3.3 Data of Core Drilling Work

Tables:

1. List of Core Drilling
2. Standard of Classification for Drilled Core
3. Standard of Rock Mass Evaluation
4. Relation of Rock Mass Evaluation and Classification for Drilled Core

Geologic Log of Drillholes:

1. Se Kong No. 4 Dam Site

SK-1	5 sheets
SK-2	3 sheets
SK-3	5 sheets

2. Xe Kaman No. 1 Dam Site

XK-1	5 sheets
XK-2	3 sheets
XK-3	5 sheets

3. Xe Namnoy Dam site

XN-1	4 sheets
XN-2	2 sheets
XN-3	3 sheets
XN-4	4 sheets
XN-5	3 sheets
XN-6	3 sheets

List of Core Drilling

Project	Drillhole Number	Length (m)	Coordinates	
			N	E
Se Kong No. 4	SK-1	100	1,715,122	692,132
	SK-2	60	1,715,512	692,112
	SK-3	100	1,715,808	692,102
Xe Kaman No. 1	XK-1	100	1,654,608	732,180
	XK-2	60	1,654,826	732,279
	XK-3	100	1,654,937	732,330
Xe Namnoy Midstream	XN-1	80	1,663,482	673,317
	XN-2	40	1,663,766	673,584
	XN-3	60	1,663,921	673,730
	XN-4	80	1,664,760	672,460
	XN-5	60	1,664,870	672,760
	XN-6	60	1,664,840	672,980
Total	12 holes	900		

Standard of Classification for Drilled Core

Weathering		Hardness		Crack spacing	
1	Very fresh. No weathering of mineral component.	1	Very hard. Broken into knifeedged pieces by strong hammer blow.	1	Over 30 cm
2	Fresh. Some minerals are weathered slightly. Usually no brown crack.	2	Hard. Broken into pieces by strong hammer blow.	2	10 - 30 cm
3	Fairly fresh. Some minerals are weathered. Cracks are stained and with weathered material.	3	Brittle. Broken into pieces by medium hammer blow.	3	3 - 10 cm
4	Weathered. Fresh portions still remain partially.	4	Very brittle. Easy broken into pieces by medium hammer blow.	4	1 - 3 cm
5	Strongly weathered. Most minerals are weathered and altered to second minerals.	5	Soft. Able to dig with hammer.	5	Under 1 cm

This standard has been used by EPDC.

Standard of Rock Mass Evaluation

Class	Rock Mass Condition
a.	Fresh, sound, cracky in part
b.	Weathered, brittle, cracky
c.	Strongly weathered, soft or very cracky

Relatiion of Rock Mass Evaluation and Classification for Drilled Core

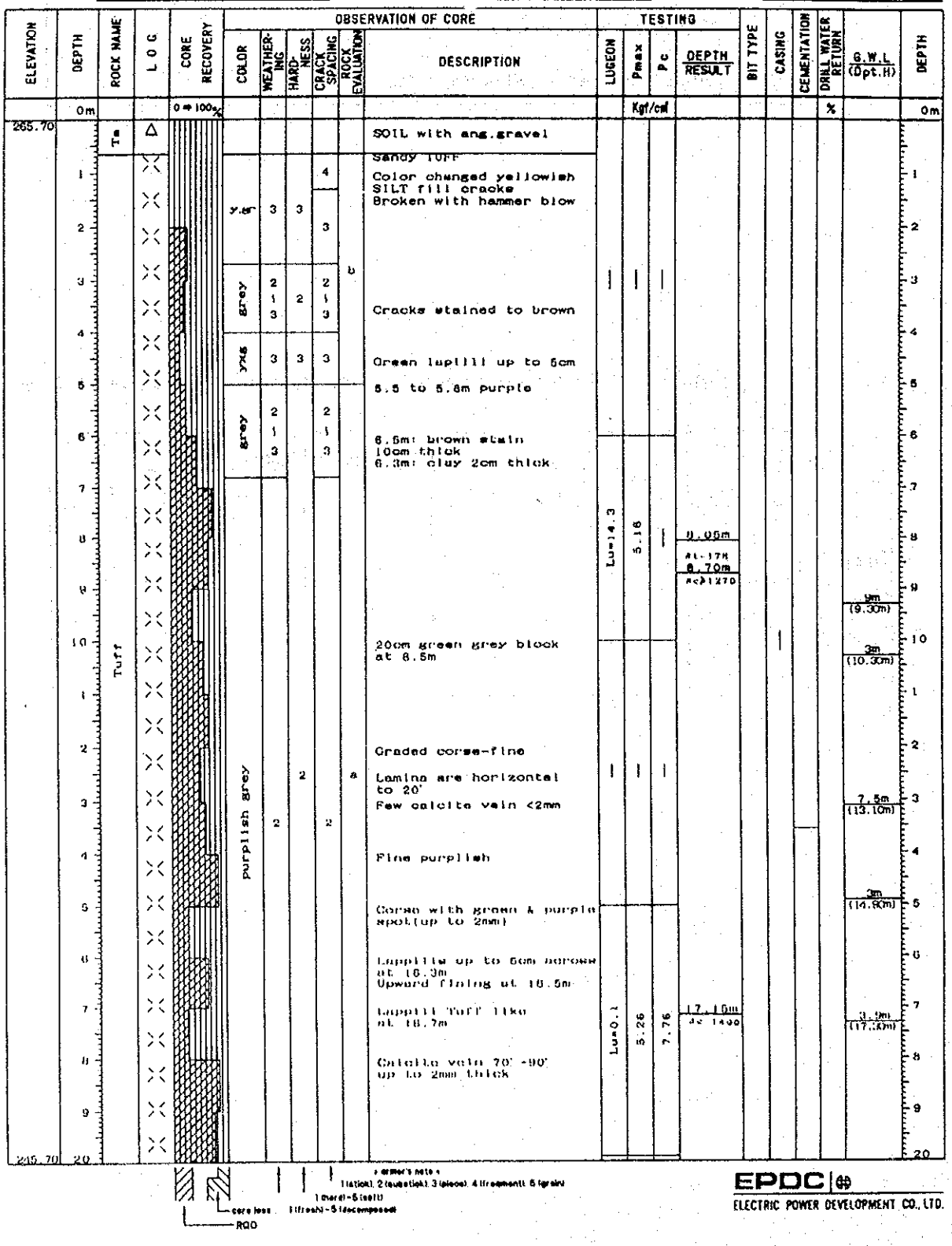
		Grade of Weathering and Hardness				
		1	2	3	4	5
Grade of Crack Spacing	1	a	a	b	c	c
	2	a	a	b	c	c
	3	a	a	b	c	c
	4	b	b	b	c	c
	5	c	c	c	c	c

GEOLOGIC LOG OF DRILL HOLE

Page

Se Kong River Basin PROJECT — HOLE No. SK-1 — (SHEET 1 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	1-1-1994
ELEVATION	265.7 m	DIRECTION OF HOLE	90°	COMPLETED	25-1-1994
COORDINATE	X:E692132	CORE RECOVERY	99.7 %	DRILLED BY	Thongsay
	Y:N1715122	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. SK-1 — (SHEET 2 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	1-1-1994
ELEVATION	265.7 m	DIRECTION OF HOLE	90°	COMPLETED	25-1-1994
COORDINATE	X:E692132	CORE RECOVERY	99.7 %	DRILLED BY	
	Y:N1715122	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	20m			0 ⇒ 100 %								Kgf/cm						%		20m
245.70		Tuff			P.BY	2				Sandy TUFF				20.33m sc=510 st=173						
	1				pplxgrey+green					Lapilli(up to 2cm across) rich Purplish matrix	Lu=0.3	7.87	—							1
	2																			2
	3					2				Crack stained from 22.9m to 24.5m Solution vein from 23.3m to 24.3m										3
	4									Opening up to 0.5cm across										4
	5							2												5
	6				greenish grey	1				Dissolved stained vein at from 25.1m to 25.3m and from 25.5m to 25.7m up to 0.5cm wide	Lu=0.9	7.93	5.43							6
	7																		8.2m (27.0m)	7
	8					3													2.5m (27.7m)	8
	9									29.8-30.0m purple fine 28.7-28.9m purple fine										9
	30						2		a	White spot up to 2mm across Green irregular net in purple fine layer between 28.2m and 28.5m									5m (30.10m)	30
	1				reddish purple			3												1
	2							2		Fine sandy	Lu=1	7.97	5.47							2
	3							3												3
	4					2														4
	5										—	—	—							5
	6																			6
	7				greenish red			2		Greenish sandy with some fine purplish layer from 10cm to 20cm thick at 4cm interval	Lu=0	8.09	—							7
	8																			8
	9									Some calcite vein at 80° Upward fining										9
225.70	40																			40

core loss
ROD

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GEOLOGIC LOG OF DRILL HOLE

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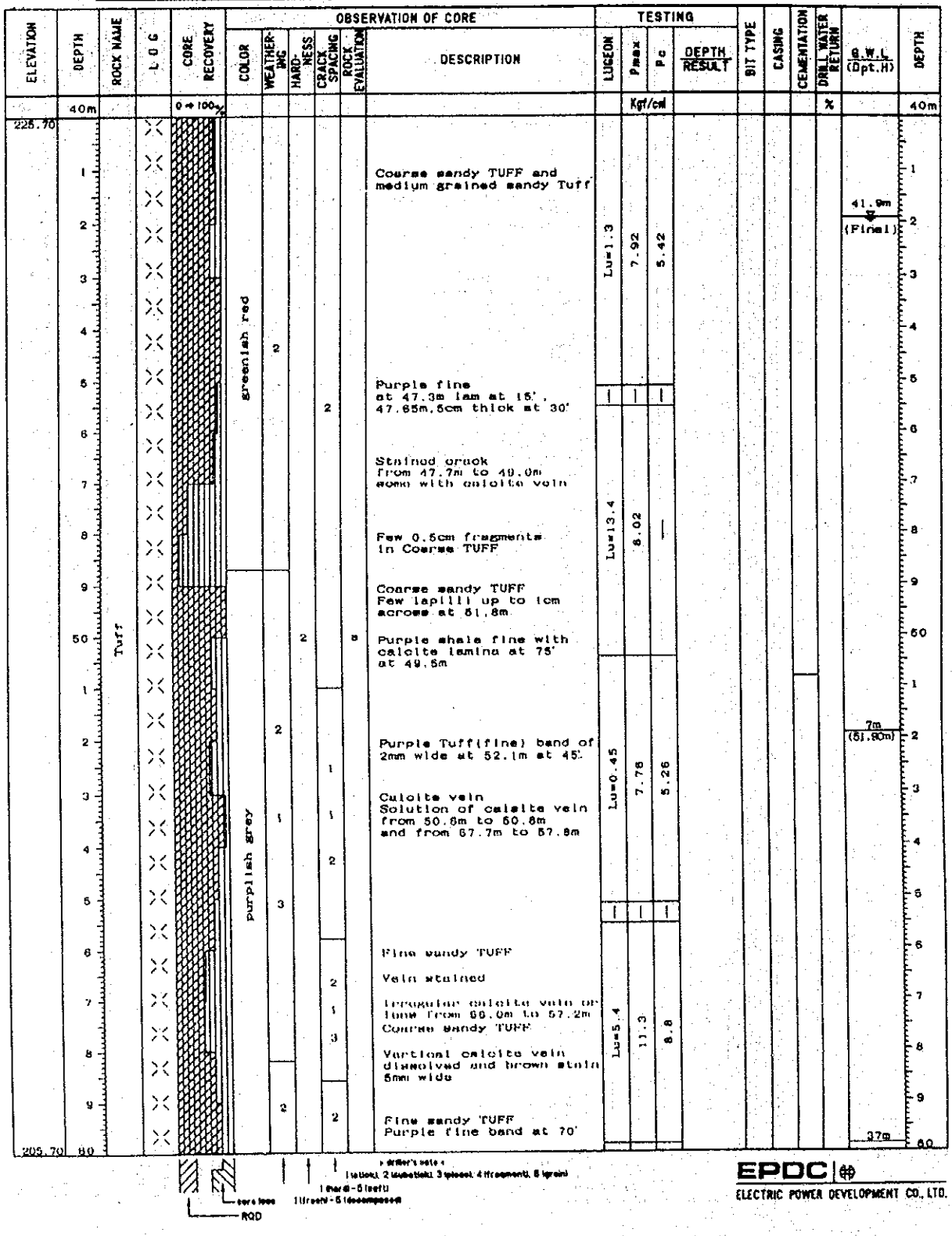
Se Kong River Basin PROJECT HOLE No. SK-1 (SHEET 3 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	1-1-1994
ELEVATION	265.7 m	DIRECTION OF HOLE	90°	COMPLETED	25-1-1994
COORDINATE	X:E692132	CORE RECOVERY	99.7 %	DRILLED BY	
	Y:N1715122	DRILLING MACHINE	KT-100	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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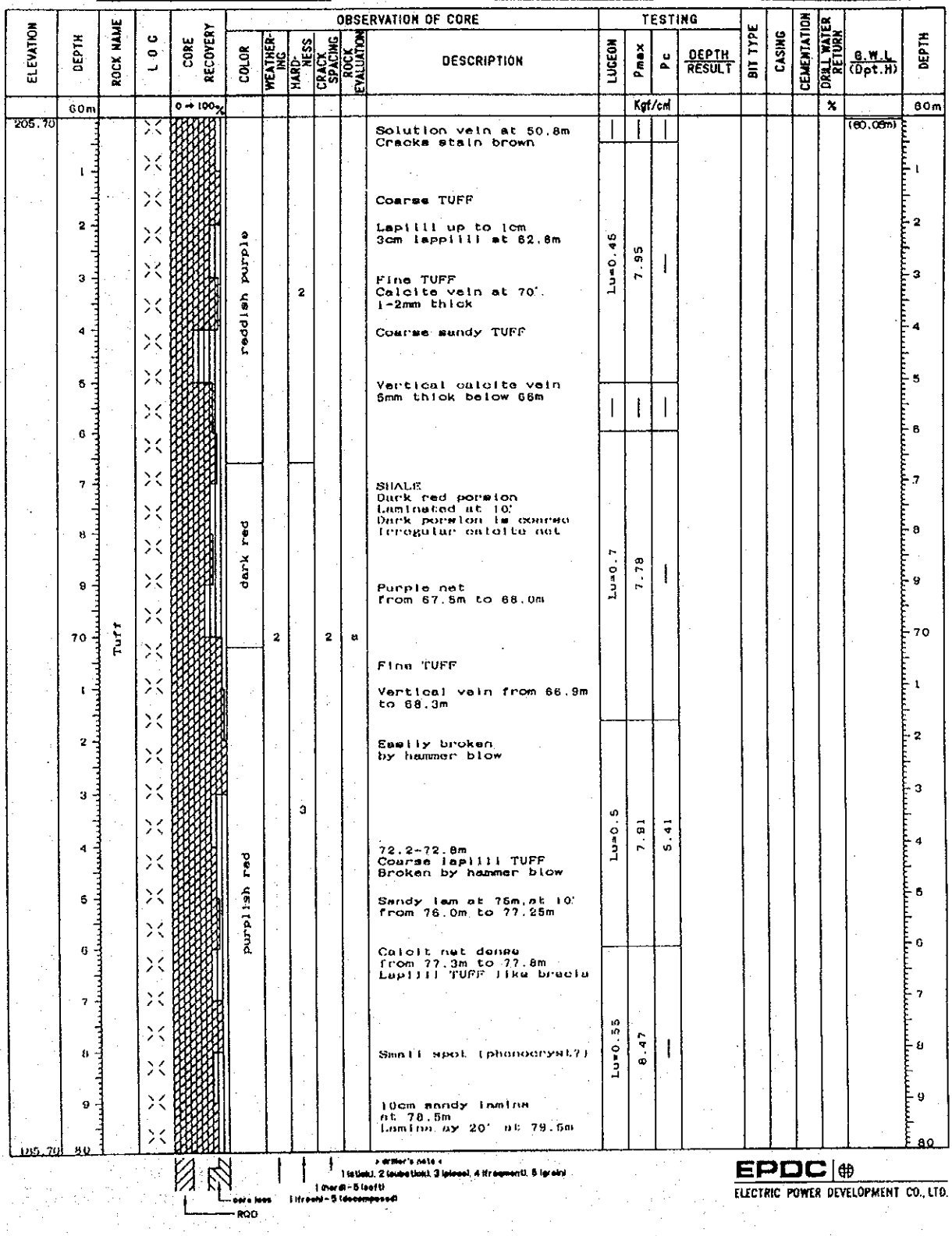
Se Kong River Basin PROJECT — HOLE No. SK-1 — (SHEET 4 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	1-1-1994
ELEVATION	265.7 m	DIRECTION OF HOLE	90°	COMPLETED	25-1-1994
COORDINATE	X:E692132	CORE RECOVERY	99.7 %	DRILLED BY	
	Y:N1715122	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. SK-1 — (SHEET 5 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	1-1-1994
ELEVATION	265.7 m	DIRECTION OF HOLE	90°	COMPLETED	25-1-1994
COORDINATE	X:E692132	CORE RECOVERY	99.7 %	DRILLED BY	
	Y:N1715122	DRILLING MACHINE	KT-100	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
	80m			0 → 100%								Kgf/cm²						%		80m
185.70	0	Tuff			purplish red	2	3	2	a	Not SHALE, because of existance of lapilli TUFF and lack of SANDSTONE beds	Lu=0.1	8.16	5.66							0
	1																			1
	2																			2
	3																			3
	4									Coarse and dark below 85m										4
	5									Calcite vein and small lens										5
	6										Lu=2.3	9.69	7.19							6
	7																			7
	8				greenish grey	2	2			Fine TUFF Small green spot (1mm) thin calcite vein										8
	9					1	1													9
90	90					3	3	4	b	Cracks stained brown										90
	1									Clay film from 90.5m to 90.8m										1
	2				ppl	2		3		TUFF Crack stained										2
	3				grn					From 91.8m to 91.8m Lapilli TUFF	Lu=2.13	10.06	7.56							3
	4				purple	2				From 92.4m to 93.1m greenish sandy TUFF										4
	5					1		2		From 93.4m to 93.7m greenish sandy TUFF	—	—	—							5
	6					3														6
	7				grn		2	1	a	Fine TUFF Few cracks stained										7
	8				ppl	2		3		Laminated at 26°	Lu=0.95	11.26	8.78							8
	9				grn					White spot at 99.9m										9
185.70	100				ppl			2		Coarse TUFF-Lapilli TUFF 2cm lapilli										100

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

Page

Se Kong River Basin PROJECT — HOLE No. SK-2 — (SHEET 1 of 3)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	17-12-1993
ELEVATION	146.4 m	DIRECTION OF HOLE	90°	COMPLETED	30-12-1994
COORDINATE	X:E692112	CORE RECOVERY	92.8 %	DRILLED BY	Thongsay
	Y:N1715512	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino

