PROJECT : SIHANOUKVILLE CCGT

Tabke 2.3-8 (1) CALCULATED DISCHARGE

SEPTEMBER 2000

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE	DISCHARGE AT TIME (CMS.)					REMARK		
	6:00	9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
16/09/00	0.117	0.342	0.657	0.938	0.790	/		9:40 - 12:00
17/09/00	0.538	0.511	0.484	0.458	0.458			
18/09/00	0.433	0.409	0.409	0.409	0.386			
19/09/00	0.386	0.386	0.386	0.364	0.364			
20/09/00	0.346	0.342	0.333	0.333	0.321			
21/09/00	0.301	0.301	0.293	0.285	0.301	/		15:00 - 18:00
22/09/00	0.342	0.333	0.321	0.433	0.790	/		12:40 - 14:30
23/09/00	0.722	0.657	0.626	0.722	0.938	/		12:00 - 20:00
24/09/00	1.263	1.235	1.146	1.102	0.938			
25/09/00	0.722	0.657	0.596	0.538	0.538			
26/09/00	0.527	0.484	0.484	0.196	0.117	/		18:00 - 20:00
27/09/00	0.626	0.596	0.538	0.567	0.626	/		12:00 - 14:00
28/09/00	0.584	0.567	0.538	0.511	0.484			
29/09/00	0.458	0.443	0.433	0.409	0.386			
30/09/00	0.386	0.364	0.342	0.474	0.484	/		12:00 - 15:00

PROJECT : SIHANOUKVILLE CCGT

Table 2.3-8 (2) CALCULATED DISCHARGE

OCTOBER 2000

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE	DISCHARGE AT TIME (CMS.)					REMARK		
	6:00	9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
01/10/00	0.386	0.474	0.474	0.657	0.644	/		11:00 - 14:00
02/10/00	0.584	0.550	0.511	0.484	0.484			
03/10/00	0.458	0.433	0.433	0.424	0.395	/		18:00 - 19:00
04/10/00	0.474	0.458	0.438	0.414	0.409	/		18:00 - 19:00
05/10/00	0.538	0.511	0.500	0.484	0.458	/		18:00 - 24:00
06/10/00	1.172	1.002	0.923	0.848	0.826			
07/10/00	0.755	0.722	0.708	0.689	0.657			
08/10/00	0.626	0.608	0.584	0.608	0.567	/		12:00 - 14:00
09/10/00	0.538	0.538	1.190	3.029	2.724	/		8:00 - 10:00
10/10/00	1.583	1.478	1.282	1.282	1.691	/		12:00 - 15:00
11/10/00	1.478	1.691	1.922	1.805	1.691	/		8:00 - 12:00
12/10/00	1.190	1.018	1.018	1.018	1.018	/		18:00 - 22:00
13/10/00	3.524	3.354	3.029	2.438	2.874			
14/10/00	1.691	1.583	1.478	1.478	1.583			
15/10/00	2.069	1.958	1.805	1.583	1.478			
16/10/00	1.691	1.583	1.478	1.190	1.102			
17/10/00	0.938	0.900	0.862	0.862	0.826			
18/10/00	0.790	0.790	0.790	0.722	1.018	/		15:00 - 18:00
19/10/00	0.790	0.755	0.722	0.689	0.657			
20/10/00	0.657	0.657	0.626	0.596	0.538			
21/10/00	0.484	0.484	0.484	0.458	0.433			
22/10/00	0.433	0.433	0.409	0.409	0.386			
23/10/00	0.368	0.368	0.386	0.458	0.567	/		12:00 - 20:00
24/10/00	0.364	0.364	0.433	0.458	0.458			
25/10/00	0.433	0.409	0.409	0.409	0.409			
26/10/00	0.342	0.342	0.342	0.342	0.342			
27/10/00	0.321	0.321	0.301	0.301	0.293			
28/10/00	0.282	0.282	0.274	0.263	0.364			
29/10/00	0.351	0.342	0.342	0.364	0.386	/		12:00 - 14:00
30/10/00	0.301	0.301	0.321	0.342	0.377	/		12:00 - 15:00
31/10/00	0.433	0.433	0.424	0.409	0.386			

