Nam Theun 2 Power Company Ltd

Nam Theun 2 Hydroelectric Project

Downstream Implementation Plan

Document No.

N	T	P	C	S	K	1	4	0	7	0	2	0	0	0	0	0	4	A

Table of contents

List of Figures

List of Tables

List of Annexes

Glossary

CA	:	Concession Agreement
COD	:	Commercial Operation Date
DAFO	:	District Agriculture and Forestry Office
DLF	:	Department of Livestock and Fisheries
DSIP	:	Downstream Implementation Plan
DSP	:	Downstream Program
DWG	:	District Working Group
E&S	:	Environment and Social
E&SD	:	Environment and Social Division (NTPC)
EMO	:	Environment Management Office (NTPC)
FCM	:	Fish Catch Monitoring
GOL	:	the Government of Lao PDR
HH	:	Household
IFIs	:	International Finance Institutions
IMA	:	Independent Monitoring Agency
LTA	:	Lender's Technical Advisor (= Lender's Engineer)
LWU	:	Lao Women's Union
NGO	:	Non Governmental Organisation
NT2	:	Nam Theun 2
NTPC	:	Nam Theun 2 Power Company
PAFO	:	Provincial Agriculture and Forestry Office
PAP	:	Project Affected People
PCR	:	Physical Cultural Resources
PIV	:	Potentially Impacted Village
PMU	:	Downstream Program Management Unit (NTPC)
POE	:	Panel of Experts
RC	:	Resettlement Committee
RMU	:	Resettlement Management Unit
UXO	:	Unexploded Ordnance
VDC	:	Village Development Committee
VF	:	Village Fund
VIRF	:	Village Income Restoration Fund
XBF	:	Xe Bang Fai

1 Introduction / Background Information

1.1 Past revisions of the DSIP

The present Downstream Implementation Plan is the result of over 2 years of investigation and pilot trials in the downstream areas of the NT2 project. Since Financial Close in June 2005, the Downstream Program has established itself in 20 pilot villages and disbursed 3 million dollars for studies & surveys, GOL expenses, livelihood restoration measures, technical assistance and operational costs. The Downstream Program was also in the process of establishing an additional 22 Village Development Committees and Village Funds as of December 2007.

During the period June 2005 to November 2007, these studies and the experiences gained during trial implementation as well as interaction with villages and GOL agencies at various levels, have provided the Downstream Team with valuable experience to ensure a successful Downstream program in continued preparation for the start of operation of the NT2 hydropower facility scheduled for December 2009.

The first draft of the DSIP was submitted in July 2006 according to CA requirements for a plan to be designed one year after FC. It constituted 7 volumes including an Executive Summary, Pilot Village Implementation Plan, Overall Implementation Manual, Fisheries Management Plan, Flood Gate Manual, Main Report and Report Annexes. In July 2006, IFIs reviewed some of these volumes and the comments made during this review were included in the August 2006 re-release of the DSIP. A summary of the documents was made available in Lao and presented by NTPC to GoL and IFIs at a workshop in Thakhek in August 2006, with the major focus on livelihood programs and the process of village development committee establishment and funding channels. The third draft, released in November 2006, was the result of a review of the proposed Nam Phit wetland to provide additional routing capacity intended to further prevent the fluctuation of water levels from the discharge of the hydropower facility. This assessment revealed planned structures to be effective in dampening such fluctuations to acceptable levels obviating the need for the Nam Phit wetland and modifications to the Downstream channel.

Since this third draft, the continuing implementation of the Downstream Program as well as interaction with GoL have resulted in further modifications of the DSIP with respect to further IFI comments (March 2007), GoL intentions for regional development for flood and irrigation, recent modifications to VDC arrangements as requested by GOL and shareholder concerns over pre and post COD budget. Thus, this 4th draft of the DSIP includes modifications based on responses to comments of the IFIs and the GOL and incorporating lessons learned, adhering to the adaptive management process.

This current document does not intend to incorporate all the previous studies, reviews and comments, but rather provide an overview of the current status of the DS Program with brief descriptions of programs, impacts etc and overall implementation plan to date.

It is likely that the DSIP will be further modified as implementation proceeds and these changes would be reflected in further AIPs. Such probable changes will reflect not only villager preferences on their preferred development activities but also GoL directions, especially related to institutional arrangements as well as responses to NTPC industrial project schedule and NTPC shareholder assessments of expenditure.

It is agreed with the IFIs that the DSIP will be updated at least before COD. Such an update could be provided as soon as May 2009 and could be provided as part of the 2009 – 2010 Annual Implementation Plan, due in May 2009.

1.2 Reference documents

This document should be read in conjunction with the Concession Agreement which define NTPC obligations regarding the Downstream Program (Schedule 4, part 4).

The objective of this document is to define how the program is to be implemented with particular focus on the period prior to Commercial Operations Date (December 2009).

The content of this document submitted for approval to Government of Laos (as per CA) and non-objection to International Financing Institutions (as per CTA) does not modify the obligations defined in Concession Agreement.

A preliminary analysis of potential project impact in downstream areas was done in the Social Development Plan (Vol 3 - March 2005).

The present Downstream Implementation Plan is a further development of the Draft Implementation Plan submitted in October 2006, and revised late 2007 to take into account consultations and experience gained in the field and with discussion with GOL and the IFIs.

1.3 The Downstream Program budget

An overall capped budget of $16 million is defined in Concession Agreement, with no more that 8 MUSD to be spent before COD.

Furthermore the $1.5 million required by GOL for the construction of additional irrigation outlets at regulating dam and along the channel is coming in addition to this $16 million budget.

1.4 The implementation schedule

The anticipated impact downstream of NT2 Power Station is expected to start occurring in **May 2009**, when the first Pelton unit is scheduled to begin commissioning and operation, which will result in approximately ~15m^3/s discharge from the Power Station to the Regulating Pond, and subsequently to the Xe Bang Fai. Additional Pelton and Francis units will begin commissioning and operation afterwards, resulting in ~200m3/s discharge to the Xe Bang Fai between July and November 2009.
The anticipated impact downstream of Nakai Dam will occur in mid-April 2008, upon closure of the diversion tunnel with reduced discharge to the Nam Theun. Impacts on the 12km stretch of Nam Theun immediately below Nakai Dam may be significant as a large part of the current fish population may be severely impacted.

Please refer to Annex 9 for further details.

1.5 Additional GOL development programs

Water released downstream of the project in the Gnommalath plain and then in the Xe Bang Fai provides major potential for development of the region, and in particular for development of irrigated land during dry season. NTPC aims at developing synergies with additional GOL programs regarding irrigation development in Gnommalath plain and Xe Bang Fai to increase rural livelihood for concerned communities.

1.5.1 Irrigation in Gnommalath plain

In addition to the $16 million downstream development program and beyond its contractual obligations, NTPC has accepted to fund for approximately $1.5 million the irrigation outlets in the regulating dam and along the channel which will allow for a large scale irrigation plan in the Gnommalath plain. NTPC has also funded the pre-feasibility studies of such irrigation plan which at its maximum could cover up to 21,000 ha, with gravity-fed irrigation for a large part of it. Further, it should be noted that NTPC has constructed a siphon to reconnect the main canal of the existing irrigation scheme in ThaThot.

This initiative has been taken over the Khammouane Development Project (KDP), which will be mainly financed by the World Bank. In particular, the KDP will support: (a) rehabilitation of the existing Thathot Irrigation Scheme, (b) development of a pilot downstream irrigation area covering up to 700 ha, and (c) a strategic investment plan to develop downstream irrigation scheme in Gnommalath plain as a follow up to the above-mentioned pre-feasibility study.