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 (Dpt.H)	DEPTH
	0m			0 → 100 %								Kgf/cm²						%		0m
146.40		Topsoil								SOIL with angular gravel	—	—	—						3m (Final)	
	4	Basalt			grxgy	2 1 3	3 1 4	3	b	With irregular shale lens Crack stained Easily broken by hammer										
	5	Sh			blk			2		Sandy SHALE										
	6	Basalt			grxgrey					Black round spot(1mm) Broken along hair cracks				7.20m 66=100						
	8										Lu=1.8	5.32	3.32							
	9	Shale			black	2	4 3 1 4	3		Sandy SHALE Easily broken by hands Sheared Some portion easily broken by fingers										
	1	Sandstone			d.grey		2		a	SANDSTONE with lamina										
	2									No core from 12.5m to 12.8m	Lu=1.75	5.25	—							
	3				d.gy	2	2	3		White spot										
	4	Sh			Bk		3			SHALE quartz vein, striation, luster No core from 14.0m to 14.8m										
	5	Sandstone/shale			Bk		4	5												
	6				d.grey	2	3	2 1 3	b	m.g. SANDSTONE and SHALE SANDSTONE is hard but SHALE is easily broken	—	—	—							
	7							4												
	8				d.gy	2	3 1 4	4		No core from 15.85m to 16.1m, from 16.4m to 17.4m, from 18.3m to 18.5m	Lu=2.5	7.8	5.3							
	9				d.gy	2	3	4 1 5		Sheared from 19.0m to 19.8m										
126.40	20	Sa			LT		2	2~3											1.45m	20

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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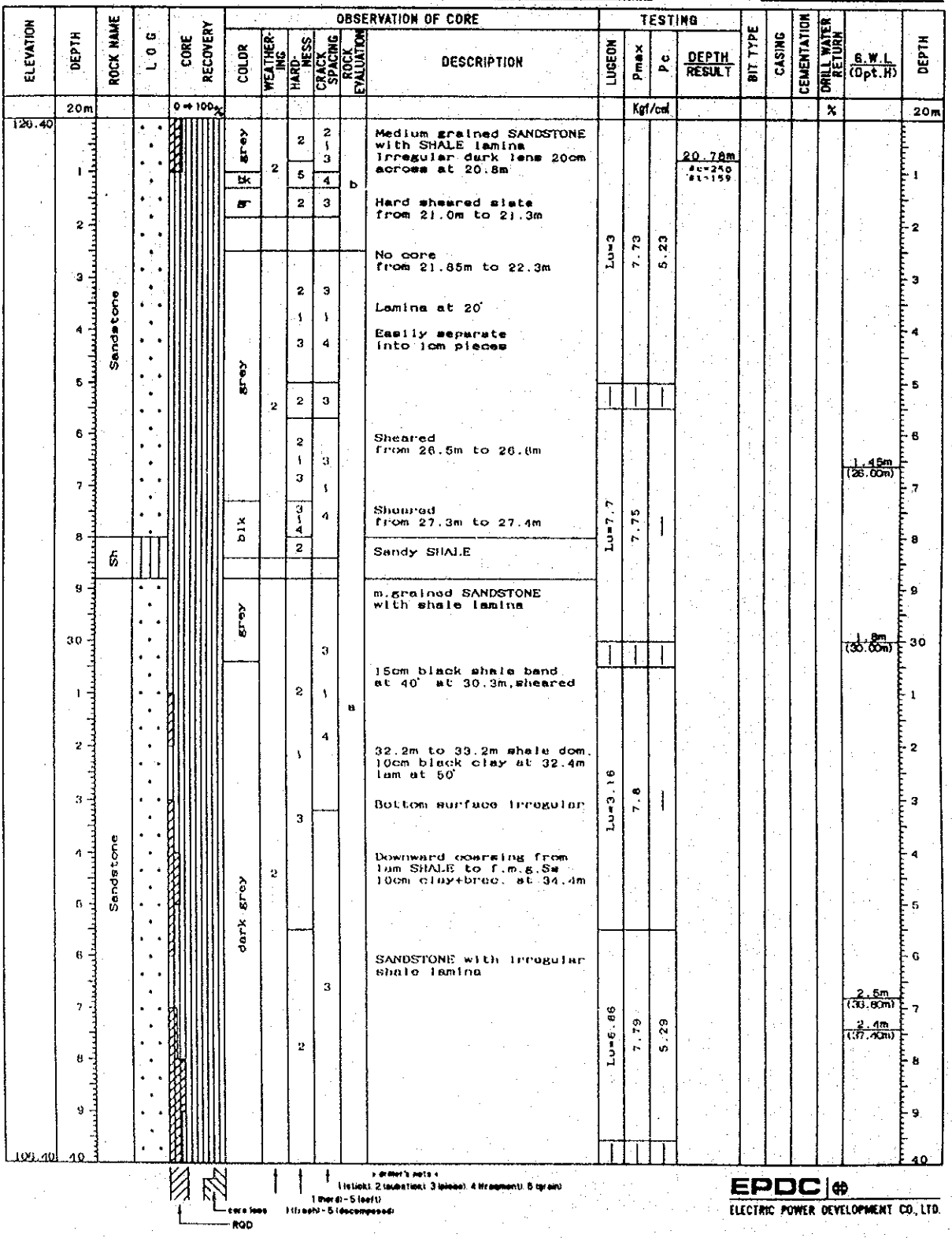
Se Kong River Basin PROJECT — HOLE No. SK-2 — (SHEET 2 of 3)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	17-12-1993
ELEVATION	146.4 m	DIRECTION OF HOLE	90°	COMPLETED	30-12-1994
COORDINATE	X:E692112	CORE RECOVERY	92.8 %	DRILLED BY	
	Y:N1715512	DRILLING MACHINE	KT-100	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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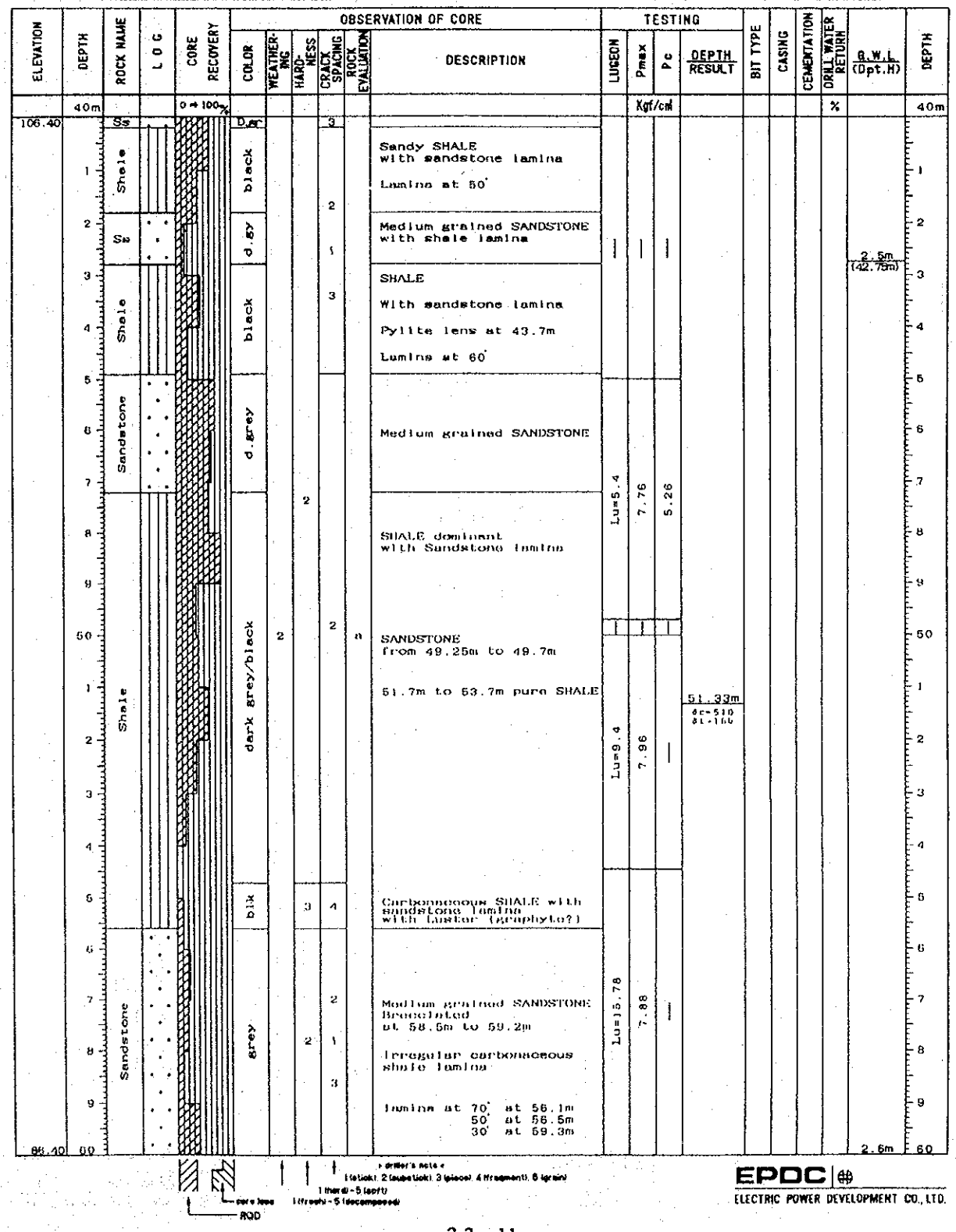
Se Kong River Basin PROJECT — HOLE No. SK-2 — (SHEET 3 of 3)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	17-12-1993
ELEVATION	146.4 m	DIRECTION OF HOLE	90°	COMPLETED	30-12-1994
COORDINATE	X:E692112	CORE RECOVERY	92.8 %	DRILLED BY	
	Y:N1715512	DRILLING MACHINE	KT-100	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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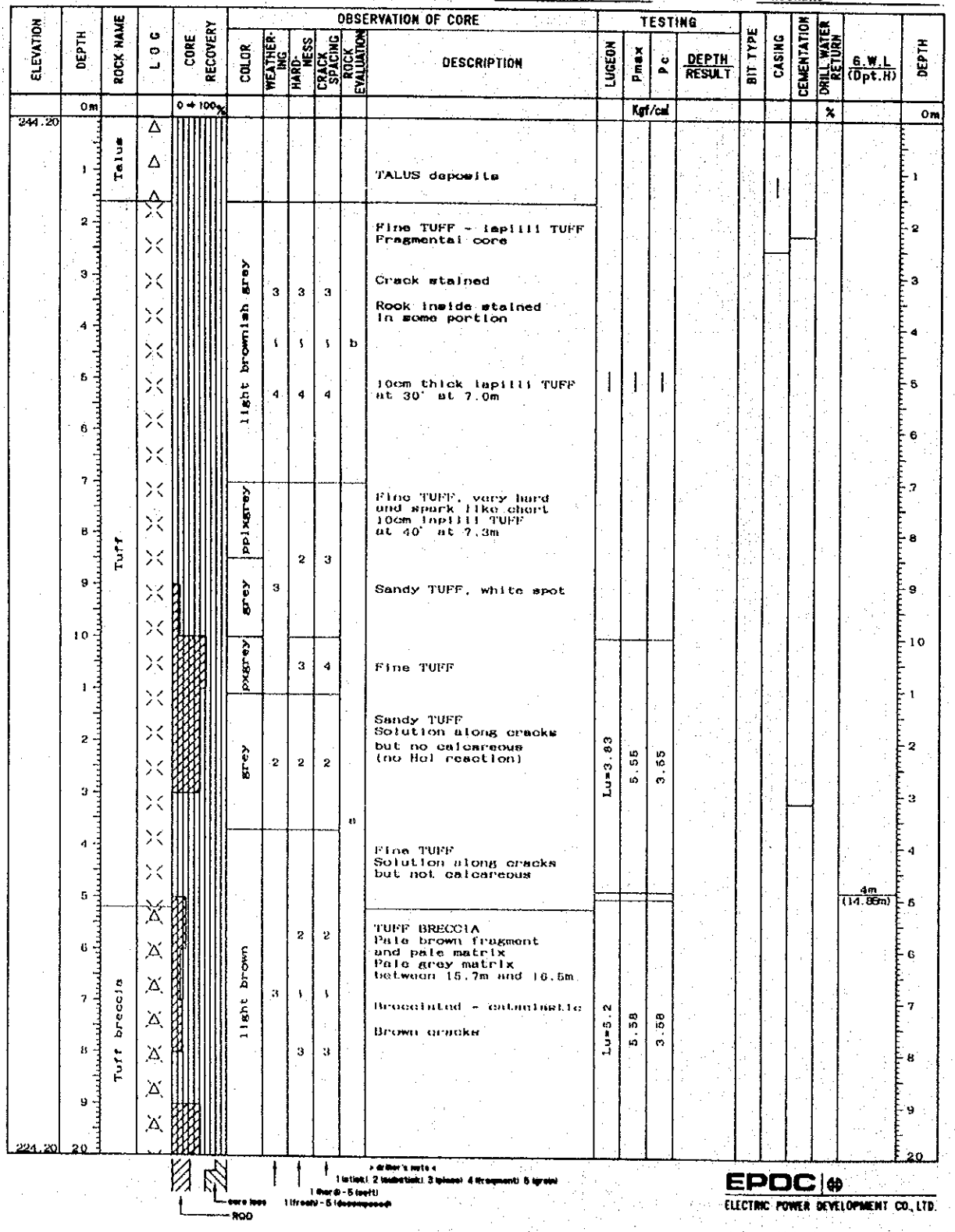
Se Kong River Basin PROJECT — HOLE No. SK-3 — (SHEET 1 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	27-1-1994
ELEVATION	244.2 m	DIRECTION OF HOLE	90°	COMPLETED	9-2-1994
COORDINATE	X:E692102	CORE RECOVERY	97.5 %	DRILLED BY	Thongsay
	Y:N1715808	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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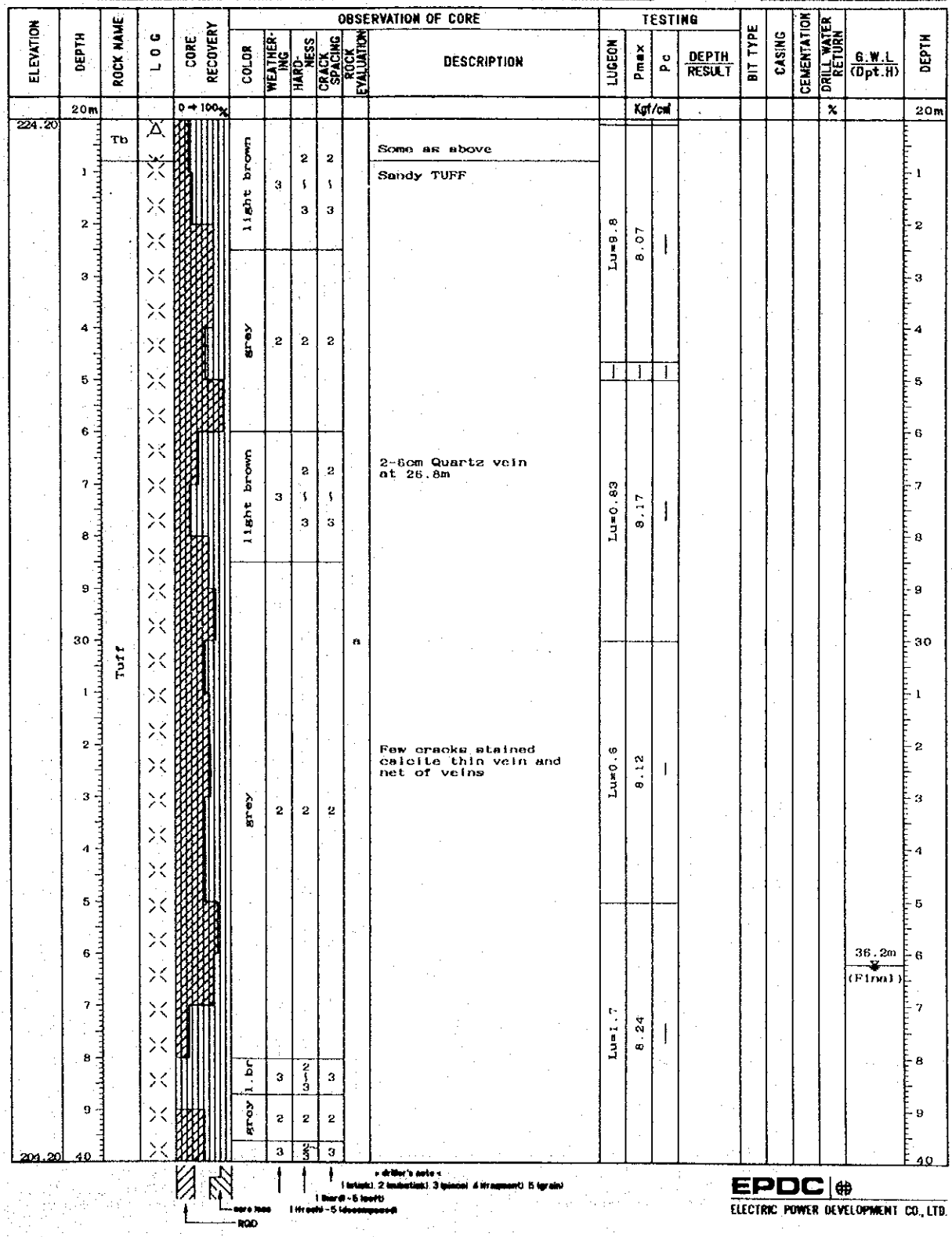
Se Kong River Basin PROJECT — HOLE No. SK-3 — (SHEET 2 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	27-1-1994
ELEVATION	244.2 m	DIRECTION OF HOLE	90°	COMPLETED	9-2-1994
COORDINATE	X:E692102	CORE RECOVERY	97.5 %	DRILLED BY	
	Y:N1715808	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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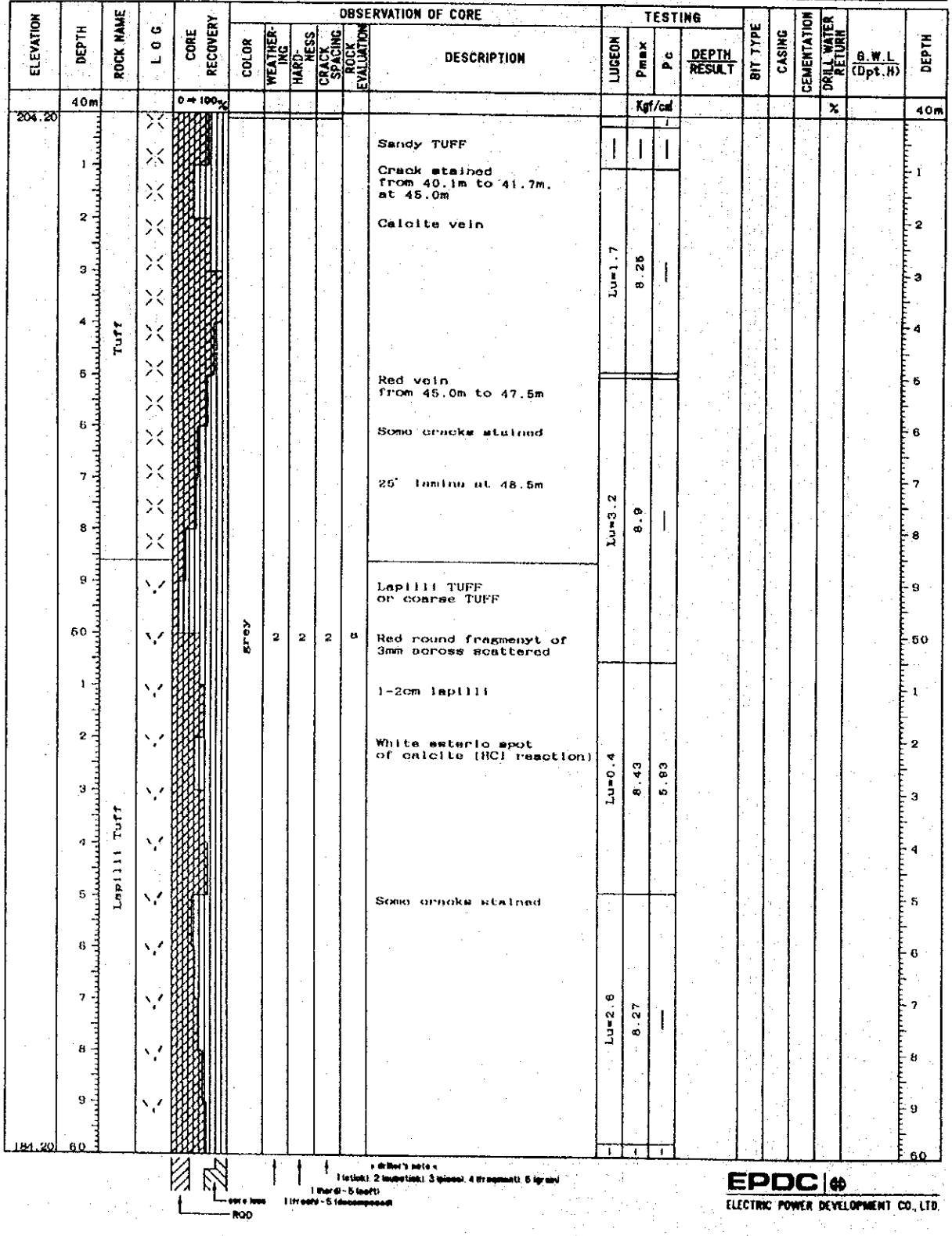
Se Kong River Basin PROJECT — HOLE No. SK-3 (SHEET 3 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	27-1-1994
ELEVATION	244.2 m	DIRECTION OF HOLE	90°	COMPLETED	9-2-1994
COORDINATE	X:E692102	CORE RECOVERY	97.5 %	DRILLED BY	
	Y:N1715808	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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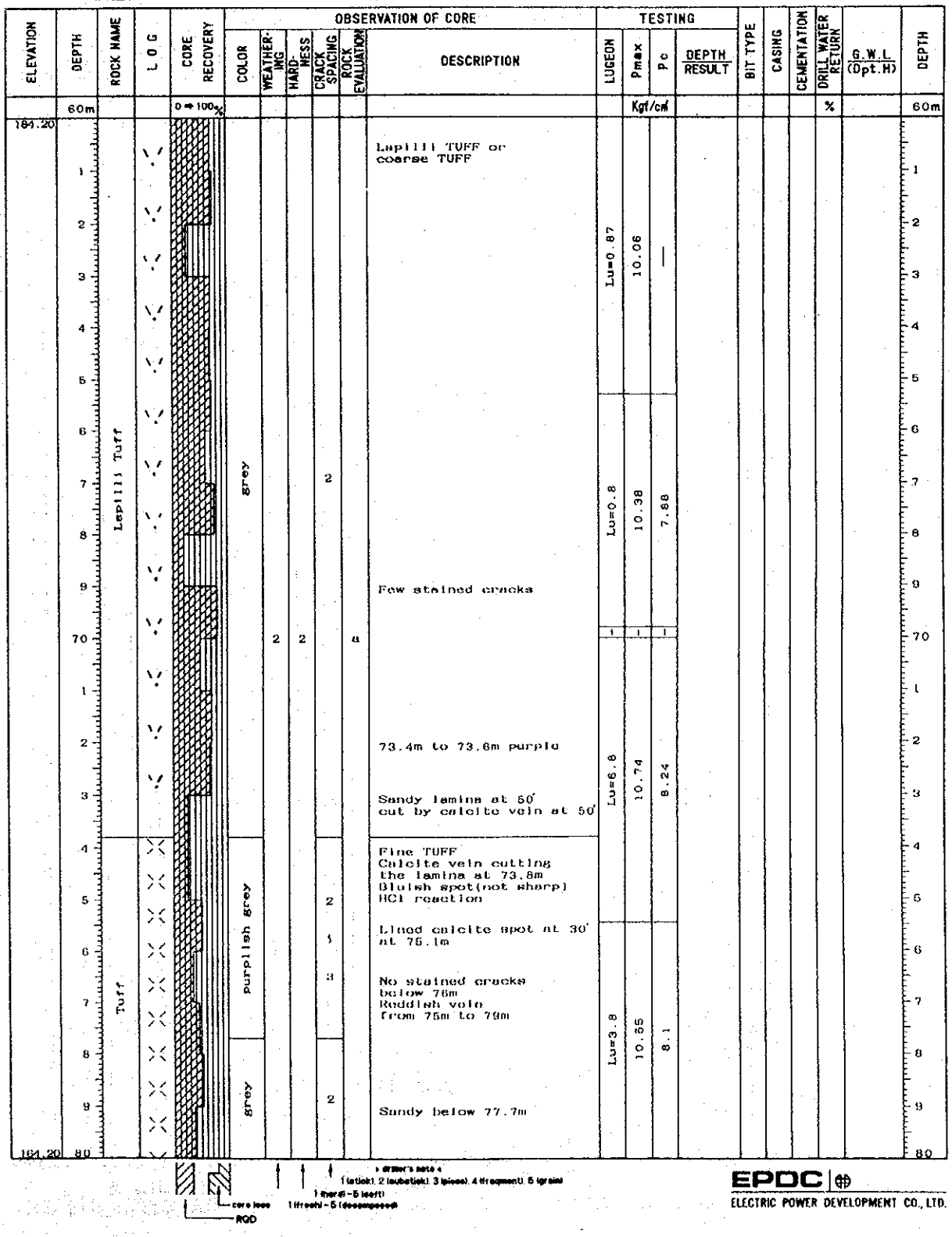
Se Kong River Basin PROJECT — HOLE No. SK-3 — (SHEET 4 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	27-1-1994
ELEVATION	244.2 m	DIRECTION OF HOLE	90°	COMPLETED	9-2-1994
COORDINATE	X:E692102	CORE RECOVERY	97.5 %	DRILLED BY	
	Y:N1715808	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. SK-3 — (SHEET 5 of 5)