PROJECT : SIHANOUKVILLE CCGT

Table 2.3-8 (3) CALCULATED DISCHARGE

NOVEMBER 2000

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE	DISCHARGE AT TIME (CMS.)					REMARK		
	6:00	9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
01/11/00	0.364	0.342	0.342	0.342	0.342			
02/11/00	0.342	0.342	0.338	0.333	0.321			
03/11/00	0.301	0.301	0.293	0.282	0.282			
04/11/00	0.263	0.263	0.263	0.263	0.263			
05/11/00	0.263	0.267	0.267	0.270	0.274	/		10:00 - 12:00
06/11/00	0.245	0.228	0.228	0.222	0.215			
07/11/00	0.212	0.212	0.206	0.202	0.202			
08/11/00	0.196	0.196	0.196	0.193	0.190			
09/11/00	0.190	0.190	0.187	0.187	0.187			
10/11/00	0.181	0.181	0.181	0.176	0.167			
11/11/00	0.162	0.162	0.154	0.154	0.154			
12/11/00	0.141	0.141	0.141	0.141	0.117	/		18:00-20:00
13/11/00	0.212	0.206	0.202	0.196	0.190			
14/11/00	0.159	0.159	0.154	0.154	0.149			
15/11/00	0.146	0.146	0.146	0.141	0.141			
16/11/00	0.141	0.141	0.141	0.141	0.141			
17/11/00	0.141	0.141	0.141	0.141	0.141	/		18:00-20:00
18/11/00	0.146	0.146	0.146	0.143	0.143			
19/11/00	0.143	0.141	0.141	0.141	0.141			
20/11/00	0.136	0.136	0.129	0.122	0.117			
21/11/00	0.113	0.113	0.109	0.106	0.106			
22/11/00	0.102	0.102	0.100	0.100	0.096			
23/11/00	0.368	0.368	0.386	0.458	0.567			
24/11/00	0.096	0.096	0.096	0.096	0.096			
25/11/00	0.096	0.096	0.096	0.096	0.100	/		15:00-17:00
26/11/00	0.100	0.096	0.096	0.096	0.096	/		19:00-24:00
27/11/00	0.173	0.173	0.173	0.173	0.293			
28/11/00	0.117	0.117	0.115	0.113	0.109			
29/11/00	0.096	0.096	0.096	0.092	0.092			
30/11/00	0.092	0.092	0.092	0.090	0.090			

PROJECT : SIHANOUKVILLE CCGT

Tabel 2.3-8 (4) CALCULATED DISCHARGE

DECEMBER 2000

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE						REMARK		
		9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
01/12/00	0.088	0.086	0.086	0.085	0.085			
02/12/00	0.081	0.081	0.081	0.077	0.076			
03/12/00	0.076	0.076	0.074	0.074	0.074			
04/12/00	0.074	0.074	0.074	0.072	0.072			
05/12/00	0.072	0.071	0.071	0.069	0.069			
06/12/00	0.067	0.067	0.067	0.066	0.064			
07/12/00	0.064	0.064	0.064	0.063	0.061			
08/12/00	0.071	0.069	0.069	0.069	0.069			
09/12/00	0.076	0.076	0.076	0.072	0.072	/		4:00-9:00
10/12/00	0.069	0.069	0.069	0.067	0.066			
11/12/00	0.077	0.081	0.085	0.088	0.092			
12/12/00	0.106	0.111	0.115	0.119	0.124			
13/12/00	0.141	0.141	0.141	0.141	0.117			
14/12/00	0.212	0.205	0.202	0.196	0.190			
15/12/00	0.159	0.159	0.154	0.154	0.148			
16/12/00	0.061	0.061	0.061	0.061	0.061			
17/12/00	0.061	0.061	0.060	0.060	0.060			
18/12/00	0.058	0.058	0.058	0.058	0.058			
19/12/00	0.057	0.057	0.057	0.057	0.057			
20/12/00	0.057	0.057	0.057	0.061	0.061	/		12:00 - 18:00
21/12/00	0.096	0.096	0.094	0.094	0.092			
22/12/00	0.086	0.085	0.085	0.081	0.077			
23/12/00	0.069	0.066	0.064	0.061	0.061			
24/12/00	0.058	0.058	0.058	0.058	0.058			
25/12/00	0.058	0.058	0.058	0.055	0.055			
26/12/00	0.050	0.050	0.047	0.045	0.045			
27/12/00	0.045	0.045	0.045	0.046	0.047	/		12:00 - 18:00
28/12/00	0.047	0.047	0.047	0.046	0.046			
29/12/00	0.046	0.046	0.046	0.045	0.045			
30/12/00	0.045	0.045	0.045	0.045	0.045			
31/12/00	0.045	0.045	0.045	0.045	0.045			