1.5.2 Lower Xe Bang Fai flood protection and irrigation scheme

Under the downstream program, NTPC plans to provide adjustment to some irrigation pumps so as to absorb the weekly fluctuation of the Xe Bang Fai River (see section 4.2.1.4). The above-mentioned KDP would also support the critical repair and rehabilitation of the pumps and associated canals.

NTPC has also funded the pre-feasibility studies of such flood protection and irrigation plan, which is now completed. The next step is the funding of the feasibility study awaiting country's donor support, then to be followed by funding of the implementation works. GOL is currently exploring possible donors to support the follow up activity in this end.

2 The Downstream areas

2.1 The downstream areas and potentially affected villages

The Downstream Program's mitigation, compensation and livelihood restoration activities will work with people living along the Xe Bang Fai mainstream, from the junction of the Nam Gnom (located approximately 11km upstream of the confluence with the downstream channel), to the Mekong River, as well as villages not located along the Xe Bang Fai mainstream but who rely on the Xe Bang Fai for fish or aquatic products. The Downstream Program also addresses villages that rely on the impacted waterway for fish or aquatic products specifically villages in Khamkeut District and in the Nam Theun Hinterland, which rely on the Nam Theun or its tributaries.

The downstream areas whose livelihoods may be potentially impacted by these changes in hydrological regimes and water quality are defined in the Concession Agreement (Schedule 4, Part 4) and include the following potentially impacted villages:

- **Downstream of the NT2 Power Station**
  - 82 riparian villages of which, 67 are along the Xe Bang Fai and 15 are along the Nam Kathang / Gnom
  - 101 hinterland villages

- **Downstream of Nakai Dam**
  - 37 villages located along tributaries of the stretch of the Nam Theun between Nakai Dam and the Theun Hinboun head pond

- **Upstream of the Nakai Reservoir**
  - 31 villages located along the Nam Theun or its tributaries upstream of the Nakai Reservoir

These areas are depicted in Figures 2.1, 2.2 and 2.3.

The NTPC Downstream Program will cover all these villages with measures defined in relation to the specific anticipated impact for each area. A complete list of the 251 Downstream Area villages with expected project physical impacts and the consequent social and economic effects is provided as Annex 3.

Annex 1 provides reconciliation between the current estimate of 251 potentially impacted villages (PIV) and the number of villages as indicated in the Social Development Plan. The total number of villages changes over time, due to amalgamation or division of villages.

2.2 Zones, Areas, Districts and Households

The maps provided below, together with the tables on the following pages, indicate how the impacted areas have been grouped into zones.

The following the maps gives a detailed breakdown of zones, sub-zones, districts and numbers of households. The population figures are taken from the GOL 2005 census and have been updated for villages.

Figure 2.1. Downstream Areas

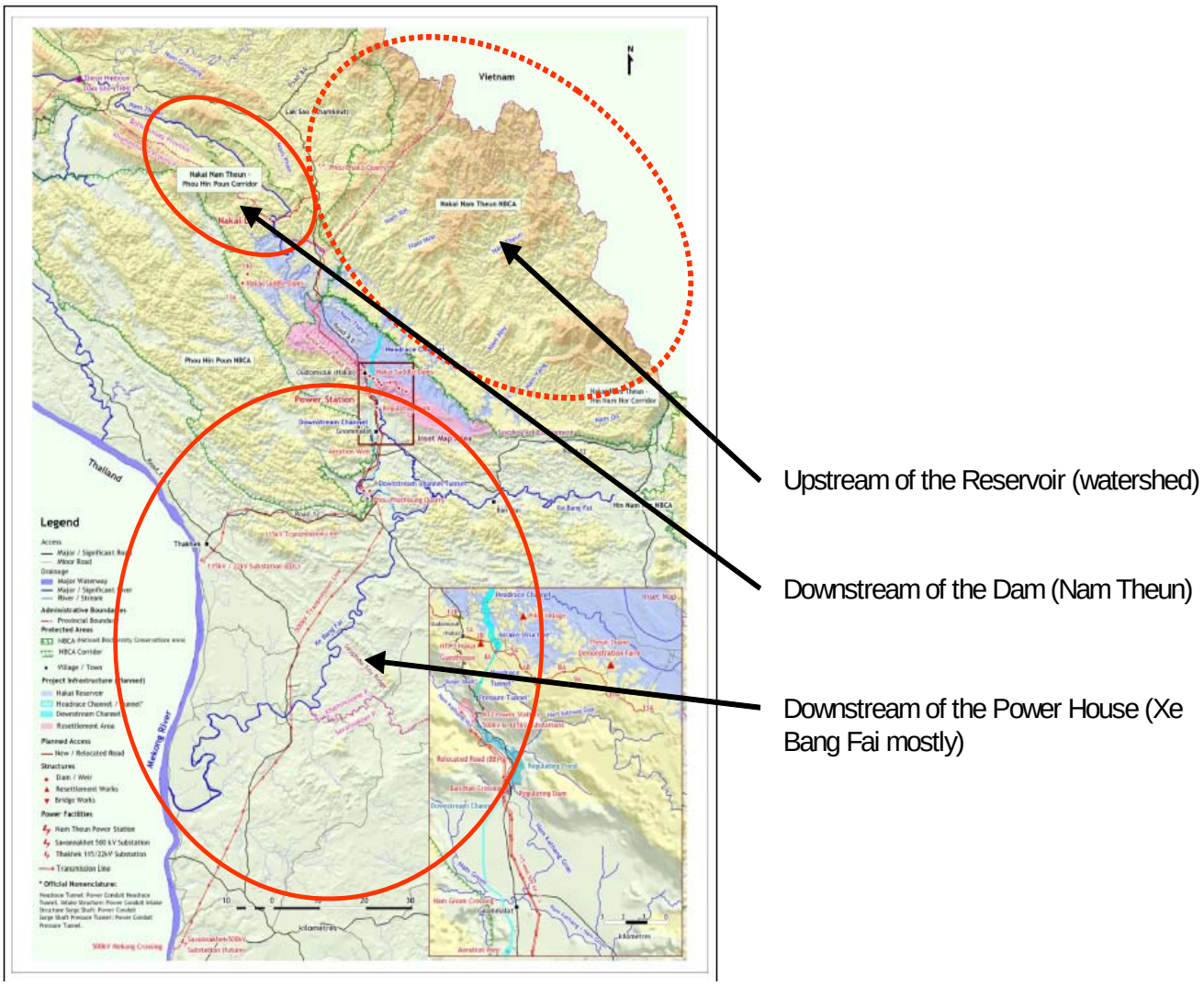


Figure 2.2. Provincial and District Administrative Boundaries and NT2 XBF Zone Divisions

