ឧបសម្ព័ន្ធទី ៦:

- ការចាត់ស្ថានតំណែលសំរាប់ការពិនិត្យតាមដានការបន្ធូរបន្ថយបរិស្ថាន

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Mitigation measure cost estimation

No.	Description	Qnty	Unit cost	Annual cost, USD	Frequancy (year)	Sub-Total, USD
A	***Pre-construction phase***					
1	De-mines of remains bomb/UXO in construction site, quarries, and proposed resettlement. Total area of 3550ha. (the unit cost (1,500-2000$/ha) based on de-mining rate in Cambodia, and the total area obtain from PECC1 resettlement expert (Mr. Duc))	3550	1,500		1	5,325,000.00
2	Land concession and forest consession, especially compensate to plantation and product (EVN/***PECC-1, MIME, MAFF, CDC, and local authority will deal on this issues***)					53,759,467.00
3	Compensation for whole resettlement of the project (***Base on the resettlement study results***)					
	Sub-total:					***59,084,467.00***
B	***Construction phase***					
1	Fish center construction	1	500,000		1	500,000.00
2	Forest-seeding-station	1	300,000		1	300,000.00
3	Water quality examination	1	1,000	1,000.00	5	5,000.00
4	Traffic sign and facilitator	1	5,000	5,000.00	5	25,000.00
	Sub-total:					***830,000.00***
C	***Operation phase***					
1	Baby fish production and fish center operation	1	100,000	100,000.00	10	1,000,000.00
2	Reforestration: (small) trees production/plantation, including tree station operation and forest management	1	1,000,000	1,000,000.00	30	30,000,000.00
3	Wildlife and its habitat conservation	1	500,000	500,000.00	30	15,000,000.00
4	Water quality examination	1	1,000	1,000.00	30	30,000.00
5	Training/capacity building or income restoration to PAH and APs, 1579HH	1579	300		1	473,700.00
6	Compensation to (in reservoir site) people livelihood due to the project will damage forest-byproduct by provide agricultural extension program and rural credit, etc.	1638	296	484,029.00	10	4,840,290.00
7	Compensation to upstream people livelihood due to the project will damage aquatic resources by provide agricultural extension program, feeding animal, feeding fish, and rural credit, etc.	6664	200	1,332,800.00	10	13,328,000.00
8	Compensate or improve tourism facility	1	50,000	50,000.00	10	500,000.00
	Sub-total:					***65,171,990.00***
	Grandt total			3,473,829.00		**125,086,457.00**

Note:
- # of HH living along the Se San river in Rattanakiri — 4598 HH, data 2007, Obtain from commune profile of MoI
- # of HH living along the Srepok river in Rattanakiri and Mondulkiri — 1871 HH, data 2007, Obtain from commune profile of MoI
- # of HH will affect by Lower Se San 2 HPP — 1579 HH, data estimate in 2011 (by resettlement study team)
- # of HH living in project area — 1638 HH, data 2007 (commune profile)

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Monitoring Cost Estimation

No.	Description	Frequency	Qty	Lab cost	Transport	Engineer rate	Person	Amount	Total
Pre-Construction phase									
1	Investigate new settlement area to screen the impact on social and environment in place.	One time for draft final design, and one time for final design	2	0	100	120	3	660	1,320.00
2	Check the alignment of detour road, access road, and new resettlement area	One time for draft final design, and one time for final design	2	0	20	20	2	80	160.00
3	Check the detail project report to make sure the solving committee for the land conflict ready established and work effectively	One time for draft final design, and 5 time for final design and completed compensate	5	0	100	120	4	880	4,400.00
4	Check the compensation and resettlement action plan implementation are effective as real result on the reseltlement study	One time for draft final design, and 10 time for final design and completed solving	11	0	100	120	3	660	7,260.00
	Sub-total:								***13,140.00***
Construction phase									
1	Inspect on release flow, dimension of diversion canal that can do navigate of small boat. Check the canal functioning	two times in first construction stage and quaterly in whole construction period	22	20	20	20	3	120	3,080.00
2	Check drainage system make sure project implementing company and contractor adequate provide	Along the road construction and other construction site	20	0	20	20	2	80	1,600.00
3	Inspect on the erosion and sediment laden protection facilities/method, kake sure the mitigation measure are properly applied	Monthly in raining season entire construction period	20	0	20	20	2	80	1,600.00
4	Check waste management facility and its functioning use for project	Quaterly in whole construction period	20	0	20	20	1	40	800.00
5	Control/check water quality.10 parameters will take for examination such as pH, Conductivity or Total dissolved solid (TDS), DO, BOD5, COD, Tot-N, Tol-P, NO3 -N, PO4 –P, Tot-Coliform.	Quaterly in whole construction period	20	500	110	140	2	500	20,000.00
6	Control/check air quality that emitted from the construction activities. Parameters to be measure: TSP, NO2, SO2, CO, and Noise	Every 6 month entire construction period	6	2020	110	140	2	500	15,120.00