PROJECT : SIHANOUKVILLE CCGT

Table 2.3-8 (5) CALCULATED DISCHARGE

JANUARY 2001

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE	DISCHARGE AT TIME (CMS.)					REMARK		
	6:00	9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
01/01/01	0.045	0.045	0.045	0.045	0.045			
02/01/01	0.045	0.045	0.045	0.045	0.045	/		18:00-20:00
03/01/01	0.047	0.047	0.047	0.047	0.047			
04/01/01	0.047	0.047	0.047	0.047	0.047			
05/01/01	0.046	0.046	0.046	0.046	0.046			
06/01/01	0.045	0.045	0.045	0.045	0.045			
07/01/01	0.045	0.045	0.045	0.045	0.045			
08/01/01	0.045	0.045	0.045	0.043	0.043	/		18:00-02:00
09/01/01	0.064	0.064	0.064	0.064	0.077			
10/01/01	0.096	0.096	0.096	0.092	0.088			
11/01/01	0.069	0.067	0.064	0.064	0.061			
12/01/01	0.061	0.061	0.061	0.058	0.055			
13/01/01	0.055	0.055	0.055	0.052	0.064	/		15:00-23:00
14/01/01	0.106	0.106	0.106	0.096	0.096			
15/01/01	0.117	0.117	0.113	0.102	0.098	/		03:00-06:00
16/01/01	0.077	0.074	0.071	0.067	0.064			
17/01/01	0.064	0.064	0.064	0.061	0.061			
18/01/01	0.058	0.058	0.058	0.055	0.052			
19/01/01	0.052	0.052	0.052	0.050	0.050			
20/01/01	0.050	0.050	0.050	0.050	0.050			
21/01/01	0.047	0.047	0.047	0.047	0.069	/		15:00-23:00
22/01/01	0.069	0.069	0.067	0.064	0.061			
23/01/01	0.061	0.061	0.061	0.061	0.061			
24/01/01	0.058	0.058	0.055	0.055	0.055			
25/01/01	0.052	0.050	0.047	0.047	0.045			
26/01/01	0.041	0.041	0.041	0.039	0.039			
27/01/01	0.037	0.037	0.037	0.037	0.037			
28/01/01	0.037	0.037	0.037	0.037	0.037			
29/01/01	0.035	0.035	0.035	0.035	0.035			
30/01/01	0.025	0.025	0.025	0.025	0.025	/		18:00-20:00
31/01/01	0.025	0.025	0.025	0.025	0.025			

PROJECT : SIHANOUKVILLE CCGT

Table 2.3-8 (6) CALCULATED DISCHARGE

FEBRUARY 2001

LOCATION : PREY TRENG (POND)

WEIR CREST ELEVATION = 1.020 M. (M.S.L.)
MEAN SEA LEVEL HA TIEN DATUM (VIETNAM)
Established on 15th Sept. 2000

DATE	DISCHARGE AT TIME (CMS.)					REMARK		
	6:00	9:00	12:00	15:00	18:00	RAIN	NO RAIN	TIME
01/02/01	0.047	0.047	0.047	0.047	0.045			
02/02/01	0.042	0.042	0.042	0.042	0.122	/		14:00-18:00
03/02/01	0.122	0.122	0.122	0.117	0.196			
04/02/01	0.081	0.077	0.074	0.071	0.069			
05/02/01	0.064	0.064	0.064	0.061	0.058			
06/02/01	0.055	0.055	0.052	0.052	0.050			
07/02/01	0.050	0.050	0.050	0.047	0.047			
08/02/01	0.047	0.047	0.045	0.045	0.045			
09/02/01	0.045	0.045	0.042	0.042	0.040			
10/02/01	0.040	0.040	0.037	0.037	0.037			
11/02/01	0.035	0.035	0.035	0.033	0.031			
12/02/01	0.031	0.031	0.031	0.031	0.030			
13/02/01	0.029	0.029	0.029	0.029	0.028			
14/02/01	0.027	0.027	0.027	0.027	0.027			
15/02/01	0.035	0.035	0.035	0.035	0.035	/		03:00-06:00
16/02/01	0.033	0.032	0.032	0.032	0.031			
17/02/01	0.031	0.031	0.028	0.028	0.028			
18/02/01	0.025	0.025	0.025	0.025	0.025			
19/02/01	0.025	0.025	0.025	0.025	0.025			
20/02/01	0.025	0.025	0.025	0.025	0.025			
21/02/01	0.023	0.023	0.023	0.023	0.023			
22/02/01	0.021	0.021	0.021	0.021	0.021			
23/02/01	0.020	0.020	0.020	0.020	0.020			
24/02/01	0.020	0.020	0.020	0.020	0.019			
25/02/01	0.017	0.017	0.017	0.017	0.017			
26/02/01	0.017	0.017	0.017	0.017	0.017			
27/02/01	0.017	0.017	0.017	0.017	0.017			
28/02/01	0.017	0.017	0.017	0.017	0.017			