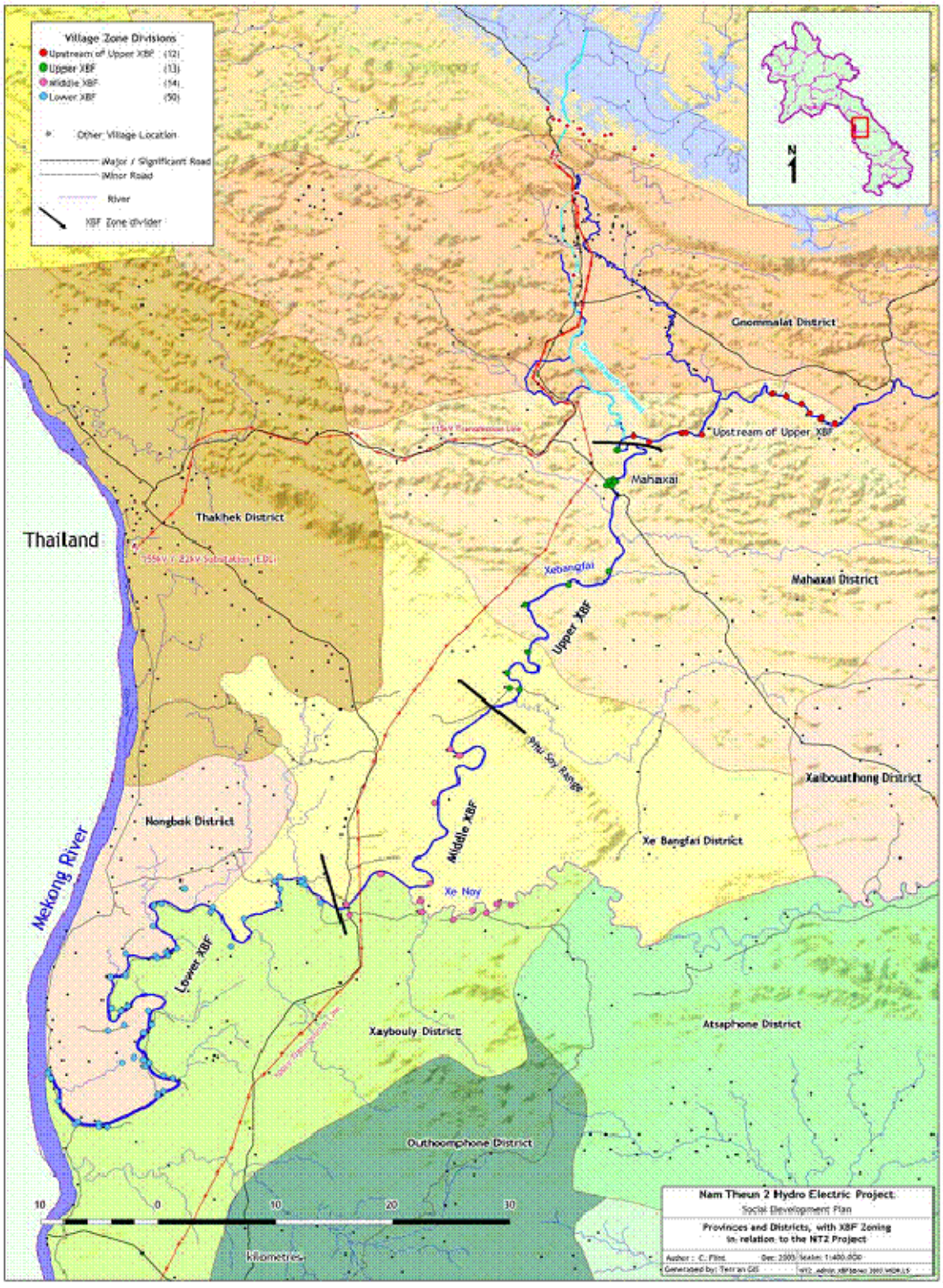


Figure 2.3. Administrative Regions: Provinces and Districts

Figure 2.4. Pilot Villages and Zones

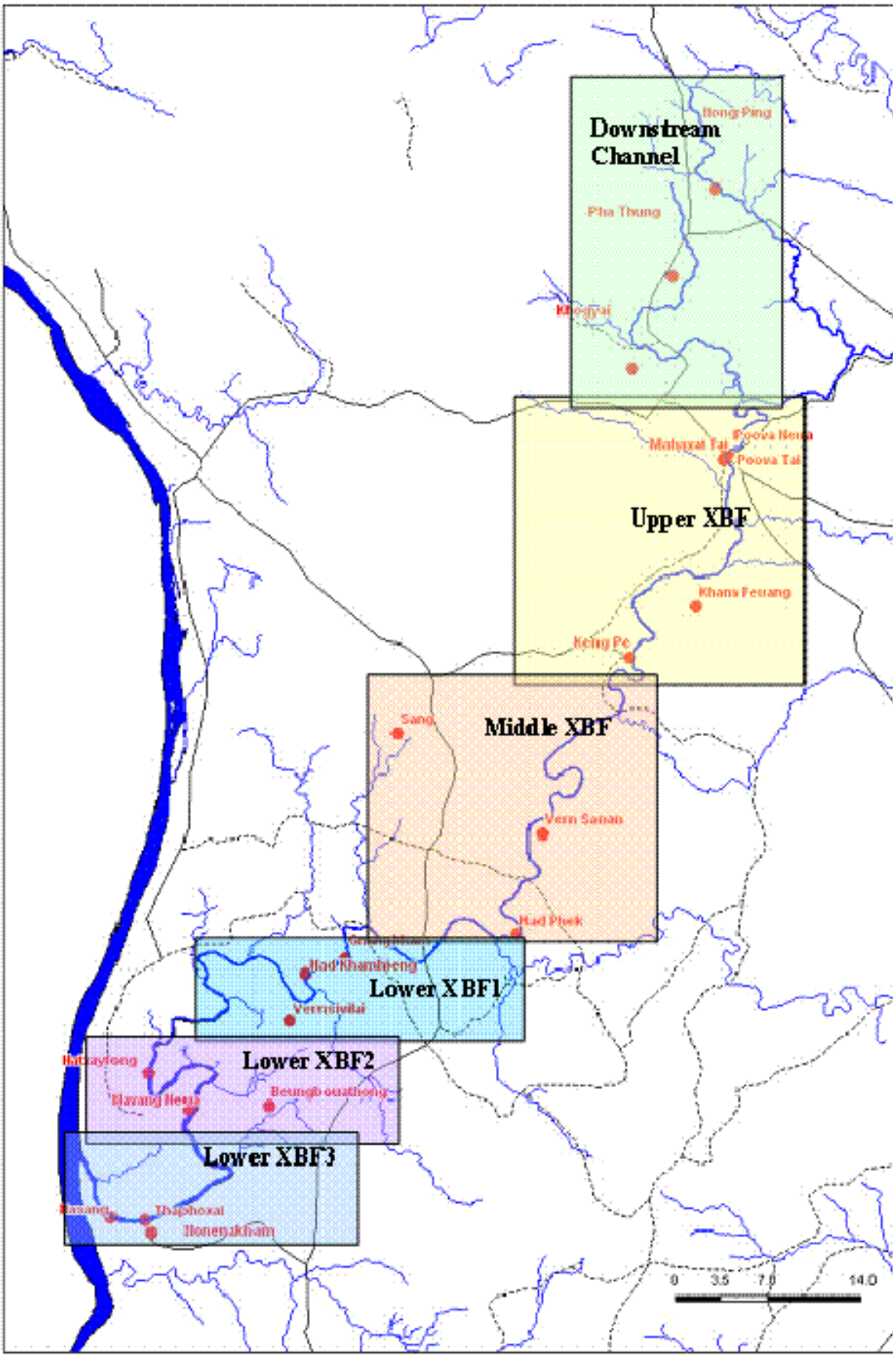


Table 2.1. Riparian Villages in the Xe Bang Fai basin (zones, sub-zones, Districts and Total Number of Households)

	Location		Number of Villages & Households			
			Number of Potentially Impacted Villages		Total Number of HH in Potentially Impacted Villages	
	Zone / Downstream Powerhouse	District	By District	Total in Zone	By District	Total in Zone
Riparian	Nam Gnom / Katang	Gnommalath	11	11	1436	1436
	XBF upstream confluence	Mahaxai	5	5	313	313
	Upper XBF	Mahaxai	8	11	620	826
		Xe Bang fai	3		206	
	Middle XBF	Xe Bang fai	4	5	203	250
		Xaibouli	1		47	
	Lower XBF1	Xe Bang fai	6	17	988	2167
		Xaibouli	9		992	
		Nong Bok	2		187	
	Lower XBF2	Xaibouli	12	22	841	1879
		Nong Bok	10		1038	
	Lower XBF3	Xaibouli	6	11	724	1162
		Nong Bok	5		438	
	TOTAL		**82**	**82**	**8033**	**8033**

