally rather cracky.										2
	23				gray	3	3	3 (2)	d	Core recovery is not so poor, but with almost gravelish core. 26.5										3
	24																			4
	25														Core Labo. Test					5
	26					3														6
	27				dark gray		4	4 (3)	e	Sheared Slickenside in part Weak and loosened core. Easily broken. Somewhat weathered.										7
	28																			8
	29					3 (4)	4 (5)	5 (4)												9
	30																			0
	1									Bottom of Hole at 30.85m										1
	2																			2
	3																			3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9																			9
																				0

Core barrel: 800

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL. 13CM (SHEET 1 of 3)

LOCATION	POWERHOUSE	DEPTH OF HOLE	50.0 m	COMMENCED	
ELEVATION	102.035 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pe	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	m			0→100%								Kgf/cm²						%		0m
	1	Residual Soil			brown	5	5	5	>e	Gravelish core only without any slime. 2.25										1
	2																			2
	3	Talus Deposits			brown	5 (4)	4 (5)	4 (5)	e	Core recovery is very poor, with some gravelish core and slime (sand and sandy silt). 7.05										3
	4																			4
	5																			5
	6																			6
	7									Cracky and somewhat brittle.										7
	8									Partially somewhat weathered along cracks and/or joints.										8
	9													Core Lobo. Tes 9.25						9
	10																			0
	11																			1
	12	Breccia			greenish brown	4 (3)	4 (3)	3 (4)	d	Generally weathered rock with some gravelish core. Almost cracks dip oblique.										2
	13													Core Lobo. Tes 12.95						3
	14																			4
	15																			5
	16									Gravels in breccia are obviously angular. But it is thought that it is a part of conglomerate.										6
	17													Core Lobo. Tes 17.41						7
	18																			8
	19																			9
	20																			0

RCD

EPDC 69
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-13CM (SHEET 2 of 3)

LOCATION	POWERHOUSE	DEPTH OF HOLE	50.0 m	COMMENCED	
ELEVATION	102.035 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pe	DEPTH RESULT	DIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
				0 → 100 %								Kg/cm²						×		0m
	20	Breccia			greenish brown	4 (3)	4	3 (4)	d	Generally weathered and cracky core with some gravelish core. 22.5										1
	21																			
	22														Core Labo. Test					2
														22.35						
	23				greenish gray	3 (4)	(3)	4 (5)	e	Recovered cores easily broken Weakly and loosened core. 25.5										3
	24																			4
	25																			5
	26				gray	3 (2)	3	4 (3)	d	Generally cracky but slightly weathered rock. 28.2										6
	27																			7
	28				brown	5	4 (5)	5 (4)	e	Sheared and re-consolidated 29.0										8
	29				dark gray	3 (2)	3	3 (4)	d	Generally cracky, crack planes are discolored by weathering. Core recovery is not so well with some gravelish core. 35.05										9
	30																			0
	31																			1
	32																			2
	33														Core Labo. Test					3
														33.75						
	34																			4
	35	Conglomerate				4	4	4 (5)	e	Weak and loosened 36.0 core.										5
	36																			6
	37				light gray	4 (3)	3 (4)	3 (4)	c	Somewhat cracky. Generally weathered and loosened core with some oblique dip cracks.					Core Labo. Test					7
														37.10						
	38																			8
	39																			9
	40																			0

EPDC (e)
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-13CM (SHEET 3 of 3)

LOCATION	POWERHOUSE	DEPTH OF HOLE	50.0 m	COMMENCED	
ELEVATION	102.035 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Dpt.m)	DEPTH
	40 m			0 = 100%																0m
	41	Conglomerate			light gray	4 (3)	3 (4)	3 (4)	c	Generally weathered 41.1				Core Labo Test 40.66						1
	42					4	(4)	4 (5)	e	Weak and loosened. 41.85										2
	43				dark brown	2 (3)	3	3	d	Slightly weathered . and generally cracky core. 44.9										3
	44																			4
	45				willy gray	5	5	5	e	45.2										5
	46	Mudstone(Marl)			greenish gray	3	4	5 (4)	e	Cracky and loosened along bedding plane Core recovery is not so well with some gravelish core. Cracks dip oblique										6
	47																			7
	48																			8
	49						5 (4)													9
	50									Bottom of Hole at 50.00m										0
	1																			1
	2																			2
	3																			3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9																			9