LOCATION	Se Kong No.4 Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	27-1-1994
ELEVATION	244.2 m	DIRECTION OF HOLE	90°	COMPLETED	9-2-1994
COORDINATE	X:E692102	CORE RECOVERY	97.5 %	DRILLED BY	
	Y:N1715808	DRILLING MACHINE	KT-100	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
	80m			0 ⇒ 100%								Kgf/cm²						×		80m
164.20																				
	1	Tuff			grey		2	2		Sandy TUFF										1
	2				l.ppl		2 ~ 3	3		Laminated fine TUFF	Lu=2.7	10.61	8.1							2
	3	Lapilli Tuff																		3
	4																			4
	5									Lapilli TUFF and coarse grained TUFF with veins of calcite										5
	6																			6
	7										Lu=10.1	12.17	9.7							7
	8							2		Broken vein at 91.7m										8
	9									Upward fining										9
	90						2		B	minor fault cut a red vein	—	—	—							90
	1																			1
	2																			2
	3										Lu=2.8	11.4	—							3
	4									Fine TUFF										4
	5									Black shale band below 96.8m										5
	6	Tuff						2												6
	7							1		Black shale intrude into grey tuff and core appeared brecciated										7
	8				grey/dark grey			3			Lu=0.6	11.2	—							8
	9									This hole has few purple layers which are dominant in SK-1										9
141.20	100									End of Hole 100.0m										100

> driller's note <
1 Hard - 5 Soft
1 Fresh - 5 Decomposed
core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XK-1 — (SHEET 1 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	5-3-1994
ELEVATION	266.4 m	DIRECTION OF HOLE	90°	COMPLETED	15-3-1994
COORDINATE	X:E732180	CORE RECOVERY	94.4 %	DRILLED BY	Thongsay
	Y:N1654608	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino

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 (Dpt.H)	DEPTH
	0m			0 → 100%								Kgf/cm²						%		0m
266.40	0	Talus	△		light reddish grey					Talus deposit red, grey, clayey										
	1		△																	
	2		△							wethered SANDSTONE fragments										
	3		△																	
	4		△																	
	5		△																4.8m (Final)	
	6		△																	
	7		△																	
	8		△																	
	9		△																	
	10	Shale			redxgrey					Strongly wethered SHALE										
	1									No sandstone fragment from 9.5m to 11.0m										
	2				l.redxgrey	5	5	5												
	3				l.b	4	4	4		Pale grey SANDSTONE from 12.9m to 13.5m										
	4									No core from 13.5m to 15.4m										
	5																			
	6				L.br	3~4	3~4	4		Sheared and reconsolidated from 15.4m to 15.7m										
	7				l.br	4	3	4		Core loss from 15.7m to 16.5m Stained cracks										
	8									No core from 17.2m to 18.3m										
	9				lb		3~4	4												
246.40	20					4	3~4	4		No core from 18.7m to 19.7m										20