Table 2.2. Villages in Downstream of Nakai Dam (Zones, Sub-zones, Districts and Number of Households)

	Location		Number of Villages & Households			
			Number of Potentially Impacted Villages		Total Number of HH in Potentially Impacted Villages	
	Zone / Downstream of Nakai Dam	District	By District	Total in Zone	By District	Total in Zone
Hinterland	Lower Nam Phao	Khamkeut	37	8	1444	1444
	Nam Kata			10	1198	1198
	Nam Kheo			3	278	278
	Nam Ngoy			6	422	422
	Nam Phouan/Phiat			4	408	408
	Theun Hinboun Headpond			2	307	307
	Upper Nam Phao			4	886	886
	TOTAL		**37**	**37**	**4943**	**4943**

Table 2.3. Hinterland Villages in the Xe Bang Fai basin (Zones, Sub-zones, Districts and Number of Households)

	Location		Number of Villages & Households			
			Number of Potentially Impacted Villages		Total Number of HH in Potentially Impacted Villages	
	Zone / Downstream NT2 Power Station	District	By District	Total in Zone	By District	Total in Zone
Hinterland	Nam Gnom / Katang	Gnommalath	14	14	1896	1896
	XBF upstream confluence	Mahaxai	0	0	0	0
	Upper XBF	Mahaxai	10	14	855	1180
		Xe Bang fai	4		325	
	Middle XBF	Xe Bang fai	18	19	1792	1892
		Xaibouli	1		100	
	Lower XBF1	Xe Bang fai	2	32	237	4216
		Xaibouli	8		1317	
		Nong Bok	22		2662	
	Lower XBF2	Xaibouli	11	19	1174	1923
		Nong Bok	8		649	
	Lower XBF3	Xaibouli	1	3	81	430
		Nong Bok	2		349	
	TOTAL		**101**	**101**	**11537**	**11537**

Table 2.4. Villages upstream of the Nakai Reservoir (Zones, Sub-zones, Districts and Number of Households)

	Location		Number of Villages & Households			
			Number of Potentially Impacted Villages		Total Number of HH in Potentially Impacted Villages	
	Zone / Upstream of Nakai Reservoir	District	By District	Total in Zone	By District	Total in Zone
Hinterland	Nam Mon	Nakai	31	6	204	204
	Nam Noi			9	279	279
	Nam Theun			9	372	372
	Nam Xot			3	171	171
	Nam Noi			4	160	160
	TOTAL		**31**	**31**	**1186**	**1186**

3 The anticipated potential impacts

3.1 The anticipated impacts

The three tables below give a summary of the type of impacts and their expected intensities for the various village types of the Downstream Program.

Table 3.5. Anticipated Impacts

		RIPARIAN									
Location	District	Number of villages		Number of HH		Impacts by NT2 at Village					
						Flooding	River Bank Erosion	River Bank Gardens	Water Quality	Fisheries	Water Supply
Downstream Powerhouse	Gnommalat	11	11	1436	1436				+++	+++	+++
XBF upstream confluence	Mahaxai	5	5	313	313	+	+	+	+	+	+
Upper XBF	Mahaxai	8	11	620	826	+	+++	+++	++	+++	+++
	Xe Bang fai	3		206		+	+++	+++	++	+++	+++
Middle XBF	Xe Bang fai	4	5	203	250	+	++	++	+++	++	+++
	Xaibouli	1		47		+	++	++	++	++	++
Lower XBF1	Xe Bang fai	6	17	988	2097	+	+	+	+	+	+
	Xaibouli	9		922		+	+	+	+	+	+
	Nong Bok	2		187		+	+	+	+	+	+
Lower XBF2	Xaibouli	12	22	841	1879	+	+	+	+	+	+
	Nong Bok	10		1038		+	+	+	+	+	+
Lower XBF3	Xaibouli	6	11	724	1162	+				+	
	Nong Bok	5		438		+				+	

		HINTERLAND									
Location	District	Number of villages		Number of HH		Impacts by NT2 at Village					
						Flooding	River Bank Erosion	River Bank Gardens	Water Quality	Fisheries	Water Supply
Downstream Powerhouse	Gnommalat	14	14	1251	1251	-	-	-	-	+++	-
XBF upstream confluence	Mahaxai	0	0		0						
Upper XBF	Mahaxai	10	14	883	1208	-	-	-	-	+++	-
	Xe Bang fai	4		325		-	-	-	-	+++	-
Middle XBF	Xe Bang fai	18	19	1788	1888	-	-	-	-	++	-
	Xaibouli	1		100		-	-	-	-	++	-
Lower XBF1	Xe Bang fai	2	32	237	4192	-	-	-	-	+	-
	Xaibouli	8		1293		-	-	-	-	+	-
	Nong Bok	22		2662		-	-	-	-	+	-
Lower XBF2	Xaibouli	11	19	1168	1952	-	-	-	-	+	-
	Nong Bok	8		784		-	-	-	-	+	-
Lower XBF3	Xaibouli	1	3	81	278	-	-	-	-	+	-
	Nong Bok	2		197		-	-	-	-	+	-

		HINTERLAND									
Location	District	Number of villages		Number of HH		Impacts by NT2 at Village					
						Flooding	River Bank Erosion	River Bank Gardens	Water Quality	Fisheries	Water Supply
Downstream of the dam	Khamkheut	37	37	4943	4943	-	-	-	-	++	-

3.2 Downstream of the NT2 Power Station (Xe Bang Fai basin)

The anticipated impact downstream of NT2 Power Station is expected to start occurring in **May 2009**, when the first Pelton unit is scheduled to begin commissioning and operation, which will result in approximately ~15m^3/s discharge from the Power Station to the Regulating Pond, and subsequently to the Xe Bang Fai. Additional Pelton and Francis units will begin commissioning and operation afterwards, resulting in ~200m3/s discharge to the Xe Bang Fai between July and August 2009.

Water released from the project will modify the natural flow of the Xe Bang Fai with some potential positive impacts and some potential negative impacts for the 71 riparian villages located on the 175 km section of the river impacted by the project

This chapter provides details regarding the following project impacts in the project area located downstream of the NT2 power station.

- Project impact on the Xe Bang Fai flow
  - change of natural flow and change of river water levels
  - daily and weekly water fluctuation
  - project impact during flood period
- Potential impact on Xe Bang Fai river bank erosion
- Potential impact on fish and aquatic resources
- Potential impact on water quality
- Other impacts (riverbanks gardens, crossing of river, irrigation pumps)

3.2.1 Xe Bang Fai Riparian (71 Villages)

3.2.1.1 Project impact on the Xe Bang Fai flow

The Xe Bang Fai River is 386 km long from its source on the border between Laos and Vietnam to its confluence with the Mekong River on the border between Laos and Thailand.

The Downstream Channel joins the Xe Bang Fai 155 km upstream of its confluence with the Mekong River. Backwater created by the Downstream Channel's discharge will affect approximately 20 km of the Xe Bang Fai upstream of the junction of the Downstream Channel and the Xe Bang Fai. A total of 71 villages are located along this 175 km section of the Xe Bang Fai.

Change of natural flow and change of river water level

Impacts on Xe Bang Fai flow and water level are expected to be the greatest at Mahaxai, the first major settlement downstream of the confluence between the Downstream Channel and the Xe Bang Fai. Downstream of Mahaxai, as more tributaries join the Xe Bang Fai and the river channel dimensions generally increase, the impact of the NT2 discharge on flow and water heights will gradually diminish.

The natural flow of the Xe Bang Fai varies from monthly average low in April of 13 m^3/s at Mahaxai to a monthly average high in August of 920 m^3/s. Two years return frequency flood is in range of 2000 m^3/s.

The average discharge from NT2 to the XBF is approximately 200 m^3/s.