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL-14CM (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	34.15 m	COMMENCED	
ELEVATION	103.851 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.m)	DEPTH
	m			0 ~ 100%								Kgf/cm²						%		0m
										0.2 Non Core										
		Talus Deposits	△		brown	5	5	5	>e	0.9					Core	Labo. Test				1
	1				gray	3	3 (4)	4	e	1.5							1.20			
	2		○							Fresh and hard core										2
	3									Partially somewhat cracky.										3
	4									Core recovery is not so poor.										4
	5		○							Generally					Core	Labo. Test				5
	6						3	2		massive and compact core.							5.15			6
	7				black-dark gray	2	(2)	(1)	b	Some crack planes are slightly weathered.										7
	8		○												Core	Labo. Test				8
	9									Gravels in conglomerate are derived from volcanic rocks.							8.80			9
	10														Core	Labo. Test				0
	11																9.40			1
	12	Conglomerate	○											12.15						2
							3			12.6										
	13				dark gray	3	(4)	4	d	13.4 Somewhat cracky.		11.32		2						3
	14									Fresh and hard core				13.65						4
	15		○				3	3		but slightly cracky in part.										5
	16						(2)	(2)	b	Generally										6
	17				black-dark gray	2				massive and compact.										7
	18		○																	8
										18.5					Core	Labo. Test				
	19						3	4	c	Generally cracky core.				19.85			18.68			9
	20																			0

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL-14CM — (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	34.15 m	COMMENCED	
ELEVATION	103.851 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	m			0 → 100 %								Kgf/cm²						%		m
	20	Conglomerate			black-dark gray	2	3	4	c	Generally cracky core. 21.35		12.09		1 21:35						
	21																			1
	22									Hard, compact rather fresh.										2
	23						3	3	b	Slightly cracky in part.							Core Labo. Test 23.57			3
	24						(2)										Core Labo. Test 24.28			4
	25																			5
	26									26.1										6
	27				dark gray	2	3	4	c	Carbonate(?) Veinlet 27.25										7
	28				black-dark gray		3	3	b	Hard, compact and rather fresh.							Core Labo. Test 27.87			8
	29					(3)	(2)			29.7							Core Labo. Test 28.60			9
	30									Sheared and re-consolidated Slickenside in part Weak and loosened core. Easily broken. Core recovery is poor.										0
	31					3	3	5	e											1
	32					(4)	(4)	(4)												2
	33																			3
	34									Bottom of Hole at 34.15m										4
	35																			5
	36																			6
	37																			7
	38																			8
	39																			9
																				0

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 15CM [SHEET 1 of 2]

LOCATION	POWERHOUSE	DEPTH OF HOLE	26.40 m	COMMENCED	
ELEVATION	103.173 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Po	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
				0 → 100%								Kgf/cm²						✕		0m
	0	Residual Soil	▽							0.7 Slime.										
	1				brownish gray brown	5	4	5	e	Partially weaken and crumbled Core recovery is very poor. 3.5										1
	2																			2
	3																			3
	4									Somewhat fresh core but somewhat cracky along surface of gravel										4
	5																			5
	6							3	c	Core recovery is not so poor with some sticky core.										6
	7																			7
	8				dark gray	3	3			Somewhat weathered along crack planes.										8
	9																			9
	10	Conglomerate								10.5										0
	11							4	d	Generally cracky and slightly weathered with some gravelish core.										1
	12																			2
	13						4			13.4										3
	14					5	(5)	5	e	14.05 Sheared and crumbled										4
	15									Somewhat cracky and weathered.										5
	16					3	3	3	c	15.9-16.0m Weaken										6
	17				gray	(4)	(4)	(4)		Core recovery is not so well with some gravelish core.										7
	18																			8
	19																			9
	20																			0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL 15CM (SHEET 2of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	26.40 m	COMMENCED	
ELEVATION	103.173 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax.	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
				0 → 100%								Kgf/cm²						%		0m
	20m	Conglomerate			gray-dark gray	3 (4)	3 (4)	3 (4)	c	Somewhat cracky and weathered.										
	22.9																			
					dark gray-brownish gray	5	5	5 (4)	e	Probably sheared Slickenside in part Sheared and re-consolidated Carbonate(?) Veinlet disturbed										
	26m				dark gray	4 (3)	4	4		Bottom of Hole at 26.40m										

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 16CM — (SHEET 1 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	26.0 m	COMMENCED	
ELEVATION	104.197 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax.	Pa	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	m			0 ~ 100 %								kgf/cm²						%		0m
										0.3 Non Core										
	1	Conglomerate			brownish gray	4 (5)	4 (5)	5 (4)	e	Strongly Weathered 1.0										1
	2									Many andesite gravels										2
	3									Generally cracky and slightly weathered.										3
	4									Somewhat										4
	5																			5
	6							3		weathered along crack planes.										6
	7								4	Core recovery is										7
	8							(2)	d	not so poor, with some gravelish core.										8
	9																			9
	10				black-dark gray	2				Slightly massive, compact and hard in part (ex. 15.4-16.1m).										0
	11																			1
	12																			2
	13																			3
	14																			4
	15																			5
	16							2	3											6
	17							3 (2)	4	d Generally cracky and slightly weathered. 17.55										7
	18									Somewhat fresh										8
	19							2	3 (4)	b and slightly compact but somewhat cracky in part.										9
	20																			0