Table 2.5-1 SUMMARY OF BORING WORK (Offshore)

Item	Bored Hole No.	Co-ordinate		Ground Level (msl)	Number of UD-Sampling	Number of SPT	Soil Coring (m.)	Rock Coring (m)	Total Depth of Bored Hole (m.)
		N	E						
1	BH-10	1,182,977.327	341,173.277	-5.00	1	15	7.15	12.85	20.00
2	BH-11	1,182,977.327	341,279.777	-2.00	1	10	4.75	15.25	20.00
3	BH-12	1,182,477.327	341,209.277	-3.00	1	17	8.30	14.25	22.55
4	BH-13	1,182,477.327	341,077.277	-5.00	1	19	9.50	8.00	17.50
TOTAL					4	61	29.70	50.35	80.05

Table 2.5-2 (1) Summary of Physical Properties Test Results of Borehole No.BH-10 - BH-13

Borehole No.	Sample No.	Depth (m)		Water Content (%)	Total Unit Weight (ton/m³)	Liquid Limit (%)	Plasticity Index (%)	Specific Gravity Gs	Grain Size (%)						Undrained Shear Strength, (ton/m²)		Modulus @ 50% cu (ton/m²)	SPT N Value	Colour	USCS	Soil Description
		From	To						Gravel	Sand			Silt	Clay	PP	UC					
										Coars	ediu	Fine									
BH-10	SS-6	2.50	2.95	26.3		NP	NP	2.64	0	1	29	50	20					0	Dark Greenish Gray	SM	Silty SAND
BH-10	SS-10	4.50	4.95	21.1		NP	NP	2.67	5	1	27	60	6					1	Dark Greenish Gray	SP-SM	Poorly graded SAND with silt
BH-10	SS-11	5.00	5.45	45.1		NP	NP	2.61	0	1	5	44	50					1	Grayish Olive Green	M	Sandy SILT
BH-10	UD-1	5.00	6.00	31.6	1.92	NP	NP	2.65	0	0	10	68	18	3	0.5				Dusky Blue Green	SM	Silty SAND
BH-10	C-5	11.55	13.05	2.2	2.24											213	12,179*			Rock	*Siltstone*
BH-11	SS-3	1.00	1.45	27.0		NP	NP	2.69	0	0	0	85	14					12	Light Olive Gray	SM	Silty SAND
BH-11	UD-1	1.50	2.50	35.0	1.85	NP	NP	2.69	0	0	8	64	26	2	0.5				Light Olive Gray	SM	Silty SAND
BH-11	SS-7	3.00	3.45	24.6		NP	NP	2.64	0	2	4	76	17					7	Olive Gray	SM	Silty SAND
BH-11	C-7	8.80	10.20	0.3	2.33											1,226	160,182			Rock	*Sandstone*
BH-12	SS-6	2.50	2.95	22.7		NP	NP	2.66	0	1	17	65	17					0	Dusky Blue Green	SM	Silty SAND
BH-12	UD-1	6.00	7.00	21.6	1.95	NP	NP	2.60	0	0	4	72	20	4	0.7				Moderate Olive Brown	SM	Silty SAND
BH-12	S-15	7.00	7.45	17.0		NP	NP	2.67	0	0	3	77	20					8	Light Gray	SM	Silty SAND
BH-12	C-5	14.20	15.50	0.4	2.31											2,127	326,687			Rock	*Sandstone*
BH-13	UD-1	2.00	3.00	30.9	1.78	NP	NP	2.68	1	0	8	65	24	2	0.4				Dusky Blue Green	SM	Silty SAND
BH-13	SS-10	4.50	4.95	22.9		NP	NP	2.68	0	1	8	65	26					1	Dusky Blue Green	SM	Silty SAND
BH-13	SS-19	9.00	9.45	14.5		NP	NP	2.67	2	1	7	76	15					>50	Light Gray	SM	Silty SAND
BH-13	C-4	13.80	15.30	0.3	2.42											834	136,086			Rock	*Sandstone*