This additional flow will represent a river level elevation increase of about 4 m in the Xe Bang Fai at Mahaxai and approximately 3.8 m at the Road 13 Bridge during the dry season. During the wet season, NT2 discharge to the Xe Bang Fai will result in river level elevation increases of approximately 2 m in at Mahaxai and 1m in the lower regions of the Xe Bang Fai. The increases in water level in dry season will have an impact on irrigation pumps, access across the Xe Bang Fai and on river bank gardening.

Daily and weekly water level fluctuation

The flow released from the NT2 Power Station may vary between 0 and 330 m^3/s, several times a day. An 8 million cubic meter regulating pond is located immediately downstream of the power station, which will enable discharge to the Xe Bang Fai, and subsequently water levels in the river, to be maintained at relatively constant levels throughout the week.

During the weekend, when electricity generated by the project (and consequently water released) may be much reduced, the water level fluctuation will remain limited (approximately 1.7 m in Mahaxai, 1.1 m at the Road 13 bridge, and progressively decreasing in lower Xe Bang Fai), with a low gradient (about 20 cm per hour). These predictions have been verified by the Mekong River Commission in its review of NTPCs downstream dry season hydraulic model in November 2007.

Project impact during flood period

The upper Xe Bang Fai currently experiences overbank flooding under natural conditions (i.e. prior to NT2 discharge). At Mahaxai the average frequency of over-bank flooding is approximately 1 in 2.3 years. The deeply incised morphology of the Xe Bang Fai means it can carry a discharge of 2,000 m^3/s or more without flooding. Therefore for most of the year, apart from flood periods, the river channel is large enough to accommodate the NT2 discharge.

During flood periods the additional water entering the Xe Bang Fai from the NT2 Project will be restricted due to an agreement between NTPC and the GoL. This obligation is also incorporated in the Power Purchase Agreement between NTPC and the Electricity Generating Authority of Thailand (EGAT), which requires NT2 to stop discharging water to the Xe Bang Fai, when the Xe Bang Fai is close to overbank flooding.

Studies completed in 2004 indicated that even with such project wet season operation restrictions, the project may still marginally impact the area and the duration of small flood events, but only in the lower Xe Bang Fai region.

3.2.1.2 Potential project impact on erosion of the Xe Bang Fai river bed

The river banks of Xe Bang Fai are naturally eroding with some slumping and collapses of the riverbank visible along the Xe Bang Fai. Most of Xe Bang Fai riverbanks consist of dense, silty sand soils. Such soils, once saturated with water, will drain slowly resulting in pressure gradients when river water levels are reduced. In addition, locations with steep slopes of riverbanks along Xe Bang Fai are highly sensitive to erosion. The existing conditions (silty sand soils and slope instability) make the river banks in Xe Bang Fai susceptible to erosion. As river banks erode, soil particles are transferred to the water column as suspended solids.

In addition to natural erosion of river banks, river banks erode through:

1. Human uses at the village landing places and river bank vegetable gardens, and
2. Livestock (such as cattle and buffaloes) seeking access to the river and grazing on riverbank vegetation

Potential Impact of NT2 project on natural Erosion and Sedimentation

The additional water to be added to the Xe Bang Fai (an average of approximately 200 300m^3/s) is substantially less than the river carrying capacity, which can accommodate flows up to 2000 m^3/s in the upper regions near Mahaxai without overtopping its banks.

However, NT2 discharges may contribute to incremental erosion, mainly in the upper and middle Xe Bang Fai as a possible result of:

1. Increased discharges and water levels
2. Increased water level fluctuation during the weekends when discharges from the regulation pond fluctuate
3. Increased flow velocities and shear forces

Incremental erosion of river banks caused by the project is expected to be marginal.

Monitoring of erosion in the Xe Bang Fai has been ongoing for over 10 years (see below § 8.3). At the time this document was prepared, efforts were underway to to consolidate existing data on natural erosion and to complete an inventory of physical assets to prepare for any possible issues in the future regarding erosion and sedimentation potentially caused by the project.

3.2.1.3 Potential project impact on fish in the river and on fish catch

A decrease of fish catch (and aquatic product collection) in Xe Bang Fai and the Nam Phit is anticipated as a result of the following:

1. Modification of habitat as a result of increased dry season flow and some sedimentation of habitats;
2. Possible effects of water quality in the early years,
3. Difficulty fishing in the higher/faster waters

It is expected that the Downstream Channel aeration weir and the numerous control weirs located in the 27 km Downstream Channel will provide adequate oxygen to sustain aquatic life in the Xe Bang Fai, even though Dissolved Oxygen levels may vary over time and space.

Impacts on the Biology of Fish

The impact of NT2 on the aquatic food chain in the dry season Xe Bang Fai may be significant, due to:

1. Increased discharges resulting in higher water levels and increased water velocities. These impacts are relatively more significant in the dry season than in the rainy season,
2. Introduction of some water level fluctuations during the dry season,
3. The potential incremental river bank erosion and subsequent sedimentation

However, as a result of increased discharges, the increased back water effect in Xe Bang Fai upstream of the confluence with Nam Phit, and at tributaries of Xe Bang Fai downstream of the confluence with Nam Phit, is expected to lead to an increase of abundance of fish populations at tributaries and backwaters.

In terms of biodiversity, resilient aquatic species will flourish and others may decline in numbers, modifying the species composition of the Xe bang Fai.

The effects of the Project on fish in the Xe Bang Fai are predicted to be twofold:

a) Effects on fish productivity
   Increased dry season discharges, water level fluctuations, river bank erosion and sedimentation, and an increase in water depth are known to result in reduced fish productivity. The impacts will be the most severe close to the confluence of the Downstream Channel with the Xe Bang Fai and will decline in severity further downstream.

   Increased discharges and an increased backwater effect upstream of the confluence with the Nam Phit, and at tributaries of the Xe Bang Fai downstream of the confluence with the Nam Phit are expected to lead to increased fish populations in tributaries and backwaters.

b) Impacts on the efficiency of fishing gear and techniques
The impacts include difficulties in catching fish in deeper water of higher velocity and of catching fish traveling to and from wetlands.

At present, prior to NT2 operation commences, the fishery resources in the Xe Bang Fai are in decline. These trends of declining fish catch in the Xe Bang Fai can be attributed to a number of factors, some of which are (non limitative list):

a) Trapping of all juvenile fish by blocking rivers or trapping fish as they migrate to spawn.

b) Misuse and mismanagement of structures like flood and irrigation gates as fish cannot get to their spawning grounds or return if these are not operated properly.

c) Destruction of habitats areas such as wetland for conversion into paddy fields

d) Destructive fishing practices through use of explosives or night fishing which depletes fish populations and causes detrimental damage to habitat.

Flood gates, when not operated properly, have been known to deplete fish populations quite drastically as fish do not have the opportunity to migrate and spawn. In addition many of the gates were originally not designed to allow for fish passage. Overall fish catch has been declining since 1990-2005. There was a slight respite in 2005 when government took action by introducing a law to prohibit river blocking.

3.2.1.4 Potential impact on water quality

During the first years of operation and especially during the dry season, the water in some sections of the Xe bang Fai might not be suitable for the same domestic uses as prior to NT2 discharge, due to the following:

1. Increased turbidity, especially during the dry season;
2. The presence of organic matters, originating from the decay of the biomass in the Nakai Reservoir;
3. The possible presence of sulphur compounds (H_2S), due to anoxic decomposition of biomass in the Nakai Reservoir, most likely limited to the dry season.

Although some of these impacts may be limited in location and in time, an extensive mitigation program is provided in order to maintain access to water of domestic quality during operation of the power plant, as almost all of the populations of all the downstream riparian villages use the Xe Bang Fai for their domestic water supply.