EPDC
ELECTRIC POWER DEVELOPMENT CO. LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL 16CM — (SHEET 2 of 2)

LOCATION	POWERHOUSE	DEPTH OF HOLE	26.0 m	COMMENCED	
ELEVATION	104.197 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.M)	DEPTH
	m			0 ~ 100%								Kgf/cm²						%		0m
	20	Conglomerate			dark gray	2	2	(4)	b	20.4 Somewhat fresh.										
					black	4	(4)	5	a	20.85 Silicias veinlet										
	21									Fresh core										1
	22									Slightly massive and compact but cracky in general.										2
	23				black-dark gray	2	2	4	c											3
	24						(3)	(3)												4
	25									Slightly weathered along crack planes.										5
	26									Bottom of Hole at 26.00m										6
	27																			7
	28																			8
	29																			9
	30																			0
	31																			1
	32																			2
	33																			3
	34																			4
	35																			5
	36																			6
	37																			7
	38																			8
	39																			9
	40																			0

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL 17TP — (SHEET 1 of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	21.60 m	COMMENCED	
ELEVATION	391.319 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE		CORE RECOVERY	%	DRILLED BY	
		DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH (m)	ROCK NAME	LOG	CORE RECOVERY (0→100%)	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax (Kgf/cm²)	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.m)	DEPTH (cm)
										0.3 Non Core										
	1	Talus deposits	△		brown	5	5	5	>e	Gravelish core with some slime. 1.7										
	2	Conglomerate	○		light brown	5	5	5	>e	Strongly Weathered Weak and loosened core. Easily broken. 5.45										
										5.85 Non Core										
	6	Conglomerate	○		black-dark gray	2	3	3	c	Somewhat cracky but slightly weathered with some gravelish core. 8.35										
					brown	(3)	(4)													
	9					4	4	4	e	Generally weathered. 9.1										
										9.65 Non core.										
	10	Conglomerate	○		brown	4	4	4	d	Generally weathered and cracky with some gravelish core. 12.1										
							(3)	(3)												
	13						4	4	e	Generally weathered and cracky with some gravelish core. Core recovery is very poor without any sticky core. Slightly hare in part (ex. 16.3-17.5m). 19.85										
							(5)													
	17						4	4												
							(3)													
	18						4	4												
	19						(5)													
							4													
	20				grey	4	(3)	4	c	Somewhat cracky.										

Core recovery: 0 → 100%

EPDC (e)
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PBLL 17TP — (SHEET 2of 2)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	21.60 m
ELEVATION	391.319 m	DIRECTION OF HOLE	V.
COORDINATE		CORE RECOVERY	%
		DRILLING MACHINE	
		COMMENCED	
		COMPLETED	
		DRILLED BY	
		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pa	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Dpt.H)	DEPTH
	m			0 ~ 100 %								Kg/cm²						%		0m
	20	Conglomerate			gray	3	4 (3)	4	c	Somewhat cracky. 20.6										
	21		O		brown	4	4 (5)		d	Generally cracky and weathered.										1
										Bottom of Hole at 21.60m										2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				0
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9

Core Hole ROD

EPDC
ELECTRIC POWER DEVELOPMENT CO. LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL18TP — (SHEET of)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	30.20 m	COMMENCED	
ELEVATION	297.205 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE	455,532.940	CORE RECOVERY	%	DRILLED BY	
	385,288.135	DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L.O.G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.m)	DEPTH
	m			0 → 100%								Kgf/cm²						%		0m
	1	Residual Soil			yellowish brown	5	5	5		A few rounded gravels are recovered.										1
	2									2.5										2
	3									Core loss										3
	4									4.0										4
	5	Residual Soil			yellowish brown	5	5	5		Strongly weathered conglomerate with some rounded gravels derived from residual core of weathering. 6.0-6.45m REC are very low.										5
	6																			6
	7																			7
	8									8.0-9.13m REC are very low.										8
	9									9.13										9
	10	Conglomerate			gray	3	3	4		Hard but somewhat cracky. 10.1										0
					brownish gray	5				10.2										
	11									10.1-10.2m Somewhat clayish. 10.2-13.7m Gravels are almost all volcanic rocks with phenocrysts obviously and rare groundmass.										1
	12				gray	3	2	3												2
	13																			3
					brownish gray			4		13.7										
	14					4	3	3		14.05										4
										14.55										
	15				dark gray					Oxidized plane are obviously. White vein with oxidized plane vertical-15° are obviously. Hard and fresh rock not so cracky.										5
	16							2												6
	17					3	2			17.7										7
	18									Hard and fresh rock not so cracky.										8
	19							1												9
	20																			0