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No.	Description	Frequency	Qty	Lab cost	Transport	Engineer rate*	Person	Amount	Total
7	Inspect on forest cutting for the project is exactly in the limit of project site required. Inspect to make sure there is not elligal reclamation or hunting from the project staff	Weekly or Monthly in clearing for the construction site and clearing in reservoir area	50	0	20	20	2	80	4,000.00
8	Inspect on the protection method and facilities	Weekly or Monthly in construction period	50	0	40	20	2	120	6,000.00
9	Control elligal fishing activies from project staff	Monthly in construction period	40	0	20	20	2	80	3,200.00
10	Inspect on the existing and access road that use	Quarterly in construction period	20	0	20	20	2	80	1,600.00
	Sub-total:								***57,000.00***
Operation phase									
1	Check any research on fauna and flora are carried out	Yearly in first 5 years operation period	5	0	110	140	2	500	2,500.00
2	Control/check water quality.10 parameters will take for examination such as pH, Conductivity or Total dissolved solid (TDS), DO, BOD5, COD, Tot-N, Tol-P, NO3 -N, PO4 –P, Tot-Coliform.	Every 6 month through operation phase	60	500	110	140	2	500	60,000.00
3	Check how was the fish research center worked?	Yearly in first 5 years of operation period	5	0	110	20	2	260	1,300.00
4	Check how was the forest-seeding-station worked?	Yearly in first 5 years of operation period	5	0	110	20	2	260	1,300.00
	Sub-total:								***65,100.00***
	Grad Total:								**135,240.00**

<u>Note:</u> * The above rate include accomodation, food, and poket money per field work
'- The cost above was counted with proposed operation period is 30 years

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Cost Estimation of Mitigation Measures (by VN HPPs)

No.	Description	Annual Cost, (USD)	Frequancy, (Year)	Estimation Cost, (USD)
Pre-construction phase and during construction phase				
1	UXO, Mines		1	4,388,000.00
2	Collection of daily waste	12000	5	60,000.00
3	Reservoir clearance			
	Toxic chemical treatment		1	3,076,000.00
	Disinfection of residential areas and grave's remaining within reservoir		1	85,350.00
	Vegetation clearance 1km upstream of dam site		1	1,200,000.00
4	Mosquito prevention and medicine		5	20,066.00
5	Environmental Management	20,000	5	100,000.00
6	Land concession and forest consessioncompensation		1	53,759,467.00
7	Compensation for whole resettlement of the project			
Operation phase				
1	Baby fish production and fish center operation	100,000.00	10	1,000,000.00
2	Environmental Fund to Cambodia Government	500,000.00	30	15,000,000.00
	Total Cost			**78,688,883.00**

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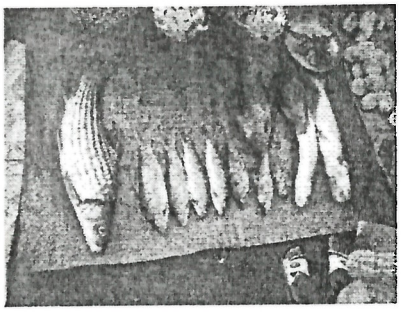
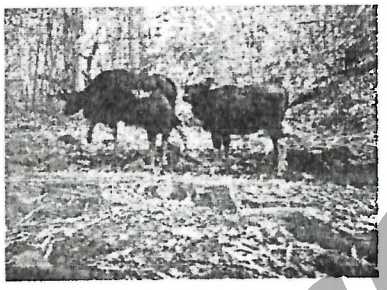
KINGDOM OF CAMBODIA

Nation Religion King

APPENDIX OF EIA REPORT



FISHERY STUDY



TERRESTRIAL WILDLIFE STUDY

SOCIO-ECONOMIC STUDY

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FOR

FEASIBILITY STUDY OF LOWER SE SAN 2 HYDROPOWER PROJECT, STUNG TRENG PROVINCE, CAMBODIA

Prepared by:

ECC1 ISO 9001

POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1 - VIETNAM

KEY CONSULTANTS CAMBODIA

Phnom Penh, July 2008

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