Table 2.5-2 (3) Summary of Isotropically Consolidated Triaxial Drained Test (CID) Results

Borehole No.	Sample No.	Depth (m)		Effective Confining Stress, σ'_c (ton/m^2)	Initial		Undrained Shear Strength, c_u (ton/m^2)	Undrained Modulus @50%, E_{50} (ton/m^2)	c' (ton/m^2)	ϕ' (degree)	Colour	USCS	Soil Description
		From	To		Water Content (%)	Total Unit Weight (ton/m^3)							
BH-10	UD-1	5.00	6.00	3.0	3.1	1.87	4.4	676	0.0	34.7	Dusky Blue Green	SM	Silty SAND
				6.0	28.4	1.94	6.9	593					
				12.0	27.5	1.96	16.3	1046					
BH-11	UD-1	1.50	2.50	1.0	39.6	1.81	1.7	132	0.2	32.0	Light Olive Gray	SM	Silty SAND
				2.0	33.2	1.89	2.4	117					
				4.0	29.9	1.94	4.9	381					
BH-12	UD-1	6.00	7.00	3.0	22.7	2.10	3.3	214	0.0	36.8	Moderate Olive Brown	SM	Silty SAND
				6.00	17.4	2.12	10.3	1979					
				12.0	17.3	2.13	18.5	2037					
BH-13	UD-1	2.00	3.00	1.0	26.8	1.99	2.4	308	0.8	27.7	Dusky Blue Green	SM	Silty SAND
				2.0	29.3	1.97	2.9	184					
				4.0	30.3	1.96	5.0	477					

Table 2.5-2 (4) Summary of Unconfined Compression Test on Rock Sample

Borehole No.	Sample No.	Depth (m)		Water Content (%)	Total Unit Weight (ton/m^3)	Undrained Shear Strength, c_u (ton/m^2)	Unconfined Compressive Strength, q_u (ton/m^2)	Undrained Modulus @ 50% cu (ton/m^2)	Strain at Failure, ε_f (%)	Rock Description
		From	To							
BH-10	C-5	12.50	12.75	2.2	2.24	213	427	12,179	3.5	Siltstone
BH-11	C-7	9.25	9.53	0.3	2.33	1,226	2,452	160,182	1.7	Sandstone
BH-12	C-5	14.40	14.66	0.4	2.31	2,127	4,253	326,687	1.1	Sandstone
BH-13	C-4	14.15	14.40	0.3	2.42	834	1,668	136,086	1.0	Sandstone

Table 2.6-1 Tidal Harmonic Constituents at CCGT Project Site

Position Lat. 10^0 41' 57" N, Long. 103^0 32' 51". Time Zone –7.0h.

Symbol	$(V_0+u)p$	F(large)	H(amp.) cm	K(phase) Degree
M_2	183.72	0.9783	13.7	14.9
N_2	159.09	0.9783	1.4	17.6
S_2	357.10	1.0000	4.3	46.8
O_1	228.90	1.1047	21.2	114.7
K_1	318.76	1.0619	24.6	122.2
K_2	98.20	1.1759	1.2	46.8
L_2	346.27	0.8404	0.4	12.2
$2N_2$	134.46	0.9783	0.2	20.3
R_2	132.19	1.0000	0.0	46.8
T_2	42.00	1.0000	0.3	46.8
λ_2	150.74	0.9783	0.1	29.7
μ_2	12.06	0.9783	0.3	343.0
ν_2	36.70	0.9783	0.3	17.3
J_1	339.45	1.0855	1.7	125.9
M_1	207.83	1.0093	1.5	118.5
OO_1	220.74	1.4089	0.9	129.6
P_1	30.50	1.0000	8.1	122.2
Q_1	204.27	1.1047	4.1	111.0
$2Q_1$	179.63	1.1047	0.6	107.3
RHO_1	81.88	1.1047	0.8	111.5
M_4	7.44	0.9571	0.3	246.5
M_6	191.16	0.9363	0.6	168.6
M_8	14.88	0.9160	0.3	310.2
S_4	354.20	1.0000	0.1	323.6
S_6	351.30	1.0000	0.1	218.0