3.2.1.5 Other impacts

Impact on riverbank gardens:

Vegetables and crops are grown on the sloping banks of the Xe Bang Fai in many of the riparian villages. The higher water levels created by the additional flow of the project will flood garden areas situated on the lower and mid levels of the riverbanks. The impacts will be more pronounced in the upper areas of the river.

Table 3.6. Estimated Size and Households with Riverside Fields/Gardens (2004), and Possible Maximum Impact of the NT2 Project (SDP 2005)

		Riverside Crop Fields				Riverside Vegetable Garden			
		Current	Possible impact from NT2			Current	Possible impact from NT2		
District	Total HH (2004)	Area (ha)	No. of HH	Area as %	Area in ha	Area (ha)	No. of HH	Area as %	Area in ha
Mahaxai	1265	103	526	80	82.5	4.01	45	100	4.01
Xe Bang Fai	1651	74	486	80	59.2	5.25	55	100	5.25
Nong Bok	2120	41	432	40	16.4	4.34	100	70	3.01
Xaybouli	2,808	98	698	40	39.2	4.56	73	70	3.19
Total	**7,844**	**316**	**2142**		**199.1**	**18.16**	**273**		**15.46**

Impact on existing irrigation pumps

The Xe Bang Fai river level will experience weekly fluctuations due to the likely cessation of NT2 project discharges on Sunday. Within week variations may also occur resulting in fluctuations of the Xe Bang Fai river level up to approximately 1 meter in the upper zones.

At present, flexible hoses are utilized to connect irrigation pumps to the supply pipes. The flexible hoses in place may not be suitable for such regular variations and may not be long enough to accommodate the fluctuations, especially during the dry season.

A general survey of pontoon pumps will be conducted to identify the needs and modified as needed, to ensure that the pontoon pumps can handle the expected weekly water level fluctuations, particularly during the dry season.

Impact on access routes

People often cross the Xe Bang Fai in the dry season, mainly walking across rapids to visit gardens and forests, but also across temporary bamboo bridges. In some locations, low level trucks and hand tractors also cross at these points. The increased water level in the dry season will make such seasonal temporary dry season river crossings no longer possible. In addition to access across the Xe Bang Fai, some access routes may also be impacted due to the elevated water levels in tributaries to the Xe Bang Fai, particularly during the dry season.

3.2.2 The hinterland of Xe Bang Fai river basin, Nam Kathang and Nam Gnom (101 Villages)

The Downstream Program has identified 101 villages located within the Xe Bang Fai basin that are not located adjacent to the Xe Bang Fai or Nam Kathang / Gnom which are known to fish or collect aquatic products in the Xe Bang Fai and in its tributaries. These villages may experience declines in fish catch due to NT2 impacts and will be provided with measures to mitigate such losses.

3.2.3 The Riparian villages along Nam Kathang and Nam Gnom (11 villages)

While the project flow will be released into the Xe bang Fai via the 27 km Downstream Channel, an outlet has been provided in the regulating dam to release water into the Nam Kathang similar to its present natural flow.

The natural flow of Nam Kathang at regulating dam varies on average between 0.2 m^3/s in March to 35 m^3/s in August. Approximately 8 km downstream of the regulating dam Nam Kathang joins the Nam Gnom, which has approximately the same flow as the Nam Kathang.

Upon request of GoL (and if approved by the Adaptive Management Committee) additional flow may be released into the Nam Kathang downstream of the regulating dam for irrigation and fishery purposes. The quality of the water released from the regulating dam will be of different composition than prior to the NT2 project. An aerating device is located at the regulating dam outlet to the Nam Kathang. However, it is expected that the water may not be immediately suitable for domestic use in the first few years of NT2 operation.

3.3 Nam Theun Downstream of Nakai Dam – Khamkeut District (37 Villages)

The anticipated impact Downstream of Nakai Dam will occur in Mid-April 2008, upon closure of diversion tunnel with reduced discharge to the Nam Theun.

The area downstream of the Nakai dam to the Theun Hinboun Headpond will be impacted by the reduced flow in the Nam Theun. After COD, the minimum riparian release from Nakai Dam will be 2 m^3/s, measured on a weekly basis, with an additional complementary release not exceeding 5 million m^3 in any 12 months, to allow adaptive management of flows during the dry season.

However, during the period between diversion tunnel closure early 2008 and project COD end 2009 there will be some flexibility to release water downstream (up to 10 m^3/s) during the dry season, while during rainy season some reservoir flushing will happen.

This reduction in natural flow will have the greatest impact on the 12 km stretch of river between the Nakai Dam and the Nam Phao tributary. There are no permanent settlements or established villages along this reach of the river, but some households from nearby villages use this reach for fishing activities.

Impacts on the 12 km stretch of the river between the Nakai Dam and the Nam Phao may be significant as a large part of the current fish population may be drastically depleted due to the major flow reduction and hence the change in natural habitats.

Impact on the Nam Phao tributary should be much less as the flow of this tributary will not be affected by the project. Only some migratory fishes may be affected by the closure of Nakai dam.

3.4 Upstream of Nakai Reservoir (31 villages)

The anticipated impact upstream of Nakai Reservoir is in May 2008, upon closure of diversion tunnel, followed by June 2008 during the closure of spillway gates.

It is expected that migratory fish in the Nam Theun will be impacted by the closure of the Nakai Dam. However, migration is to some extent already inhibited by the Nam Theun Hinboun Dam.

3.5 Industrial Project Mitigation Measures

3.5.1 Vegetation clearance

An assessment of biomass in the reservoir area was carried out by Prosser (1997) with an additional evaluation of biomass on the Nakai Plateau presented by Aruna (2004). Based partially on the findings of these reports, and field measurements of soil carbon content (HYDRECO, 2001) Gregoire and

Thorncraft (2007) assert that "complete above-ground biomass removal would have little effect on the peak of degradation of the water quality". Duly, the same authors recommend selective clearance achieved through controlled slash and burn of specific areas of the Nakai Plateau.

Based on the findings of Gregoire and Thorncraft (2007) discussions were held with GoL and IFIs to develop a comprehensive clearance plan. The agreed clearance plan focuses on areas of interest for the development of livelihood programs. As a priority, areas below minimum operating level will be cleared for (i) access corridors and (ii) fishing areas. A total of 3,000 ha was initially identified for this purpose and is being cleared (since January 2008) of any ligneous vegetation before impoundment (note that because large parts of the Nakai plateau on these areas were already free of ligneous vegetation, since made of wetlands, grassland, rice paddies, etc…, only 1,600 ha out of these 3,000 turned out to actually require vegetation clearance). NTPC extended early April 2008 the activity so that up to 1900 ha could actually be cut and burnt before inundation. These activities are carried out by Ministry of Agriculture (MAF) with financial support from NTPC and it is expected that after this operation most of the area below MOL and upstream of Ban Thalang will be clear of vegetation. However, as evidenced in the aforementioned studies the largest stock of biomass will remain in the soils and be unaffected by this clearance. There is no practical method for removing this residual biomass.