EPDC | ED
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL18TP. (SHEET of)

LOCATION	PENSTOCK ROUTE	DEPTH OF HOLE	30.20 m	COMMENCED	
ELEVATION	297.205 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE	455,532.940	CORE RECOVERY	%	DRILLED BY	
	385,288.135	DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax Kgf/cm²	Pc	DEPTH RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN %	G.W.L (Opt.H)	DEPTH
	20m			0 = 100 %						Hard and fresh rock not so cracky. 20.5-20.6m White vein vertical -20° separated along vein are obviously. Oxidized brown plane are obviously.										0m
	21	Conglomerate			dark gray	3	2	1		23.1										1
	22																			2
	23				brownish gray	4	4	3		23.5										3
								4		23.8										
	24									Fresh and hard rock but alomost all mafic minrals are somewhat altered. Felsic minerals are not altered.										4
	25																			5
	26				dark gray	2	2	1												6
	27									27.5										7
						3	4	4		27.9										
	28									Somewhat cracky compared with upper than 27.5m.										8
	29					2	2	2												9
	30									Bottom of Hole at 30.20m										0
	1																			1
	2																			2
	3																			3
	4																			4
	5																			5
	6																			6
	7																			7
	8																			8
	9																			9

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL19CM — (SHEET of

LOCATION	POWERHOUSE	DEPTH OF HOLE	25.25 m	COMMENCED	
ELEVATION	88.684 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE	454,953.190	CORE RECOVERY	%	DRILLED BY	
	385,386.504	DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	L O G	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH/RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	m			0 → 100%								Kgf/cm²						%		0m
										Core loss										
										3.45										
		Top Soil			dark brown					4.0										
		Terrace Deposits								A few sub-rounded gravels are recovered.										
										5.4										
					dark green	3	3	3 (4)		4.5-5.0m core loss										
										6.43										
					dark brown	2	3 (2)	3		5.4-6.43m coarse grained sandstone with some pebbles										
										7.6										
							4 (5)	5		8.10-8.20m core loss										
							3	3		8.2										
										8.45										
					grayish black - black					Micro slip planes are observable. Calcite vein are not obvious compareing other parts.										
							4			10.45-10.85m Disturbed and reconsolidated. (very brittle, easily clackly)										
						3	(3)	4		12.70-13.15m Disturbed and very brittle partially clayey.										
								(5)		13.15-14.00m Somewhat sandy. (sandy part is rather well-cemented)										
							4			14.0-14.1m Sheared and brittle.										
							(5)			16.0										
										15.7-16.0m Sheared and clayey part.										
						3	3	4		16.0-18.4m Somewhat massive not so flaky.										
						(2)	(4)	(3)		18.4-19.0m Somewhat flaky. Microslip planes are observable every places.										
	20																			

RQD

EPDC
ELECTRIC POWER DEVELOPMENT CO.,LTD.

GEOLOGIC LOG OF DRILL HOLE

Page

LOS LLANOS PROJECT — HOLE No. PHLL19CM — (SHEET of)

LOCATION	POWERHOUSE	DEPTH OF HOLE	25.25 m	COMMENCED	
ELEVATION	88.684 m	DIRECTION OF HOLE	V.	COMPLETED	
COORDINATE	454,953.190	CORE RECOVERY	%	DRILLED BY	
	385,386.504	DRILLING MACHINE		LOGGED BY	

ELEVATION	DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE: COLOR	WEATHERING	HARDNESS	CRACK SPACING	ROCK EVALUATION	DESCRIPTION	TESTING: LUGEON	Pmax	Pc	DEPTH / RESULT	BIT TYPE	CASING	CEMENTATION	DRILL WATER RETURN	G.W.L (Opt.H)	DEPTH
	20 m			0 → 100%								Kgf/cm²						%		0 m
	21	Mudstone (Marl)			grayish black - black	3	3	4		Microslip planes are observable every places.										1
	22					(2)	(4)	(3)		22.0-24.5m Somewhat massive. (but partially flaky)										2
	23																			3
	24																			4
	25					2	4	4		24.5 Very brittle. Very flaky.										5
						(3)	(5)	(5)		Bottom of Hole at 25.25m										6
																				7
																				8
																				9
																				0
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9

core loss
ROD

EPDC
ELECTRIC POWER DEVELOPMENT CO., LTD.