core loss / RQD

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GEOLOGIC LOG OF DRILL HOLE

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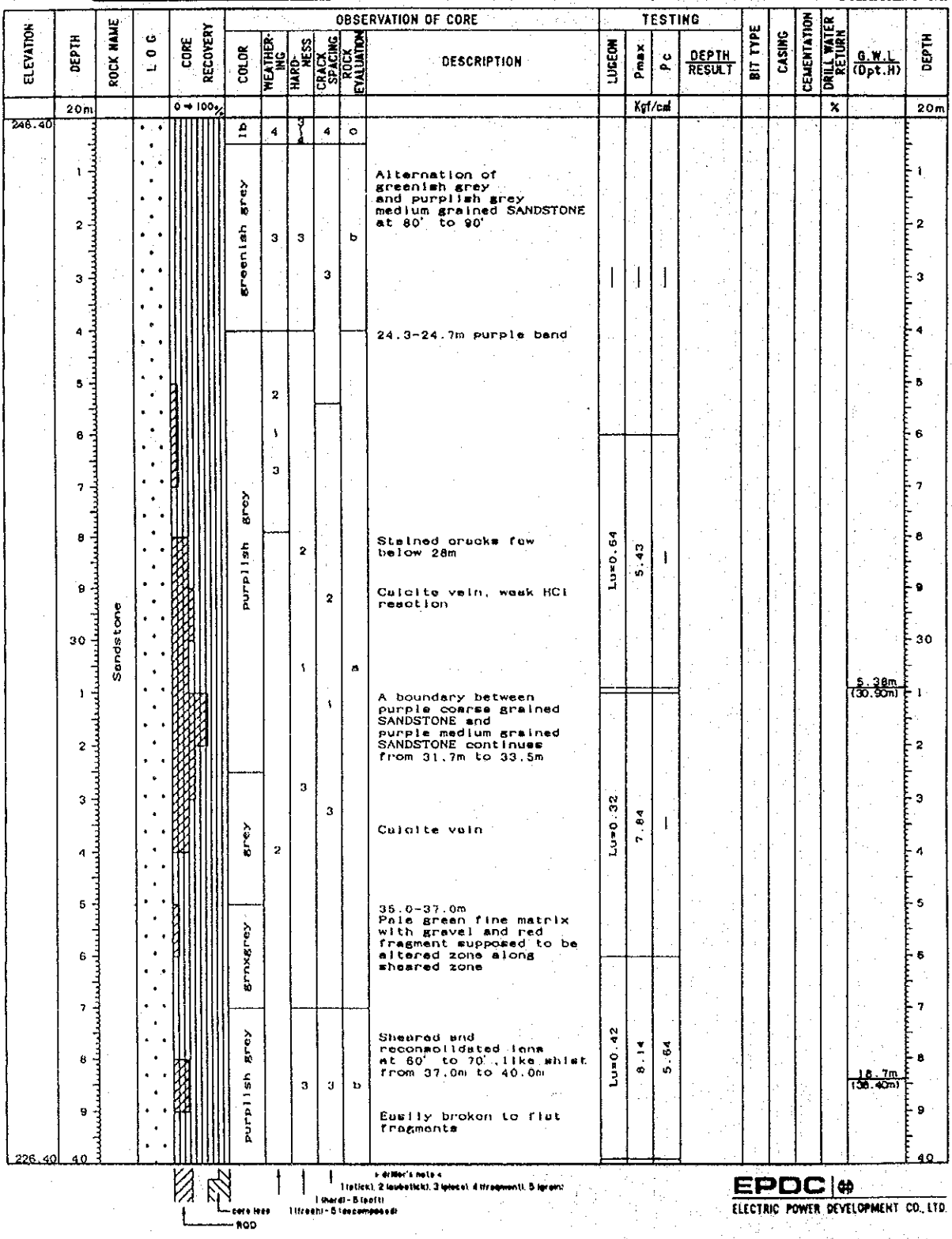
Se Kong River Basin PROJECT | HOLE No. XK-1 | (SHEET 2 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	5-3-1994
ELEVATION	266.4 m	DIRECTION OF HOLE	90°	COMPLETED	15-3-1994
COORDINATE	X:E732180	CORE RECOVERY	94.4 %	DRILLED BY	
	Y:N1654608	DRILLING MACHINE	KT-100	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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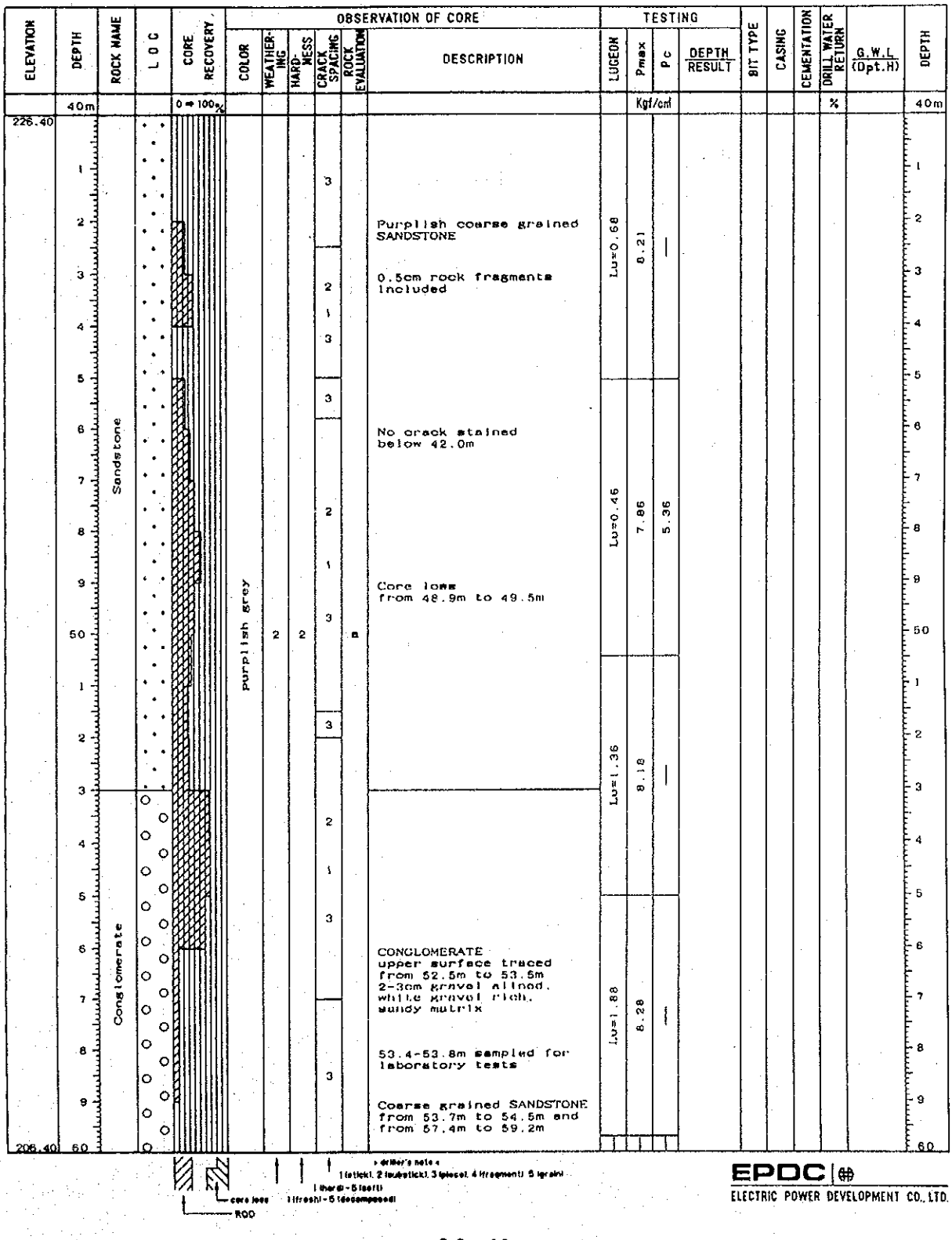
Se Kong River Basin PROJECT — HOLE No. XK-1 — (SHEET 3 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	5-3-1994
ELEVATION	266.4 m	DIRECTION OF HOLE	90°	COMPLETED	15-3-1994
COORDINATE	X:E732180	CORE RECOVERY	94.4 %	DRILLED BY	
	Y:N1654608	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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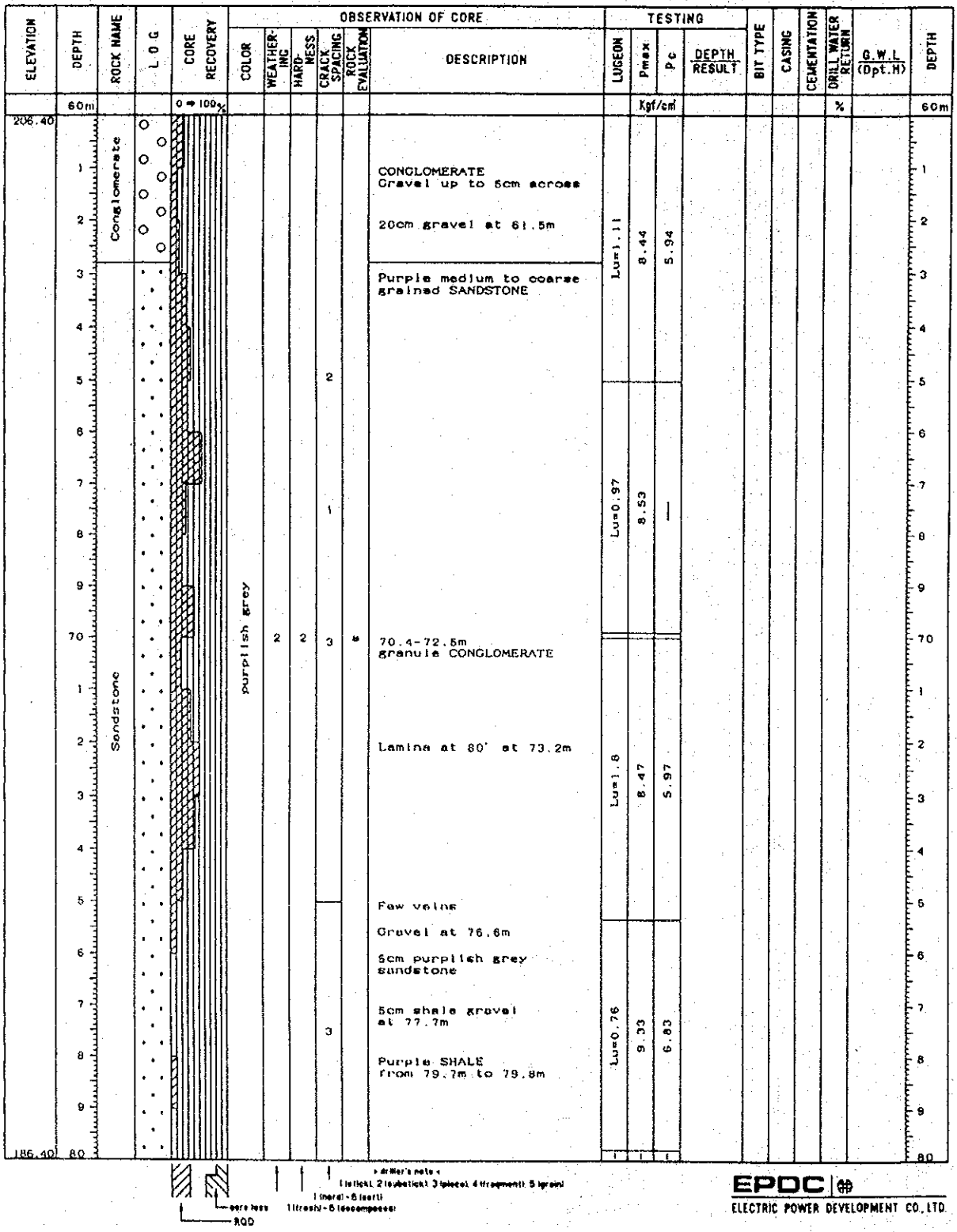
Se Kong River Basin PROJECT | HOLE No. XK-1 | (SHEET 4 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	5-3-1994
ELEVATION	266.4 m	DIRECTION OF HOLE	90°	COMPLETED	15-3-1994
COORDINATE	X:E732180	CORE RECOVERY	94.4 %	DRILLED BY	
	Y:N1654608	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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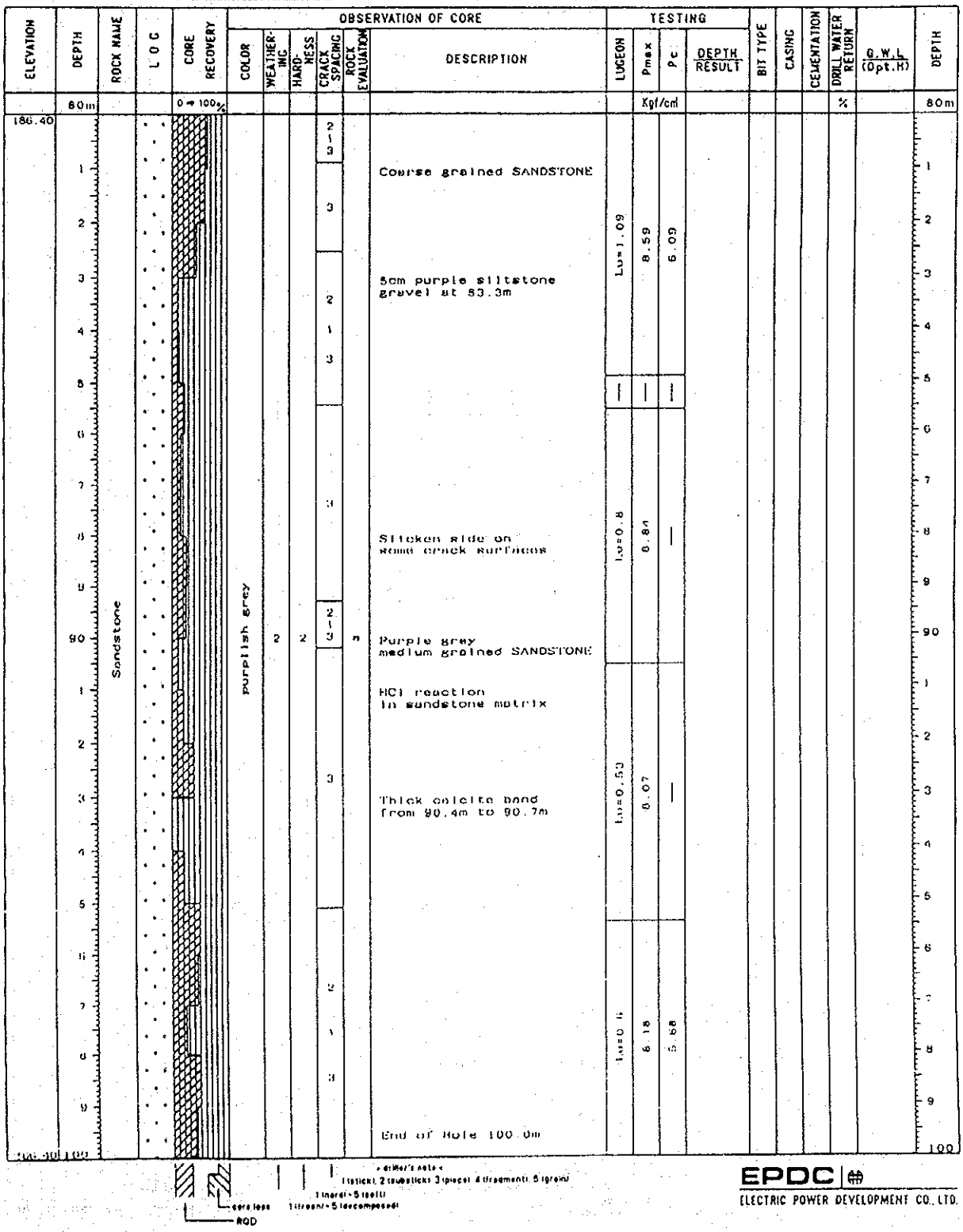
Se Kong River Basin PROJECT HOLE No. XK-1 (SHEET 5 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	5-3-1994
ELEVATION	266.4 m	DIRECTION OF HOLE	90°	COMPLETED	15-3-1994
COORDINATE	X:E732180	CORE RECOVERY	94.4 %	DRILLED BY	
	Y:N1654608	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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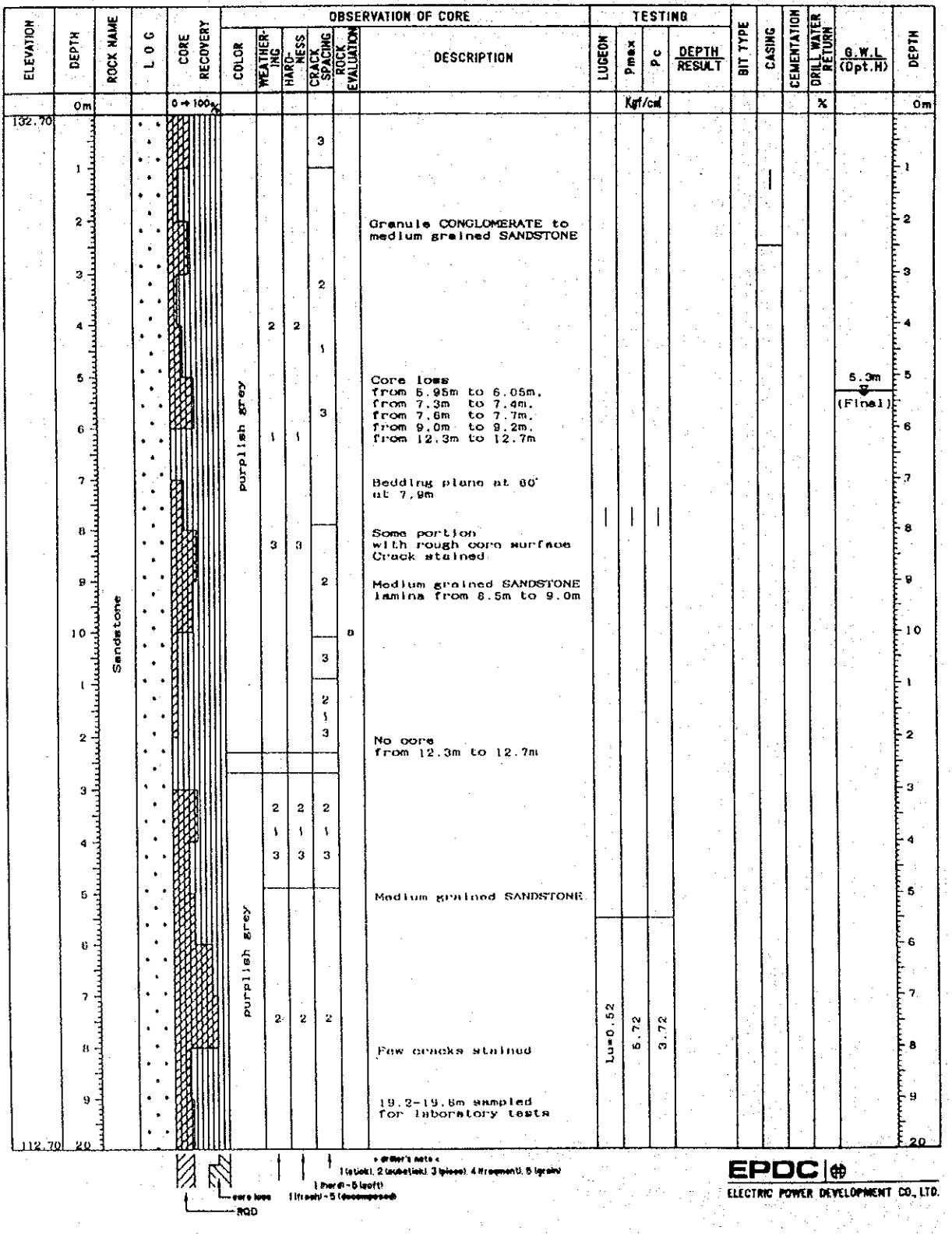
Se Kong River Basin PROJECT — HOLE No. XK-2 — (SHEET 1 of 3)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	24-2-1994
ELEVATION	132.7 m	DIRECTION OF HOLE	90°	COMPLETED	5-3-1994
COORDINATE	X:E732279	CORE RECOVERY	98.3 %	DRILLED BY	Thongsay
	Y:N1654826	DRILLING MACHINE	D-900	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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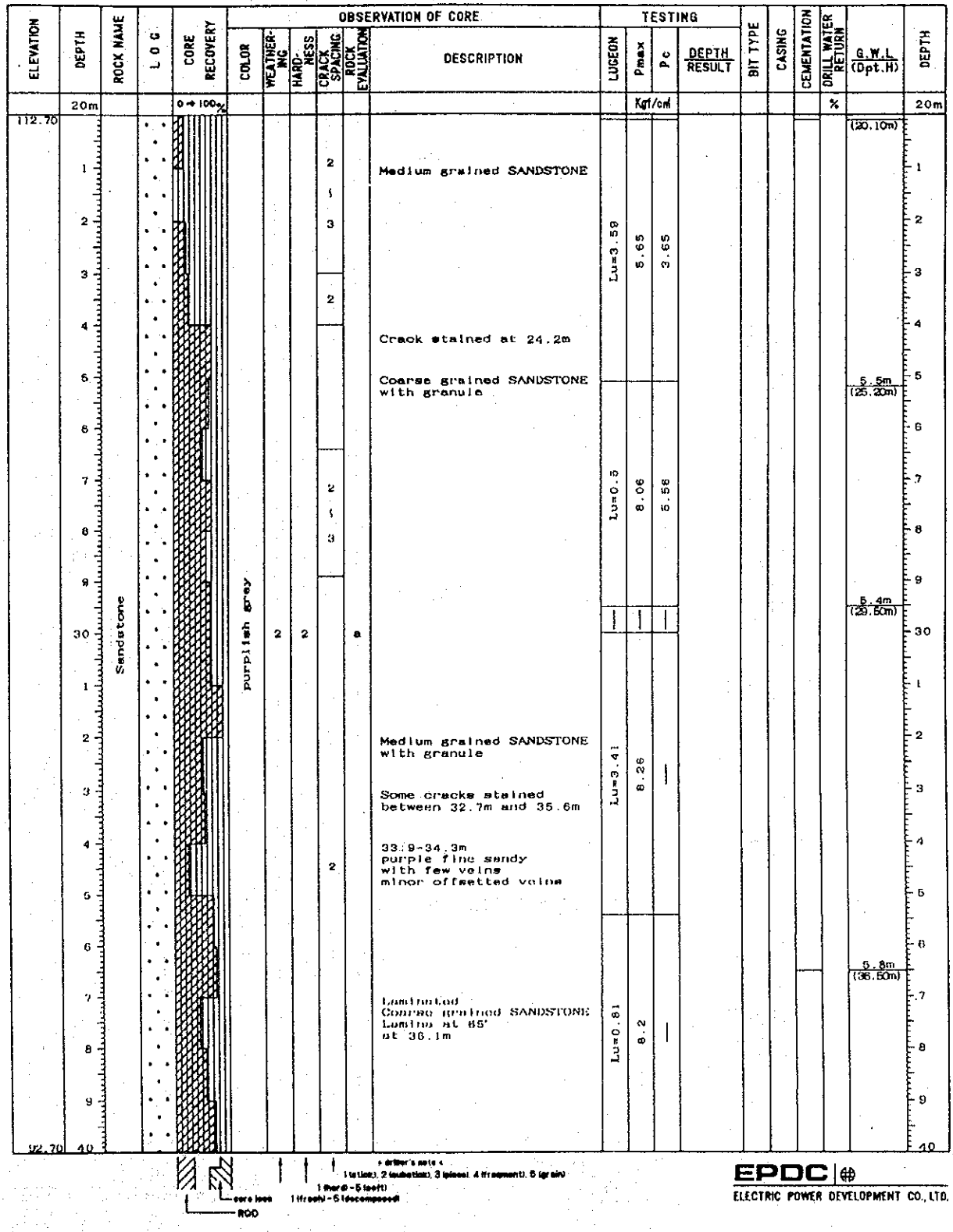
Se Kong River Basin PROJECT — HOLE No. XK-2 — (SHEET 2 of 3)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	24-2-1994
ELEVATION	132.7 m	DIRECTION OF HOLE	90°	COMPLETED	5-3-1994
COORDINATE	X:E732279	CORE RECOVERY	98.3 %	DRILLED BY	
	Y:N1654826	DRILLING MACHINE	D-900	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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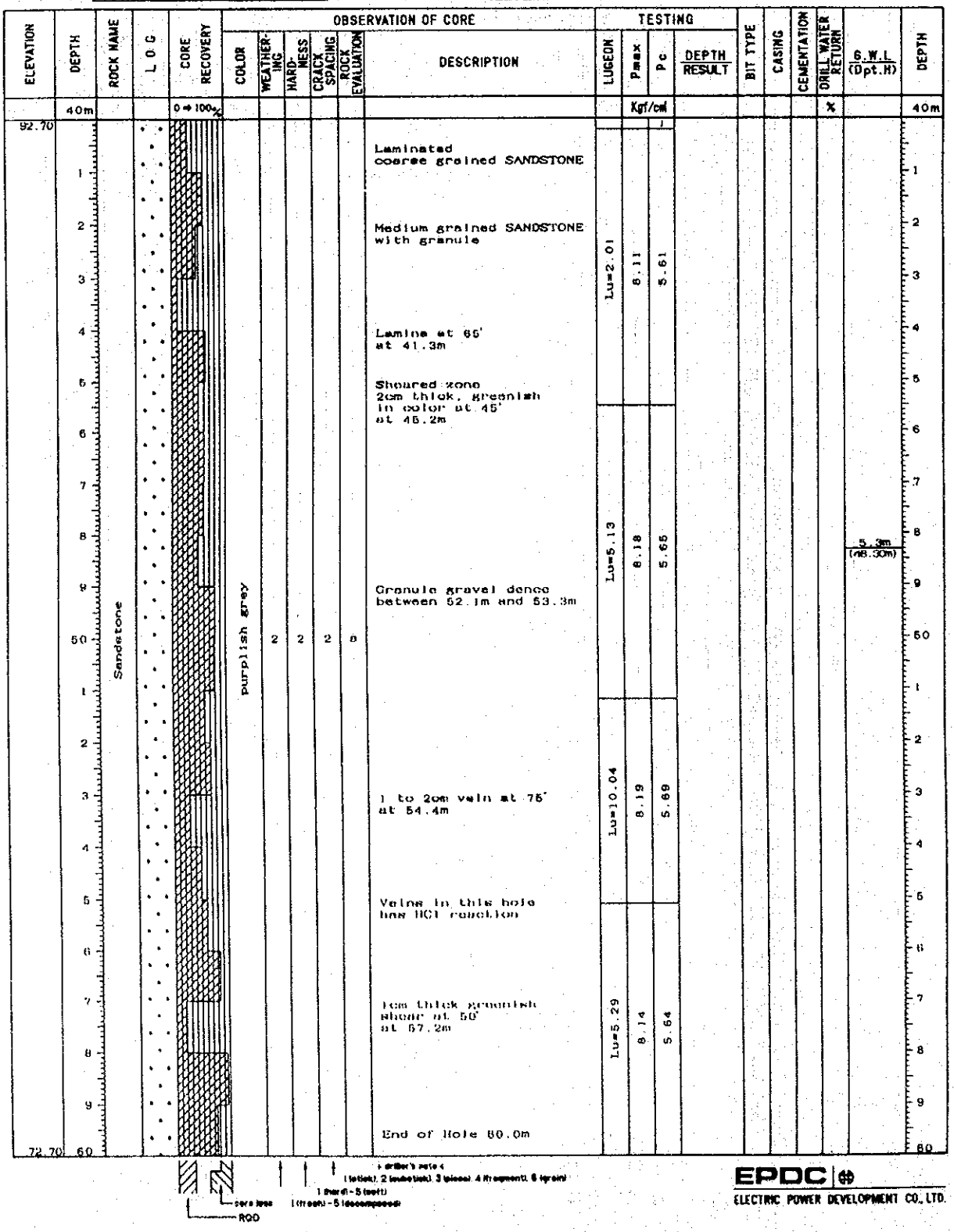
Se Kong River Basin PROJECT — HOLE No. XK-2 — (SHEET 3 of 3)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	24-2-1994
ELEVATION	132.7 m	DIRECTION OF HOLE	90°	COMPLETED	5-3-1994
COORDINATE	X:E732279	CORE RECOVERY	98.3 %	DRILLED BY	
	Y:N1654826	DRILLING MACHINE	D-900	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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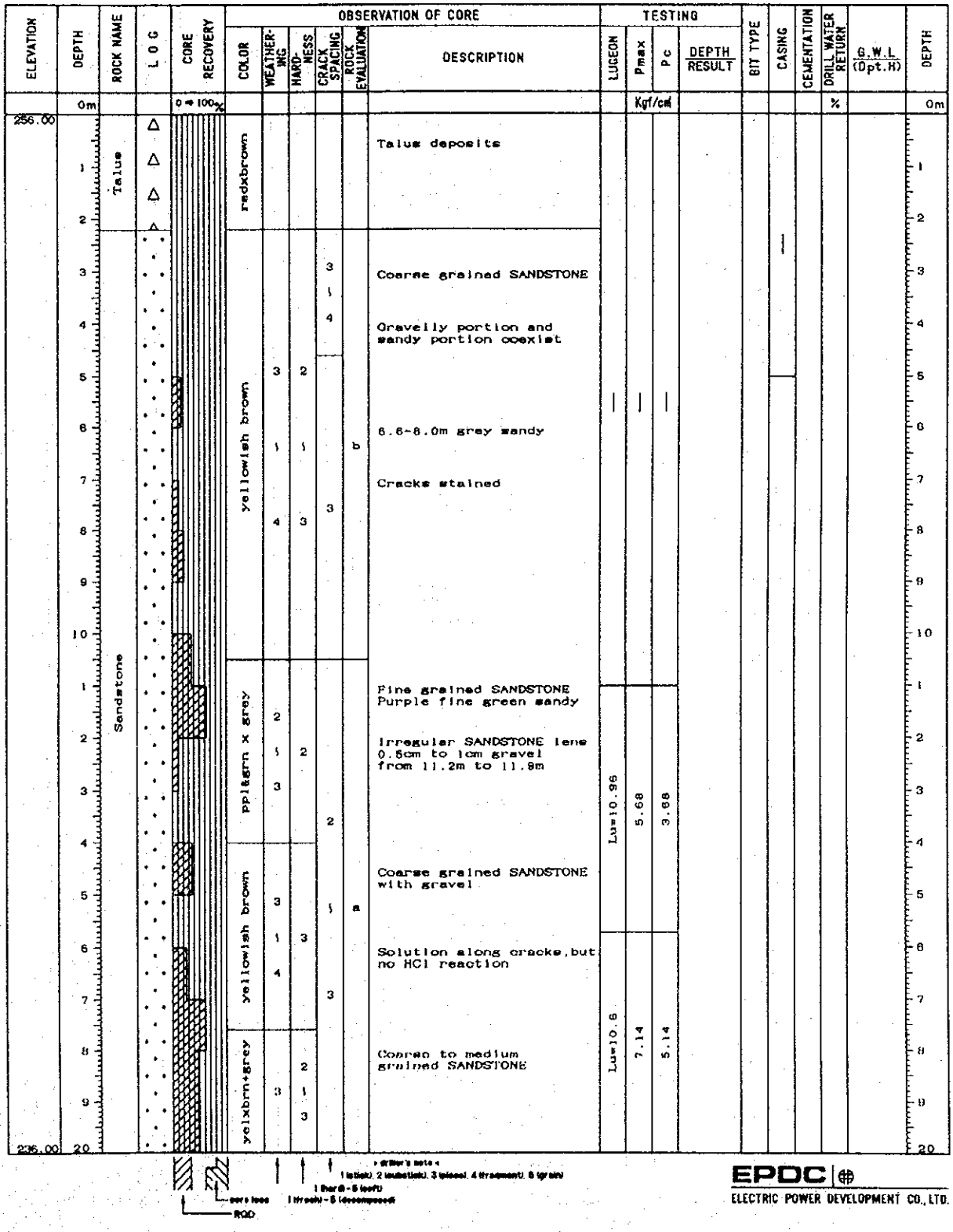
Se Kong River Basin PROJECT — HOLE No. XK-3 — (SHEET 1 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	15-2-1994
ELEVATION	256.0 m	DIRECTION OF HOLE	90°	COMPLETED	25-2-1994
COORDINATE	X:E732330	CORE RECOVERY	99.6 %	DRILLED BY	Thongsay
	Y:N1654937	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XK-3 — (SHEET 2 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	15-2-1994
ELEVATION	256.0 m	DIRECTION OF HOLE	90°	COMPLETED	25-2-1994
COORDINATE	X:E732330	CORE RECOVERY	99.6 %	DRILLED BY	
	Y:N1654937	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	20m			0 ⇔ 100%								Kgf/cm²						%		20m
256.00	0	Sandstone			br	3	2~3	3		Bottom surface at 80°										0
	1				purplish grey	2 1 3	2	2		Purplish fine SANDSTONE with 2-3cm thick greenish medium grained sandstone bands,wound and vertical	Lu=11.45	6.59	4.59							1
	2					2														2
	3																			3
	4					2 1 3	2	2 1 3		Purplish SANDSTONE										4
	5																			5
	6						3													6
					br	3		3		SANDSTONE stained to brown										
	7				grey					Purple f.g.SANDSTONE / green m.g.SANDSTONE 1-3cm alt. at 70° Cracks stained from 26.4m to 27.3m	Lu=13.39	5.18	3.18							7
	8																			8
	9									Purplish irregular shaped shale gravel from 29.3m to 30.0m up to 10cm across										9
	30					2		2	B											30
	1									Most cracks stained										1
	2				purplish grey	1	2	1		Granule Conglomerate from 30.9m to 31.6m										2
	3									Purple f.g.SANDSTONE with green g.g.sandstone bands at 85°	Lu=15.3	7.05	5.05							3
	4	Conglomerate				3		3		1-6cm green sheared zone at 10° to 20° with stained crack on the top surface										4
	5									Granule CONGLOMERATE including 2cm shale gravels										5
	6																			6
	7	Sandstone								Coarse grained SANDSTONE	Lu=6.5	8	6							7
	8						2													8
215.00	9					3	1 3	3		Solution from 37.9m to 38.2m, 38.8m,39.0m to 39.4m No HCl reaction										9
	40																			40