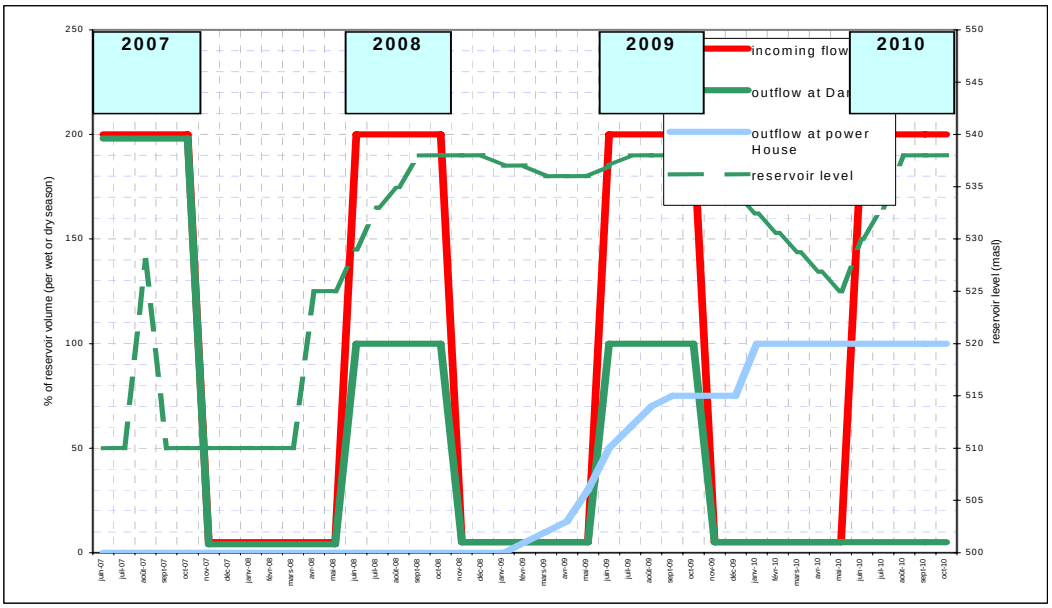
3.5.2 Fill and Flush Approach

To further mitigate adverse impacts to reservoir water quality, Gregoire and Thorncraft (2007) recommended that a regime be employed to flush dissolved biomass off the plateau. The recommended fill and flush strategy supports the use of the spillway gates (which will release water at an elevation of 527 masl) possibly combined with the flap gates (which release water to an elevation of only 536-537 masl).

The risk of reduced dissolved oxygen in the Nam Theun downstream of the dam is expected to be mitigated through natural re-aeration along the numerous rapids, waterfalls and eddies located there. To avoid social impacts, releases from early filling will be timed and adjusted with appropriate coordination and planning among technical and environmental staff of the project as well as local inhabitants. Figures 3.1 and 3.2 provide a schematic illustration of the envisaged fill and flush strategy, depending on the extent of natural re-oxygenation that will occur on the Nam Theun.

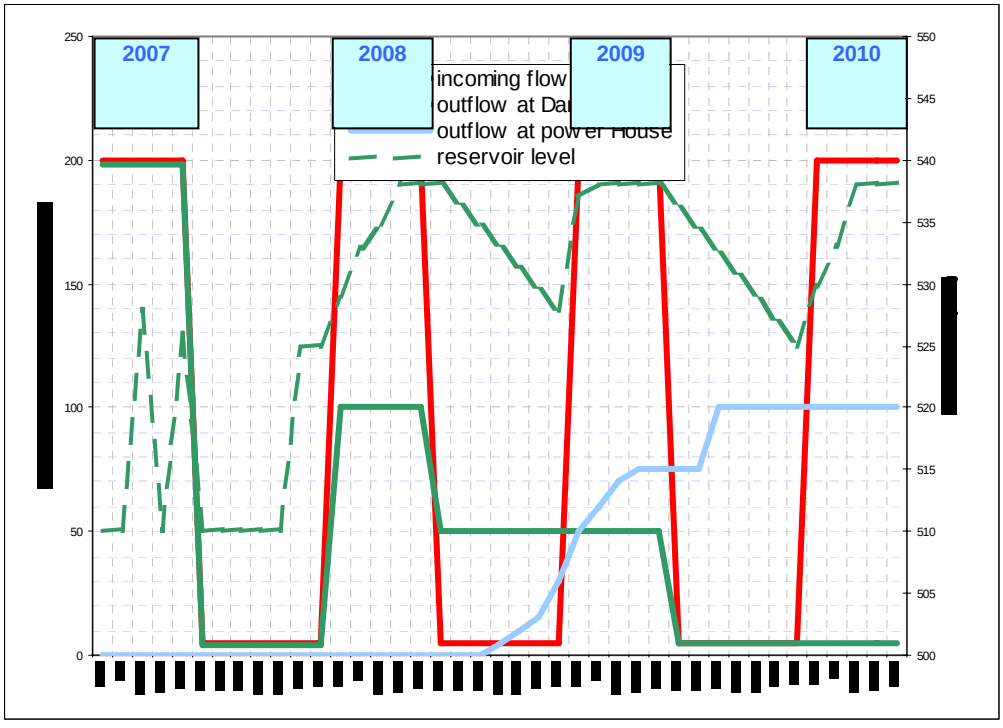
The confluence of the Nam Theun and the Nam Phao is approximately 12 km downstream of the Nakai dam. At this point, the Nam Phao inflow will restore approximately 20 to 30% of the natural flow in the Nam Theun and beyond this point additional tributaries will further restore the flow. Nevertheless, continuous monitoring of environmental and social indicators both in the reservoir and downstream of the dam will be simultaneously conducted so as to inform adaptive management and adjust water releases during the 2008-9 dry season.

Figure 3.1. Fill-Flush Strategy (in case of poor water quality recovery downstream of the dam)



(Taken from Gregoire and Thorncraft, 2007)

Figure 3.2. Fill-Flush Strategy (in case of good water quality recovery downstream of the dam)



(Taken from Gregoire and Thorncraft, 2007)

3.5.3 Variable Off-Take at Nakai Dam

In order to help maintain the ecological value of the Nam Theun, the Project will ensure a guaranteed minimum riparian release of 2 m^3/s from Nakai Dam. An additional annual complementary release of 5 million m^3 will also be provided for adaptive management of flows, especially during the dry season and early wet season.

The riparian release is intended to provide an amount of water sufficient to maintain a basic level of natural processes and ecological value in the aquatic ecosystem. In particular, it is intended to maintain connectivity between pools to ensure that heterogeneity of aquatic habitats remains and habitats are not isolated. The ability to vary the flow will be the basis for a strategically focused adaptive management program.

The EAMP provides further detail concerning variable off take at the dam site, extracts of which are reproduced here. An outlet conduit is provided next to the spillway of the dam to meet the downstream riparian release obligations. The riparian water will be drawn from the reservoir through a variable-level intake structure equipped with stop logs, enabling the riparian release to be drawn from the surface water of the reservoir down to 2 m below MOL. A trash-rack is located upstream of the stoplogs.

The outlet conduit is equipped with a cone valve permitting discharge of riparian flows without scour or damage to the Nam Theun and enabling aeration of the riparian flows. The outlet conduit has the capacity to release a discharge equal to 2 m^3/s continuously during the entire year. In addition it is able to accommodate up to 10 m^3/s on a continuous basis for short periods of time

3.5.4 Regulating Dam, Downstream Channel and Oxygenation Weir

Water discharged from the turbines will be conveyed through a concrete transition stilling structure into an excavated tailrace channel. The tailrace channel will convey the water to a regulating pond downstream from the Power Station and downstream from the confluence of the Nam Kathang Noi and Nam Kathang Gnai rivers. The maximum discharge from the Power Station into the regulating pond will be 330 m^3/s. The regulating pond enables the projects to be operated as an intermediate peaking facility by regulating the downstream flows for environmental reasons.

The purpose of the regulating pond is to limit water level fluctuations in the Xe Bang Fai, in particular during start up, shut down and load changing operations. It will be created by the construction of an additional dam consisting of two contiguous concrete structures, one spilling into the Nam Kathang and the other into a downstream channel. An earth and rock-fill embankment will be constructed to complete the downstream closure of the regulating pond. The regulating pond will have an active storage volume of 8 million m^3.