> driller's note <
1 (a little) 2 (subordinate) 3 (several) 4 (frequent) 5 (grave)
1 (hard) - 5 (soft)
1 (fresh) - 5 (decomposed)
core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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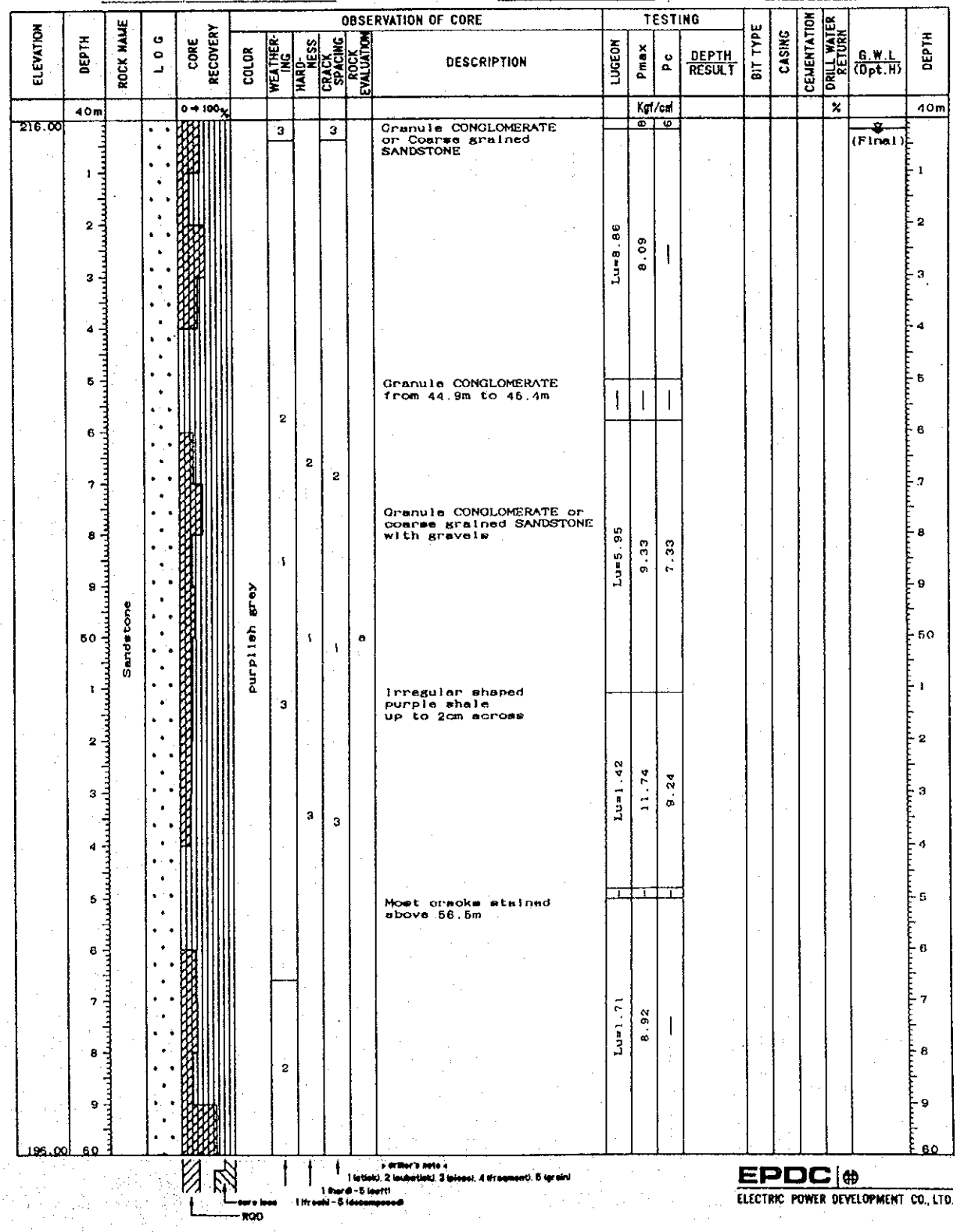
Se Kong River Basin PROJECT — HOLE No. XK-3 — (SHEET 3 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	15-2-1994
ELEVATION	256.0 m	DIRECTION OF HOLE	90°	COMPLETED	25-2-1994
COORDINATE	X:E732330	CORE RECOVERY	99.6 %	DRILLED BY	
	Y:N1654937	DRILLING MACHINE	XT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT | HOLE No. XK-3 | (SHEET 4 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	15-2-1994
ELEVATION	256.0 m	DIRECTION OF HOLE	90°	COMPLETED	25-2-1994
COORDINATE	X:E732330	CORE RECOVERY	99.6 %	DRILLED BY	
	Y:N1654937	DRILLING MACHINE	KT-100	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
	60m			0 → 100%								Kgf/cm²						%		60m
180.00		Sandstone			purplish grey	2	2	2 1 3		Medium to coarse grained SANDSTONE with gravels Few calcareous veins at 60° Dissolved veins at 66.2m and 66.6m	Lu=6.41	8.6	6.6							
								3												
								2			Lu=3.66	8.84	6.84							
	70																			70
											Lu=7.49	8.91	—							
						2	2			Medium grained SANDSTONE below 74.7m										
		Conglomerate				1 3	1 3	3			—	—	—							
						2	2	2 1 3		Granule CONGLOMERATE										
176.00	80	Ss								M.g.Ss 79.7m to 80.0m		8.97	6.97							80

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XK-3 — (SHEET 5 of 5)

LOCATION	Xe Kaman Damsite	DEPTH OF HOLE	100.0 m	COMMENCED	15-2-1994
ELEVATION	256.0 m	DIRECTION OF HOLE	90°	COMPLETED	25-2-1994
COORDINATE	X:E732330	CORE RECOVERY	99.6 %	DRILLED BY	
	Y:N1654937	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	80m			0 ⇔ 100%								Kgf/cm²						%		80m
176.00		Sandstone			purplish grey	2	2	2		Fine purple SANDSTONE above 80.8m Medium grained SANDSTONE	Lu=3.15	8.97	6.97							
	1																			1
	2																			2
	3							1		Dissolved vein at 50° at 81.4m, 3mm thick										3
	4									Three purplish 1cm thick bands at 80° at 83.8m										4
	5							3												5
	6				grn					5cm gravel bed at 50° at 85.7m Medium to coarse grained greenish SANDSTONE from 85.6m to 86.5m	Lu=3.65	9.8	7.8							6
	7																			7
	8					3	2 ↓ 3	3		Coarse grained SANDSTONE										8
	9																			9
	90							3	a	1-2cm thick green shear with calcite vein at 70° at 90.2m										90
	1				purplish grey					90.2-95.3m medium grained SANDSTONE with purple fine grained sandstone bands at 75°	Lu=8.43	8.97	6.97							1
	2							2												2
	3					2	2													3
	4																			4
	5							3		Lamina at 70° at 95.3m										5
	6									Slightly greenish and finer below 95.3m										6
	7							2		3cm purple shale patch at 95.6m	Lu=6.27	9.83	—							7
	8							1												8
	9							3		Cracks stained down to the bottom										9
156.00	100									End of Hole 100.0m										100

core loss — ROD

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GEOLOGIC LOG OF DRILL HOLE

Page

Se Kong River Basin PROJECT — HOLE No. XN-1 — (SHEET 1 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.0 m	COMMENCED	3-12-1993
ELEVATION	752 m	DIRECTION OF HOLE	90°	COMPLETED	25-12-1993
COORDINATE	X:E673317	CORE RECOVERY	91.9 %	DRILLED BY	Thongsay
	Y:N1663482	DRILLING MACHINE	D-900	LOGGED BY	Hoshino

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
	0m			0 → 100%														x		0m
752.00		Topsoil	Δ																	
	1		Δ																	1
	2		V		reddish brown	5	5	5	c	Strongly wethered BASALT Residual soil like Few hard fragments	—	—	—							2
	3		V																	3
	4		V																	4
	5		V																	5
	6		V							BASALT										6
	7		V							Fresh, hard, many pore up to 1cm across down to 10m	Lu=0.65	5.37	3.37							7
	8		V							Core is 5 to 30cm long										8
	9		V							Crack surface stained										9
	10		V							Brown but only surface										10
	1	Basalt	V								Lu=0.3	6.26	5.76							1
	2		V																	2
	3		V																	3
	4		V																	4
	5		V																	5
	6		V																	6
	7		V								Lu=0.14	8.26	—							7
	8		V																	8
	9		V											19.08m 19.50m 4c+R80						9
732.00	20		V		black	2	2	3	a		—	—	—							20

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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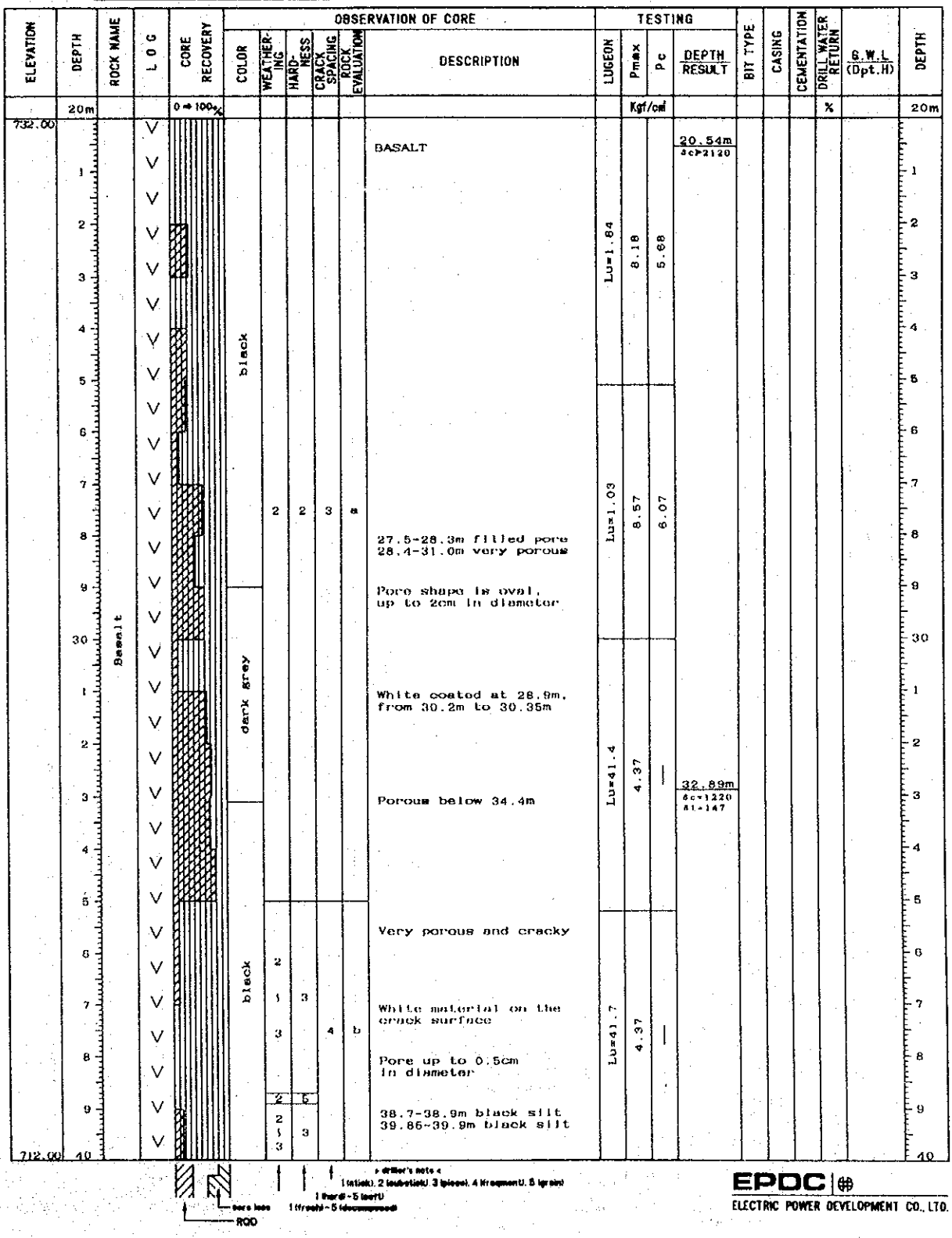
Se Kong River Basin PROJECT — HOLE No. XN-1 — (SHEET 2 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.0 m	COMMENCED	3-12-1993
ELEVATION	752 m	DIRECTION OF HOLE	90°	COMPLETED	25-12-1993
COORDINATE	X:E673317	CORE RECOVERY	91.9 %	DRILLED BY	Thongsay
	Y:N1663482	DRILLING MACHINE	D-900	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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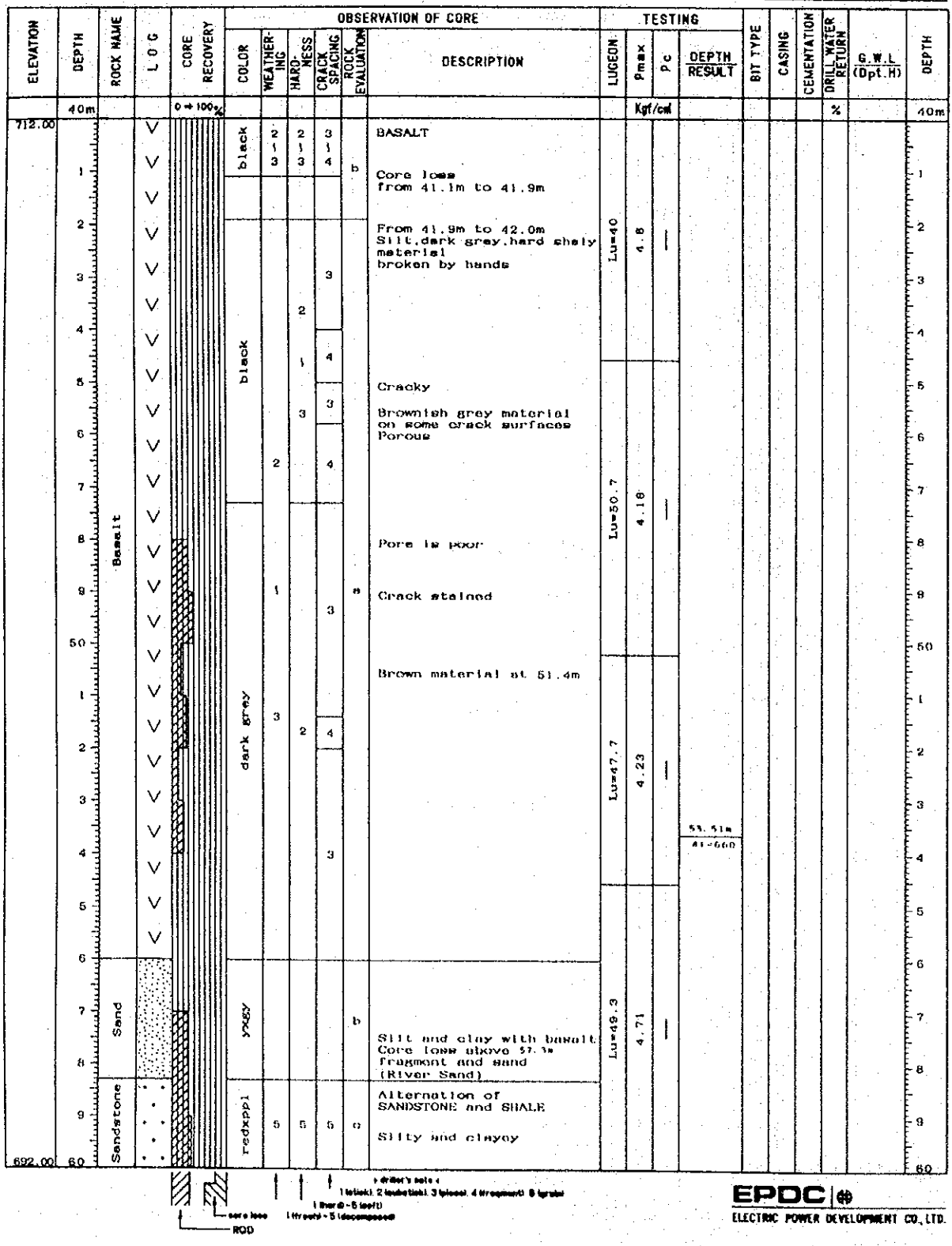
Se Kong River Basin PROJECT — HOLE No. XN-1 — (SHEET 3 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.0 m	COMMENCED	3-12-1993
ELEVATION	752 m	DIRECTION OF HOLE	90°	COMPLETED	25-12-1993
COORDINATE	X:E673317	CORE RECOVERY	91.9 %	DRILLED BY	Thongsay
	Y:N1663482	DRILLING MACHINE	D-900	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT		HOLE No. XN-1	(SHEET 4 of 4)
LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE 80.0 m	COMMENCED 3-12-1993
ELEVATION	752 m	DIRECTION OF HOLE 90°	COMPLETED 25-12-1993
COORDINATE	X:E673317	CORE RECOVERY 91.9 %	DRILLED BY Thongsay
	Y:N1663482	DRILLING MACHINE D-900	LOGGED BY Hoshino

Column headings: ELEVATION | DEPTH (60m) | ROCK NAME | L O G | CORE RECOVERY (0 → 100%) | OBSERVATION OF CORE: COLOR, WEATHERING, HARDNESS, CRACK SPACING, ROCK EVALUATION, DESCRIPTION | TESTING: LUGEON, Pmax, Pc (Kgf/cm²), DEPTH RESULT | BIT TYPE | CASING | CEMENTATION | DRILL WATER RETURN (%) | G.W.L. (Dpt.H) | DEPTH (60m)

Elevation at top: 692.00; elevation at bottom: 672.00 (depth 80)

Rock name	Color	Weathering	Hardness	Crack spacing	Rock evaluation	Description
Sandstone	redxppl	5	5	5	c	Wethered SANDSTONE AND SHALE SHALE from 61.1m to 61.6m
	purple	4	4	4		Purple SANDSTONE flat lamina from 61.9m to 62.25m Core loss
Sh	ppl	3	3	3		SHALE No core from 63.8m to 64.0m
Ss	grey	2 ~ 3	2 ~ 3	2 ~ 3		63.4m-63.7m purple sandy shell 63.7m-65.1m m.g.Ss lamina at 20°
FSs	reddish purple	2 ~ 3	3	2		Fine grained SANDSTONE Clayes at 61.9m-66.5m about 10cm thick Lamina at 10° to 15° No core from 65.05m to 65.35m
Sandstone	yellowish brown	4	3 ~ 4	4	b	Medium grained SANDSTONE Color changed to brown 2-3cm thick clayoy layers at 73.8m,74.2m and 74.5m 74.5m is reddish
FSs	pplxgrey		3	3		Fine grained SANDSTONE
Sandstone	grey	2 ~ 3	2 ~ 3	2	a	Medium grained SANDSTONE Laminated
FSs	pplxgrey		2	1		Fine grained SANDSTONE 76.8,77.4m 10cm thick shale No core from 77.6m to 78.0m
Ss	K	2~3	2	3	b	Medium grained SANDSTONE No core from 78.2m to 78.6m from 79.1m to 79.3m
	K	2 ~ 3	2	2		
Sh		3	4	5		SHALE
Ss	A					M.g.Ss calcite lens

Key to symbols (below the log):
- RQD
- core loss
- 1 (fresh) ~ 5 (decomposed)
- 1 (hard) ~ 5 (soft)
- ▸ driller's note ◂
- 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)

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GEOLOGIC LOG OF DRILL HOLE

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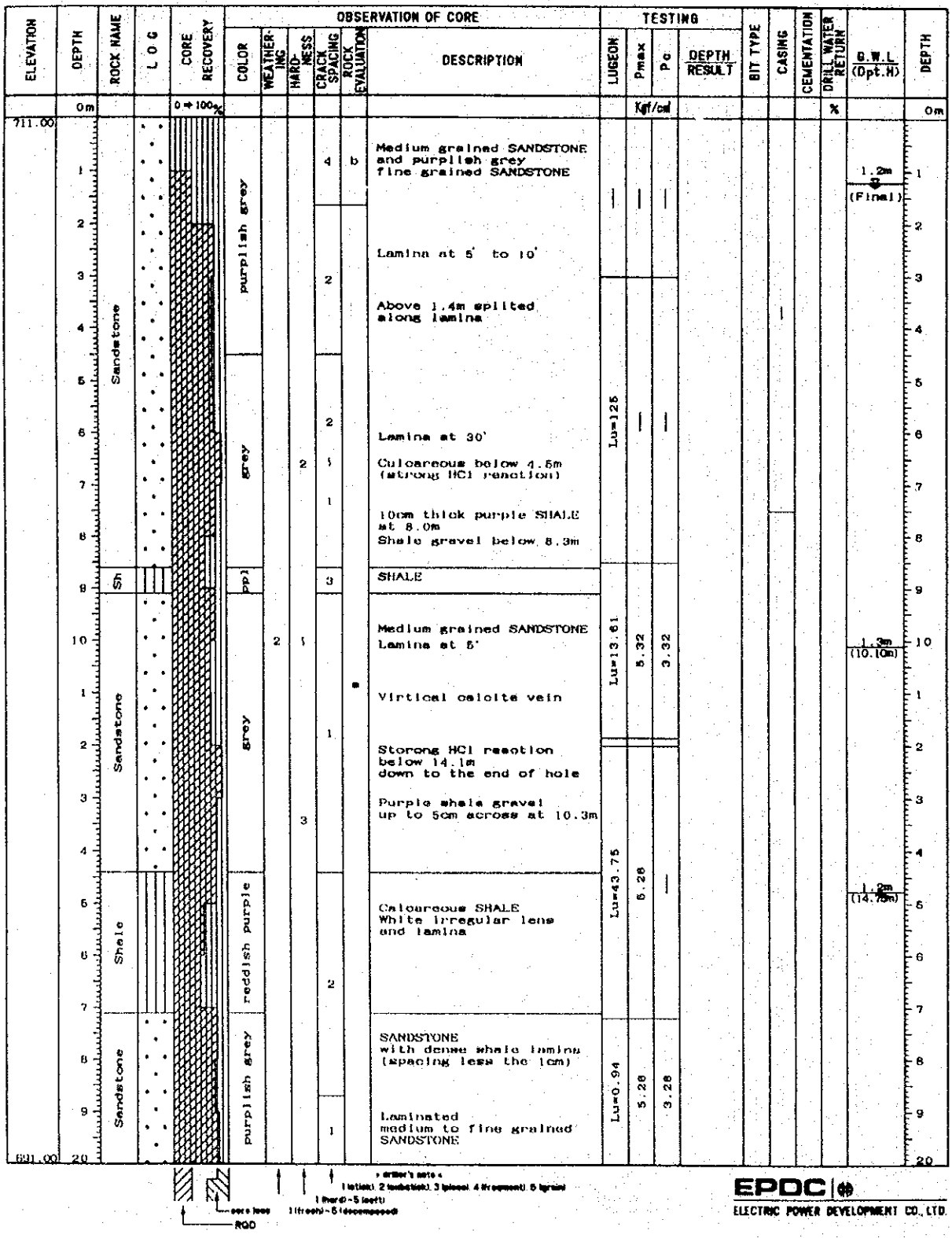
Se Kong River Basin PROJECT — HOLE No. XN-2 — (SHEET 1 of 2)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	40.0 m	COMMENCED	26-12-1993
ELEVATION	711 m	DIRECTION OF HOLE	90°	COMPLETED	2-1-1994
COORDINATE	X:E673584	CORE RECOVERY	100 %	DRILLED BY	Thongsay
	Y:N1663766	DRILLING MACHINE	D-900	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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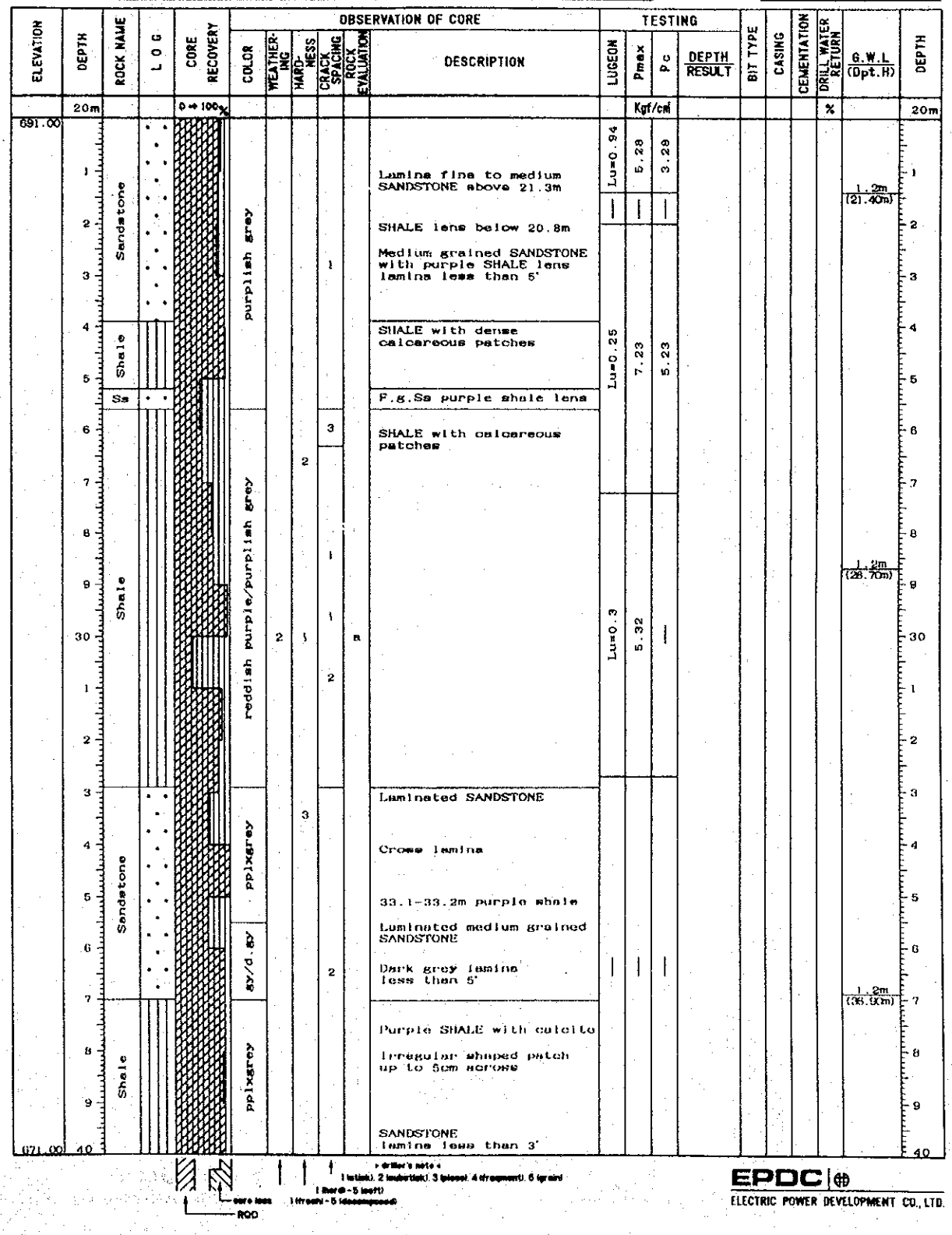
Se Kong River Basin PROJECT — HOLE No. XN-2 (SHEET 2 of 2)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	40.0 m	COMMENCED	26-12-1993
ELEVATION	711 m	DIRECTION OF HOLE	90°	COMPLETED	2-1-1994
COORDINATE	X:E673584	CORE RECOVERY	100 %	DRILLED BY	Thongsay
	Y:N1663766	DRILLING MACHINE	D-900	LOGGED BY	



GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-3 — (SHEET 1 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	2-12-1993
ELEVATION	753 m	DIRECTION OF HOLE	90°	COMPLETED	13-12-1993
COORDINATE	X:E673730	CORE RECOVERY	88.9 %	DRILLED BY	Thongsay
	Y:N1663921	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino

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 (Dpt.H)	DEPTH
	0m			0 ⇒ 100%								Kgf/cm²						%		0m
753.00		Ta	△		br					Topsoil										
	1	Talus	△		brownish grey					Talus deposits Sandstone blocks Silt,clay and block										1
	2		△																	2
	3		△																	3
	4		△																	4
	5		△																	5
	6	Shale			purplish red	4	4 1 5	5	c	SHALE Core recovery is about 30% from 4.8m to 6.4m mudcake like										6
	7					3	4			Fragmental core with clay, core recovery 60% from 6.4m to 8.2m										7
	8																			8
	9																			9
	10	Sandstone			purplish grey	2	2 1 3	2	a	Medium grained SANDSTONE Stick core Corse grained portion near 10.3m is broken by finger	Lu=34.4									10
	1									Brown crack below 13.7m										1
	2																			2
	3																			3
	4					3	3	3		Sandy SHALE Spotted sand above 15.8m										4
	5	Sandy shale																		5
	6					4	4	4 1 5	c	Core recovery is about 30% below 15.8m Fragment core or mudcake core below 15.8m	Lu=24.0									6
	7																			7
	8																			8
	9	Shale			pplxred	2	2 1 3	2	b	SHALE Fragment with clay from 18.2m to 18.3m										9
733.00	20					3	3	4				6.45							14.8m	20

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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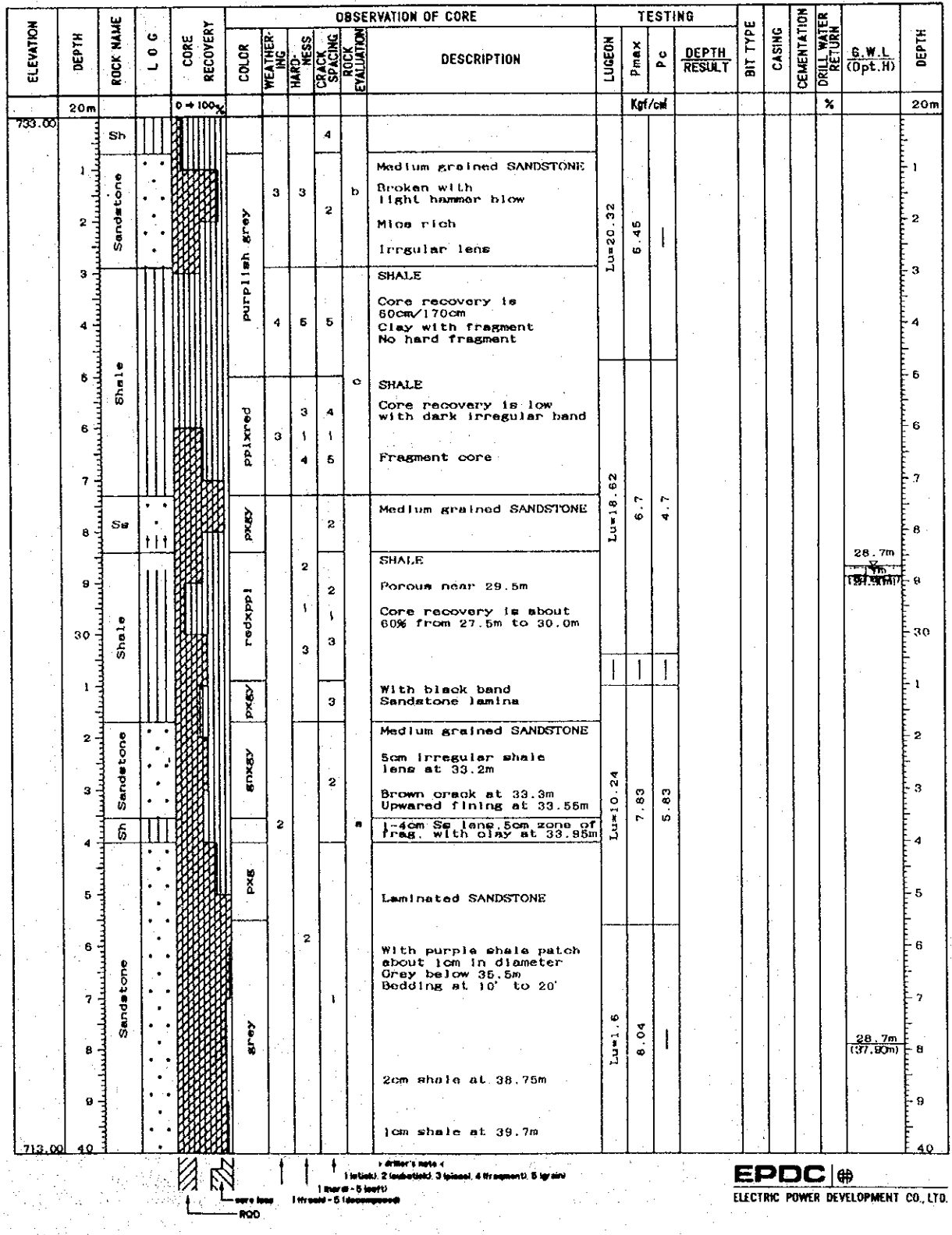
Se Kong River Basin PROJECT — HOLE No. XN-3 — (SHEET 2 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	2-12-1993
ELEVATION	753 m	DIRECTION OF HOLE	90°	COMPLETED	13-12-1993
COORDINATE	X:E673730	CORE RECOVERY	88.9 %	DRILLED BY	
	Y:N1663921	DRILLING MACHINE	KT-100	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-3 — (SHEET 3 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	2-12-1993
ELEVATION	753 m	DIRECTION OF HOLE	90°	COMPLETED	13-12-1993
COORDINATE	X:E673730	CORE RECOVERY	88.9 %	DRILLED BY	
	Y:N1663921	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	40m			0 → 100%								Kgf/cm						%		40m
713.00	1	Sandstone			grey		2			Laminated SANDSTONE with shale patch Shale band between 41.65m and 41.75m Calcareous									29.2m (41.20m)	1
	2																			2
	3	Shale			pplxred	2	2	1		SHALE SANDSTONE lamina between 44.0m and 44.3m Correlate to the depth around 18m of XN-2 Hole Calcareous	Lu=1.43	8.01	6.01								3
	4						1													4
	5						3													5
	6	Sandstone			grey	2	2			Medium grained SANDSTONE With shale patch micu 10cm thick purple shale bed from 45.5m to 46.7m	Lu=2.53	7.93	5.93						29.5m (46.70m)	6
	7																			7
	8				pxsy					Fine grained SANDSTONE										8
	9				pplxred			1												9
	50								n	Medium grained SANDSTONE Laminated	—	—	—							50
	1							1												1
	2									Laminated at 20° to 30°										2
	3										Lu=1.82	8.05	6.05							3
	4							2												4
	5																			5
	6																		28.5m (56.00m)	6
	7									5cm shale at 57.5m										7
	8	Shale			pplxred						Lu=2.37	10.49	7.89							8
693.00	9							2		SHALE with calcite patch White irregular shaped patch up to 3cm										9
	60																			60

core loss
ROD

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GEOLOGIC LOG OF DRILL HOLE

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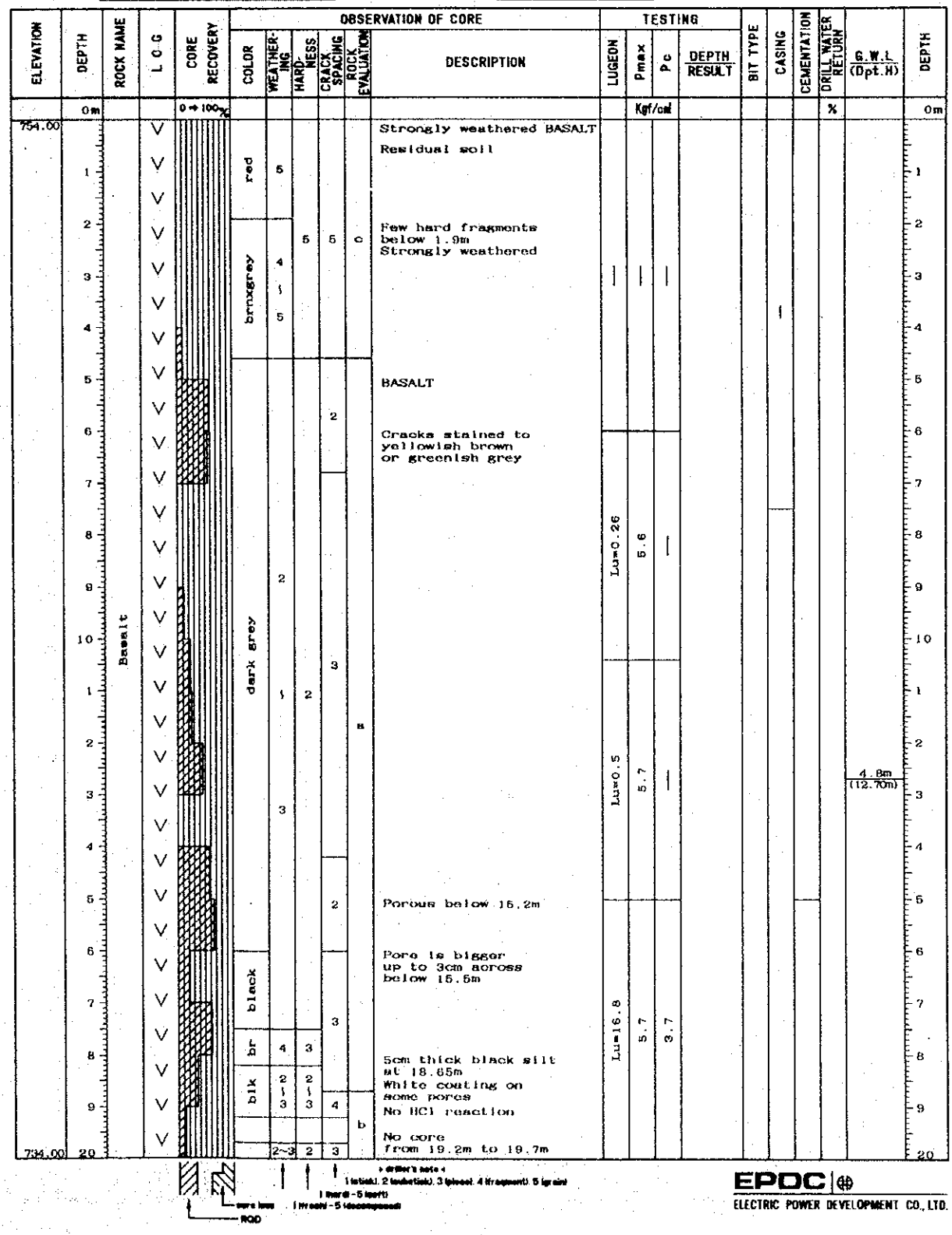
Se Kong River Basin PROJECT — HOLE No. XN-4 — (SHEET 1 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.00 m	COMMENCED	3-1-1994
ELEVATION	754.00 m	DIRECTION OF HOLE	90°	COMPLETED	21-1-1994
COORDINATE	X:E672460	CORE RECOVERY	76.6 %	DRILLED BY	Thongsay
	Y:N1664760	DRILLING MACHINE	D-900	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-4 (SHEET 2 of 4)

LOCATION Xe Namnoy Damsite — DEPTH OF HOLE 80.00 m — COMMENCED 3-1-1994

ELEVATION 754.00 m — DIRECTION OF HOLE 90° — COMPLETED 21-1-1994

COORDINATE X:E672460 — CORE RECOVERY 76.6 % — DRILLED BY

Y:N1664760 — DRILLING MACHINE D-900 — 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 (Dpt.H)	DEPTH
	20m			0 → 100%								Kgf/cm²						%		20m
734.00		Basalt			br blk	2~3	2	2~3	b	BASALT Black silty from 21.6m to 21.7m 5cm orange silt at 20.9m	—	—	—							
	1				br	2~3	3	4												1
	2						2	2		Porous above 21.4m										2
	3				black	2	1			Dry surface is dark grey below 23m	Lu=22.79	6.84	4.84						17.10m (22.70m) 23.2m (Final)	3
	4					1	3	3	a	Porous below 23.7m Pore 1cm across dense										4
	5					3		2												5
	6						4	3		Black silty porous Basalt from 25.9m to 26.4m										6
	7						3	2		Below 27.4m core recovery is bad										7
	8									Very porous above 28.5m										8
	9				bl	2~3	2	3		White coat at some cracks										9
	30																			30
	1				bl	2~3	2~3	4												1
	2				bl	2~3	2~3	4												2
	3									Porous Crack surfaces are white or yellow grey	—	—	—							3
	4								b	←2-3, 2-3, 4										4
	5									No core from 27.4m to 27.9m from 28.0m to 28.4m from 29.2m to 30.1m from 30.7m to 31.5m from 32.4m to 33.9m from 34.0m to 35.5m from 36.8m to 37.4m										5
	6				black	2~3	2~3	4												6
	7																			7
	8				black	2	2	3												8
	9					1~3	1~3	1												9
714.00	40																			40

core loss
RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-4 — (SHEET 3 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.00 m	COMMENCED	3-1-1994
ELEVATION	754.00 m	DIRECTION OF HOLE	90°	COMPLETED	21-1-1994
COORDINATE	X:E672460	CORE RECOVERY	76.6 %	DRILLED BY	
	Y:N1664760	DRILLING MACHINE	D-900	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 (Dpt.H)	DEPTH
	40m			0 ⇔ 100%								Kgf/cm						%		40m
714.00		Basalt			black	2~3	2~3	3~4	b	BASALT Pores are not dense and small										
					bl	2~3	1~2	4		Yellow green coat on some cracks										
					bl	2~3	2~3	4												
					bl	2~3	2~3	4		Breccia like at 40.4m										
					bl	2~3	2~3	4												
					bl	2~3	2~3	3~4		No core from 41.5m to 42.0m from 42.75m to 42.95m from 43.4m to 43.7m from 44.2m to 44.5m from 45.1m to 45.5m from 46.25m to 46.8m from 48.0m to 48.6m										
					bl	2~3	2~3	3~4												
					b	2~3	2~3	4												
					g	2~3	2~3	3		Medium grained SANDSTONE										
		Sandstone			grey	3	3	3		Clayey shale band below 50.2m										
	50	Sh				4	3	4		SHALE										50
					oxidy	3	3	2		SANDSTONE laminated and medium grained Yellow stained in part										
					yxdy					No core from 52.2m to 52.6m										
					light grey	2	2	4	a	Medium to Coarse grained SANDSTONE										
		Sandstone					1~2	2		Laminated										
							3	3		Yellow SANDSTONE band up to 3cm thick near 57.2m and 57.85m										
					grey					Yellow grey SANDSTONE of 15cm thick at 58.2m										
										No core from 58.2m to 58.4m										
					grey	2	2	3		Cracks stained brown at 58.7m										
694.00	60						1~3	2~3												60

core loss — RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-4 — (SHEET 4 of 4)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	80.00 m	COMMENCED	3-1-1994
ELEVATION	754.00 m	DIRECTION OF HOLE	90°	COMPLETED	21-1-1994
COORDINATE	X:E672460	CORE RECOVERY	76.6 %	DRILLED BY	
	Y:N1664760	DRILLING MACHINE	D-900	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 (Dpt.H)	DEPTH
	60m			0 ⇒ 100%								Kgf/cm²						%		60m
694.00	0	Sandstone			grey	2	2	2	a	Medium to coarse grained SANDSTONE lamina at 20°										0
	1				l.gry					No HCl reaction above 62.6m										1
	2																			2
	3									No core from 62.6m to 64.4m										3
	4					2	3	4												4
	5									Fine SANDSTONE with purple shale patch and calcareous patch										5
	6					2	2	3		No core from 64.7m to 65.4m										6
					pxr	2	2 ↓ 3	4												
	7							2		Upward fining from SHALE to fine grained SANDSTONE										7
	8									with pale calcite patch										8
	9				d.r		2 ↓ 4			Strong HCl reaction No core from 67.0m to 68.3m										9
	70	Shale			pxr	2	3	3		SHALE Core shape is like torted										70
	1									No core from 70.25m to 71.75m										1
	2	Sandstone			pxr	2	2~3	2~3	b	Fine grained SANDSTONE with irregular sand lens										2
	3							4												3
	4				l.gy	2	2 ↓ 1 ↓ 3	2 ↓ 1 ↓ 3		Medium grained SANDSTONE lamina at 20° Cross lamina in part No HCl reaction										4
	5																			5
	6				d.r	2	2 ↓ 3	2 ↓ 3		Fine grained SANDSTONE (Muddy)										6
	7				gy	2	2 ↓ 3	2 ↓ 3		Few irregular calcite patch										7
	8							2												8
	9				gy	2	3	3		Medium grained SANDSTONE Dark grey lamina Strong Hcl reaction										9
674.00	80				gy	2	3	3												80

core loss — RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-5 — (SHEET 1 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	2-12-1993
COORDINATE	X:E672760	CORE RECOVERY	91.5 %	DRILLED BY	Thongsay
	Y:N1664870	DRILLING MACHINE	D-900	LOGGED BY	Hoshino

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 (Dpt.H)	DEPTH
	0m			0 → 100%								Kgf/cm²						%		0m
735.00		Shale			brown				c	SHALE No water drilling										
	1																			1
	2									No fragment above 2.2m										2
	3				purplish red	5	5	5		From 2.2m to 2.5m few fragment										3
	4																			4
	5				pxr+y					Fragmental core below 5.0m										5
	6																			6
	7	Sandstone			pxgrey	3	3			SANDSTONE										7
	8					1	1	4		Core recovery is about 50%										8
	9	Sh			pxr	4	4		b	SHALE Broken by hand, slaky										9
	10	Sandstone			pxgrey	3	3	3		Medium grained SANDSTONE Laminated										10
	1						1													1
	2				l.grey		4													2
	3									Purple grey lamina.	Lu=6.6	5.5	3.5							3
	4																			4
	5				purplish grey	2	2	2	a	purple shale lenses of 0.5cm thick near 13.5m deep										5
	6																			6
	7									Lamina at 20°	Lu=0.68	5.81	3.81							7
	8																			8
	9				l.grey															9
715.00	20																			20

core loss — ROD

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GEOLOGIC LOG OF DRILL HOLE

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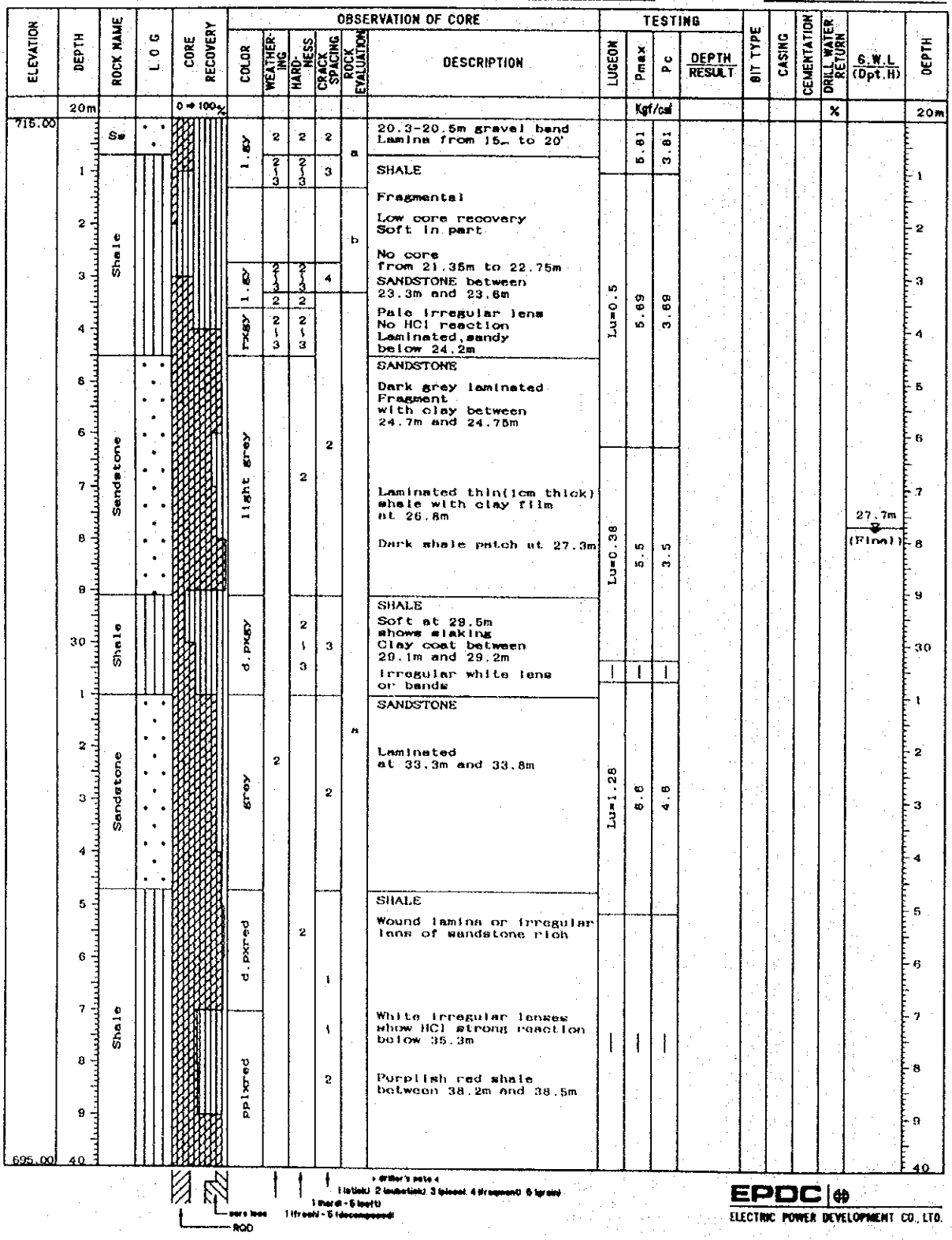
Se Kong River Basin PROJECT — HOLE No. XN-5 — (SHEET 2 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	2-12-1993
COORDINATE	X:E672760	CORE RECOVERY	91.5 %	DRILLED BY	
	Y:N1664870	DRILLING MACHINE	D-900	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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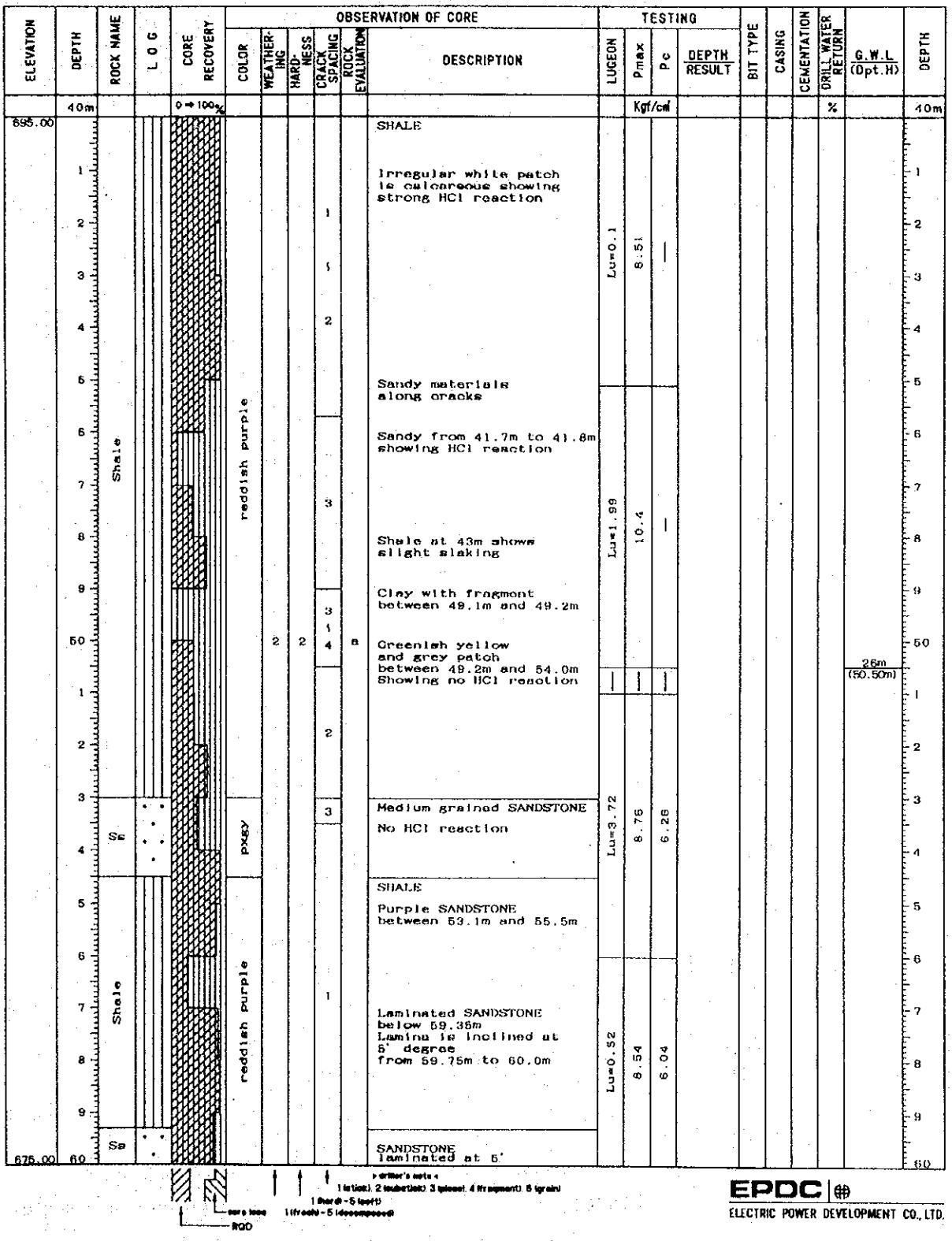
Se Kong River Basin PROJECT — HOLE No. XN-5 — (SHEET 3 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	2-12-1993
COORDINATE	X:E672760	CORE RECOVERY	91.5 %	DRILLED BY	
	Y:N1664870	DRILLING MACHINE	D-900	LOGGED BY	



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GEOLOGIC LOG OF DRILL HOLE

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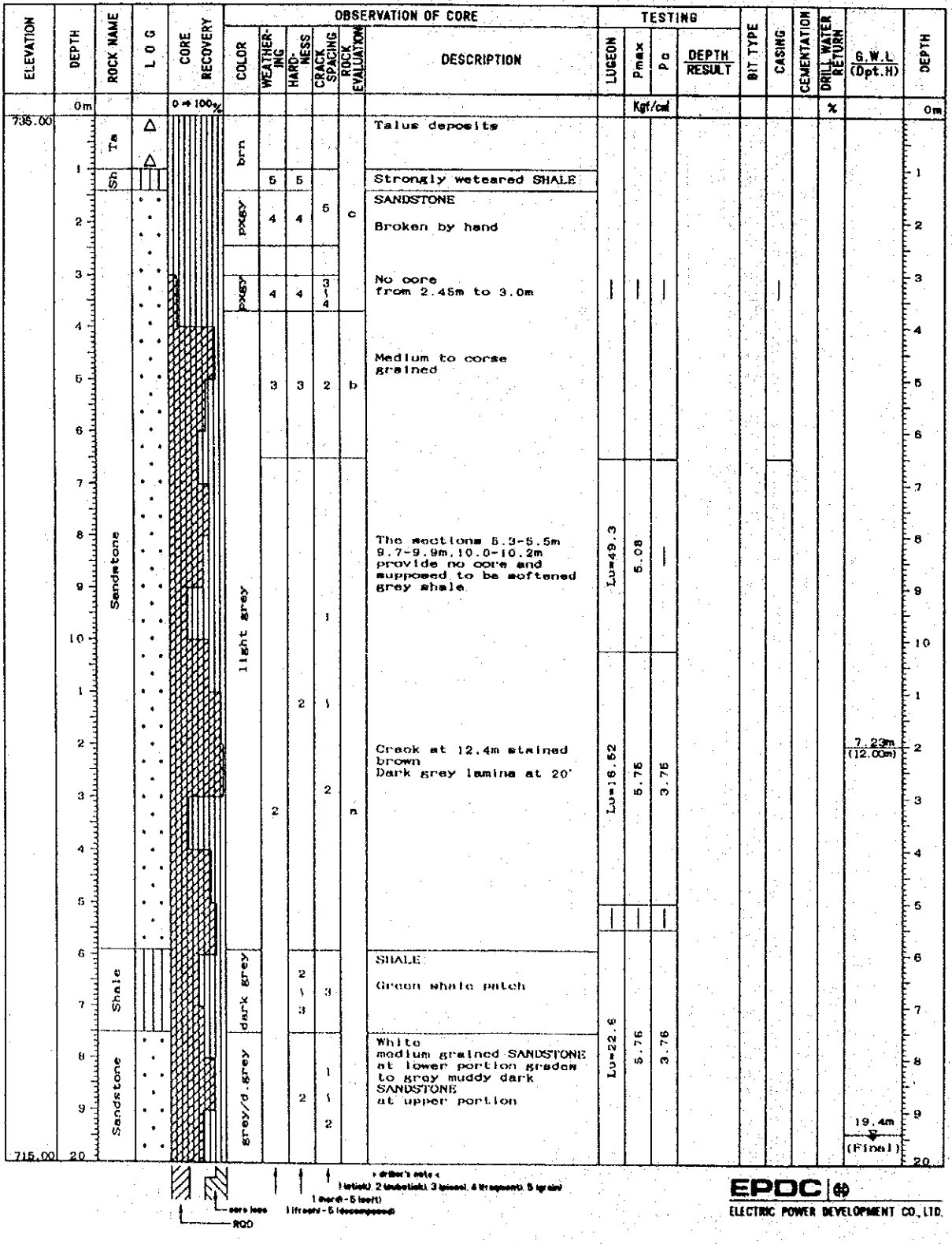
Se Kong River Basin PROJECT — HOLE No. XN-6 — (SHEET 1 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	30-11-1993
COORDINATE	X:E672980	CORE RECOVERY	94.6 %	DRILLED BY	Thongsay
	Y:N1664840	DRILLING MACHINE	KT-100	LOGGED BY	Hoshino



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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-6 — (SHEET 2 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	30-11-1993
COORDINATE	X:E672980	CORE RECOVERY	94.6 %	DRILLED BY	
	Y:N1664840	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	20m			0 ⇒ 100%								Kgf/cm²						%		20m
715.00		Sandstone			light grey			1			—	—	—							
	1							3		Virtical crack between 20.6m and 21.3m										1
	2							2												2
	3	Shale			pplxred/dark red					SHALE with irregular patches in upper part	Lu=1.31	6.13	4.13							3
	4									Purple Sandstone in lower part										4
	5									(Upward fining)										5
	6							2		Irregular white patches are poor above 23.0m	—	—	—							6
	7	Sandstone			light grey			1		SANDSTONE Brown crack HCl reaction above 26.8m										7
	8										Lu=6.75	6.09	4.09							8
	9							3												9
	30	Shale			pplxred/dark red	2	2		a	SHALE From 29.3m to 30.70m dark purple shale										30
	1									to 30.75m Sandstone to 31.10m d.p.shale to 31.70m shale with irregular lens										1
	2									to 32.1 m No core to 32.5 m d.p.shale to 32.6 m white Ss	Lu=2.7	6.13	4.13						13.5m (32.00m)	2
	3							1												3
	4							1												4
	5							2		to 35.7 m purple shale with irregular spot and sandy layer										5
	6	Sandstone			pplxred			1		SANDSTONE Luminated at 15°	Lu=5.73	6.15	—							6
	7																			7
	8	Sa.sh			pplxgrey			2		Change from top to bottom from SHALE through muddy SANDSTONE to medium grained SANDSTONE										8
695.00	40																			40

core loss — RQD

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GEOLOGIC LOG OF DRILL HOLE

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Se Kong River Basin PROJECT — HOLE No. XN-6 (SHEET 3 of 3)

LOCATION	Xe Namnoy Damsite	DEPTH OF HOLE	60.0 m	COMMENCED	22-11-1993
ELEVATION	735 m	DIRECTION OF HOLE	90°	COMPLETED	30-11-1993
COORDINATE	X:E672980	CORE RECOVERY	94.6 %	DRILLED BY	
	Y:N1664840	DRILLING MACHINE	KT-100	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 (Dpt.H)	DEPTH
	40m			0 → 100%								Kgf/cm²						%		40m
695.00		Ss.sh			pplxgrey			8		Same as above										
	1																			1
	2	Shale			pxred			2		SHALE Sandstone lens and lamina (up to 1cm thick) above 42.9m	Lu=0.18	6.13	4.13							2
	3				dark.pplxred			2												3
	4							1												4
	5							3												5
	6	Sandstone			light grey	2	2		a	SANDSTONE Greenish Lamina at 6°	Lu=0.51	6.02	—							6
	7																			7
	8																			8
	9							1												9
50																			13.2m (49.00m)	50
	1																			1
	2	Shale			pxred/d.pxred			2		SHALE Dark purple SHALE with white irregular sandstone lens with strong HCl reaction above 54.0m Purple irregular band between 54.0m and 54.5m Purple SHALE below 55.7m	Lu=1.84	6.12	—								2
	3																			3
	4																			4
	5																			5
	6	Sandstone			grey					SANDSTONE Laminated Black patch										6
	7							1											14m (57.30m)	7
	8									Erosion surface at 58.05m										8
	9									Lamina up to 10°										9
675.00	60									END of HOLE										60

core loss — ROD

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3.4 Data of Environmental Impact and Compensation Survey

Table 1 **Land use classification in the Project Areas (Hectares)**

Features	Xenamnoi		Sekong No 4		Xe kaman No1	
	Catchment	Reservoir Elev. 780 m	Catchment	Reservoir Elev. 320 m	Catchment	Reservoir Elev. 300
I. Current Forest	**53960**	**2912 (35.16)**	**323921**	**11974(55.14)**	**83570**	**16199(66.93)**
Dry Dipterocarp	5700	1000	15680	4268	0	0
Dry Evergreen	0	0	27400	0	0	0
Mixed Decidous	5520	452	280841	7706	83570	16107
Gallery forest	37240	1460	0	0	0	92
Coniferous and Mixed	0	0	0	0	0	0
Coniferous/broad leave	5500	0	0	0	0	0
II. Potential forest	**920**	**72 (0.86)**	**75620**	**4052(18.65)**	**5680**	**1429(5.9)**
Bamboo	0	0	70840	4002	2640	1080
Ray (Slush and burn cultivation)	920	72	4780	50	3040	349
III. Temporely Unstocked	0	**3836(46.32)**	**59524**	**4531(20.86)**	**77700**	**6483(26.78)**
IV. Rice paddy						
V. Others	**22510**	**1460(17.63)**	**2840**	**1160(5.34)**	**1240**	**92(0.38)**
Total	**77390**	**8280**	**461905**	**21717**	**138190**	**24203**

Notes: 1. The forest area in the reservoir is not include in the catchment area.
2. The number in parentheses shown the percentage of each land use type versus the reservoir area.

Table 2 Agriculture Land in the Reservoir Areas

Features	Unit	Xe Namnoi	Sekong No 4	Sekaman No1
Lowland Rice	Ha	0	0	0
Upland Rice	Ha	110	597	65
Coffee plantation	Ha	45	0	3
Tabacco	Ha	12	0	0
Maize	Ha	4	36	5
Potatoes	Ha	3	12	0
Cotton	Ha	4	6	0

Table 3 Villages in the Sekong Reservoir

No.	Village name	Province	District	Household	Population	Northing	Easthing	Elev(m)	Map.No.	Remark
1	Ban pakkayong	Sekong	Lanam	26	190	17 16 500	186 93 200	160	D48-22	Surveyed
2	Ban hungtai	Sekong	Lanam	15	92	17 21 400	186 90 200	180	-"-	
3	Ban hungkang	Sekong	Lanam	16	142	17 21 900	186 91 100	180	-"-	
4	Ban hungnua	Sekong	Lanam	15	104	17 23 500	186 90 400	180	-"-	
5	Ban houaylang	Sekong	Kaleum	25	162	17 23 300	186 99 700	240	-"-	
6	Ban tangkat	Sekong	Kaleum	13	117	17 23 900	187 00 000	240	-"-	
7	Ban sathong	Sekong	Kaleum	13	118	17 24 450	187 09 200	260	-"-	
8	Ban hatvy	Sekong	Kaleum	28	338	17 29 400	186 90 900	200	-"-	
9	Ban hanong	Sekong	Kaleum	23	155	17 33 000	186 98 100	280	D48-10	
10	Ban paktray	Sekong	Kaleum	20	99	17 34 000	186 96 200	240	-"-	
11	Ban hatpe	Sekong	Kaleum	12	237	17 35 500	186 92 600	280	-"-	
12	Ban pakphoung	Sekong	Kaleum	24	126	17 39 000	186 93 400	240	-"-	
13	Ban trak	Sekong	Kaleum	21	133	17 38 400	186 90 100	240	-"-	
14	Ban kongtrak	Sekong	Kaleum	27	255	17 41 200	186 88 200	240	-"-	
15	Ban kaleum	Sekong	Kaleum	23	250	17 40 800	186 87 700	240	-"-	
16	Ban bountan	Sekong	Kaleum	17	109	17 42 600	186 87 700	280	-"-	
17	Ban kloung	Sekong	Kaleum	6	110	17 44 700	186 89 800	280	-"-	
18	Ban tongkay	Sekong	Kaleum	15	98	17 42 300	186 82 900	240	-"-	
19	Ban paksay	Sekong	Kaleum	28	85	17 42 700	186 81 100	280	-"-	
20	Ban bak	Sekong	Kaleum	12	172	17 48 600	186 88 300	240	-"-	
21	Ban longkong	Sekong	Kaleum	7	99	17 53 200	186 90 000	280	-"-	
22	Ban ploynua	Sekong	Kaleum	17	45	17 50 400	186 88 200	280	-"-	
23	Ban ploytai	Sekong	Kaleum	18	211	17 50 300	186 84 700	280	-"-	
24	Ban kado	Sekong	Kaleum	17	110	17 51 900	187 01 500	280	-"-	
	Total			438	3557					

Table 4 Villages in the Xe Kaman Reservoir

No.	Village name	Province	District	Household	Population	Northing	Easthing	Elev(m)	Map.No.	Remark
1	Ban hindam	Attapu	Sanexay	20	151	16 57 400	187 33 550	150	D48-35	
2	Ban donkhen 1	Attapu	Sanexay	8	93	16 63 300	187 39 500	140	-"-	
3	Ban donkhen 2	Attapu	Sanexay	10	103	16 63 300	187 39 550	140	-"-	
4	Ban donkhen 3	Attapu	Sanexay	7	75	16 63 700	187 40 150	140	-"-	
5	Ban daklom	Attapu	Sanexay	29	167	16 68 200	187 32 500	200	-"-	Surveyed
	Total			74	589					

Table 5 Villages in the Xenamnoy Reservoir

No.	Village name	Province	District	Household	Population	Northing	Easthing	Elev(m)	Map.No.	Remark
1	Ban xenamnoy	Champasak	Paksong	24	108	16 95 800	186 72 400	760	D48-34	
2	Ban namtiang loum	Champasak	Paksong	25	150	16 63 500	186 76 900	760	-"-	
3	Ban namkong	Champasak	Paksong	42	171	16 57 500	186 89 700	740	D48-46	Surveyed
4	Ban nonghom	Champasak	Paksong	26	150	16 52 500	186 70 300	760	-"-	
5	Ban keokounmouang	Champasak	Paksong	21	89	16 55 900	186 74 500	740	-"-	
6	Ban houaysoy	Champasak	Paksong	72	350	16 56 300	186 68 000	760	-"-	
	Total			210	1018					

Table 6 Wildlife in the Project Area
(Interviewed with local residents)

Wildlife Habtat	Wildlife Species
Se Kong No. 4 Area Regrowth and savannah forest, riparian vegetation and water. Dense forest cover in upper basin; declared as conserved areas (Vietnam border)	Common species Elephant, gaur, banteng, green peaflow, primates deer, wild pig, tiger, black bear python, birds. Rare species (in upper basin) Kouprey, wild water buffalo, rhinocers, gaur, banteng. Mekong dolphin (very rare in Se Kong river downstream area).
Xe Kaman No. 1 Area Regrowth and savannah forest, bamboo. Dense ever green and mixed deciduous species.	Common species Wild dog, tiger, leopard, python deer, birds. Rare species Some rare species expected in upper basin.
Xe Namnoy Area Regrowth and savannah forest, riparian vegetation and water.	Common species Deer, wild pig, tiger, black bear, python, birds. Rare species Not existed.

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Ministry of Agriculture - Forestry
Dept. of Irrigation & Micro Hydropower
Laboratory of W.Q.A.

Vientiane, 16/08/93
No. 086/WQA

RESULT OF WATER QUALITY ANALYSIS

Parameter		1	2	3	4
Date		20/7/93	30/7/93	31/7/93	1/8/93
pH		7.06	6.50	7.03	7.19
TSS	mg/l	33	12	50	126
Turbidity	ppm	4	3	7	12
Color	ppm	0	0	1	2
Conductivity	mS/m	4.57	0.50	3.60	4.30
Ca	meq/l	0.189	0.00?	0.169	0.202
Mg	"	0.173	0.049	0.128	0.169
Na	"	0.075	0.010	0.061	0.072
K	"	0.026	0.006	0.028	0.028
Alkalinity	"	0.209	0.019	0.108	0.354
Cl	"	0.041	0.013	0.042	0.043
SO_4	"	0.254	0.022	0.220	0.128
Tot. Hardness	"	0.371	0.049	0.297	0.371
Tot. Fe	mg/l	0.062	0.146	0.102	0.129
NH_4-N	"	0.027	0.015	0.017	0.018
PO_4-P	"	0.010	0.006	0.012	0.009
Tot. P	"	0.020	0.014	0.016	0.016
Si	"	5.3	1.8	4.4	5.5
COD_{Mn}	"	2.620	1.684	2.100	4.050
$KMnO_4$	"	10.352	6.653	8.297	16.002

Laboratory of W.Q.A.

Laboratory of Water Quality Analysis
Vientiane, Lao PDR

Remark:
1. Xekong No.4
2. Xe Namnoy at Ban Latsasim
3. Xekong No.3
4. Xe Kaman No.1

Lao People's Democratic Republic
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Ministry of agriculture & Forestry
Dept. of Irrigation
Laboratory of WQA

Vientiane,.24./01/94
No: .6./94/WQA

RESULT OF WATER QUALITY ANALYSIS

LOCATION: H E C
DATE OF SAMPLING: 6/01/94

Parameter		Sekong	Se Nam Noy	Sekhaman
pH		6.77	6.51	7.21
Cond.	mS/m	3.55	1.10	6.7
Alk	meq/l	0.285	0.061	0.649
Hardness	"	0.340	0.106	0.589
Carbon dio.	mg/l	5.242	2.040	4.326

Laboratory of WQA

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity.

Ministry of Agriculture - Forestry
Dept. of Irrigation
Laboratory of W.Q.A.

Vientiane, 25/2/1994
No. 18/94/WQA

RESULT OF WATER QUALITY ANALYSIS

Parameters	Xekong at Xekong town	Xekaman Old WL station	Xe nam noy at B. Lasasin	Xe nam noy at Xe Katam
Date	29.1.94	30.1.94	26.1.94	27.1.94
Temperature	19	21	17	14.5
pH	7.34	7.43	6.55	6.64
TSS mg/l	6	8	2	8
Turbidity mg/l	0	0	1	0
Color mg/l	0	0	0	0
Conductivity mS/m	5.04	8.46	1.31	4.41
Ca meq/l	0.236	0.393	0.078	0.167
Mg meq/l	0.212	0.344	0.061	0.225
Alkalinity meq/l	0.320	0.819	0.052	0.408
Cl meq/l	0.073	0.109	0.038	0.027
SO4 meq/l	0.109	0.042	0.040	0.023
Tot.hardness meq/l	0.448	0.737	0.139	0.392
Tot.Fe mg/l	0.022	0.067	0.081	0.085
NH4-N mg/l	0.020	0.045	0.014	0.020
PO4-P mg/l	0.003	0.002	0.003	0.002
Tot.-P mg/l	0.004	0.003	0.004	0.003
Si mg/l	6.000	8.000	2.600	6.200
CODMn mg/l	0.475	0.467	0.554	0.316
KMnO4 mg/l	5.000	4.000	6.000	4.000

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Vientiane, Lao PDR