The regulating dam will be equipped with gates for irrigation intakes and outlet channels. The capacity of the irrigations intakes and outlet channel will be approximately 5 m^3/s when the regulating pond is at minimum operating level. A trash/log boom across the regulating dam's discharge intake area will be provided to trap floating debris, to provide signs to warn people not to approach, and to stop small boats from approaching the discharge gates. An acoustic warning system will be installed on the regulating dam crest and at the downstream end of the stilling basin, as well as along a portion of the Nam Kathang downstream of the regulating dam to warn people, upstream or downstream of the spillway, of the imminent opening of the spillway gates.

The 27 km long Downstream Channel will direct the flow from the regulating pond to the Xe Bang Fai. Normal flow levels are designed to be sufficiently above ground so as to permit the instillation of gravity-fed irrigation release points along the course of the channel.

The downstream aeration weir is positioned 8.5 km along the downstream channel and is an environmental measure that will reduce the concentration of methane and hydrogen sulphide in the water released through the Power Station.

3.5.5 Turbine Water Release Constraints

Within the Concession Agreement, Volume 2a Schedule 4 Part 2 Section 9.5.a (Detailed description of Environmental Measures) posits that;

During operation, in order to avoid increased overbank flooding along the upper and middle Xe Bang *Fai River, outflows of water from the Regulating Pond shall be:*

(a) restricted when the flow in the Xe Bang Fai River at Mahaxai approaches 1,970 m3/s; and

(b) stopped before *the flow in the Xe Bang Fai River at Mahaxai reaches 2,270 m3/s and in any event before the Xe Bang Fai River at Mahaxai overflows its banks.*

Furthermore, as reported in the EAMP; "water will be released from the regulating pond into the Nam Kathang below the regulating dam at a rate equivalent to the natural inflows of the Nam Kathang Gnai and Nam Kathang Noi. The arrangement of the Nam Kathang riparian release structure and spillway stilling basin and end-sill will be designed to provide aeration of the discharge".

4 Activities to be implemented – Downstream of the NT2 Power Station (Xe Bang Fai)

4.1 Overall Strategy

The Implementation Plan is a response to the provisions of the Concession Agreement, Schedule 4, Part 4, Social Component (Downstream Areas). It is consistent with the NT2 Resettlement Policy and builds upon on information provided in the Social Development Plan, Volume 3: Downstream Areas – EMDP, Resettlement, and Livelihood Restoration (NTPC Mar 2005), and the NT2 Downstream Restoration Program, Phase 1, Final Main Report (Earth Systems Lao – SEATEC – Gunaratnam JV). It is also informed by the experience of working in the 20 Pilot Villages in 2006 and 2007.

4.1.1 General Approach to Compensation

The general approach to livelihood restoration is to define the impacts of the NT2 project on the assets and livelihoods of villagers in the Downstream areas and to specify and plan the offsetting measures meeting requirements specified in the CA. The delivery of household and community assistance will be mostly through the village but also through the district and province. The impacted households must have an opportunity to specify their preferred options for compensation and livelihood restoration measures to offset losses of land or fixed assets, fisheries, agriculture and livestock. Decreases in actual and imputed livelihood income caused by increased flooding, the loss of riverbank gardens caused by elevated water levels increased erosion and the impacts from poorer water quality will be compensated by asset replacement or cash, as well as by a range of livelihood restoration measures. In addition to these measures, there will be on-the-job training and services which will improve the general well-being and livelihood potential of the affected villages. These services include improved fisheries management, veterinary services, and improved agricultural extension services.

Village Fund system is a possible but not compulsory component for the overall compensation and livelihood restoration approach. WASH and other measures related to specific impacts as described in section 4.2 are implemented independently of the Village Fund. Participating in livelihood restoration measures (section 4.3) does not require households to borrow from village fund, however these measures are generally more sustainable with the support of the village fund.

The analysis of possible project impacts on the different downstream zones has resulted in a broad differentiation between groups of villages. This can be seen in detail in Annex 3.

Several of the activities identified below will require soil disturbance in areas not previously cultivated or will require excavation to depths below what is normally required by customary agricultural activities, resulting in potential exposure to UXO risk.

The Downstream Program has contracted a UXO clearance organization to carry out these tasks in support of the Downstream Program.

4.1.2 Prioritization of villages and allocation of funding

The criteria used to identify possible impacts of operation of NT2 on villages and sectors have been developed based on the DS team's assessment of the possible impact of NT2 on the environment and the related effects on the lives of people living in the Downstream areas. An assessment was then made of the predicted social impacts of these environmental impacts. The detailed results can be seen at Annex 3.

Find below the matrix that shows project initiatives in each impact zone pre and post COD. Activities and timing have been allocated to pre and post COD based on the severity and timing of impact estimated impact.

Table 4.7. Activities Downstream of the NT2 Power Station

<table>
<tr><th></th><th colspan="2">Location</th><th colspan="3">Pre-COD</th><th colspan="3">Post-COD</th></tr>
<tr><th></th><th>Zone</th><th>District</th><th>WASH</th><th>Livelihood</th><th>Planning/VDC</th><th>WASH</th><th>Livelihood</th><th>Planning/VDC</th></tr>
<tr><td rowspan="13">RIPRIAN</td><td>Nam Gnom/Kathang</td><td>Gnommalath</td><td rowspan="13">Water supply & sanitation const'n to be complete pre-COD</td><td>1 village (11 total)</td><td rowspan="13">Planning and establishment of the VDC will be complete in the same pre-COD villages than Livelihood</td><td rowspan="13">O&M activities planned for Post-COD</td><td rowspan="13">Activities to commence where not started pre-COD, and continue in all other villages as required</td><td rowspan="13">Support to VDC [in Livelihood pre-COD villages and establishment in all other villages as required</td></tr>
<tr><td>XBF upstream confluence</td><td>Mahaxai</td><td>5 villages (5 total)</td></tr>
<tr><td rowspan="2">Upper XBF</td><td>Mahaxai</td><td>8 villages (8 total)</td></tr>
<tr><td>Xe Bang fai</td><td>3 villages (3 total)</td></tr>
<tr><td rowspan="2">Middle XBF</td><td>Xe Bang fai</td><td>4 villages (4 total)</td></tr>
<tr><td>Xaibouli</td><td>1 village (1 total)</td></tr>
<tr><td rowspan="3">Lower XBF1</td><td>Xe Bang fai</td><td>6 villages (6 total)</td></tr>
<tr><td>Xaibouli</td><td>9 villages (9 total)</td></tr>
<tr><td>Nong Bok</td><td>2 villages (2 total)</td></tr>
<tr><td rowspan="2">Lower XBF2</td><td>Xaibouli</td><td>(12 total)</td></tr>
<tr><td>Nong Bok</td><td>2 villages (10 total)</td></tr>
<tr><td rowspan="2">Lower XBF3</td><td>Xaibouli</td><td>3 villages (6 total)</td></tr>
<tr><td>Nong Bok</td><td>0 villages (5 total)</td></tr>
<tr><td rowspan="13">Hinterland</td><td>Nam Gnom/Kathang</td><td>Gnommalath</td><td colspan="3" rowspan="13">WASH, Livelihood and planning / VDC activities in the Xe Bang Fai hinterland villages pre-COD is limited to activity in 6 of the original pilot villages.</td><td rowspan="13">See note (1)</td><td rowspan="13">Yes</td><td rowspan="13">Yes</td></tr>
<tr><td>XBF upstream confluence</td><td>Mahaxai</td></tr>
<tr><td rowspan="2">Upper XBF</td><td>Mahaxai</td></tr>
<tr><td>Xe Bang fai</td></tr>
<tr><td rowspan="2">Middle XBF</td><td>Xe Bang fai</td></tr>
<tr><td>Xaibouli</td></tr>
<tr><td rowspan="3">Lower XBF1</td><td>Xe Bang fai</td></tr>
<tr><td>Xaibouli</td></tr>
<tr><td>Nong Bok</td></tr>
<tr><td rowspan="2">Lower XBF2</td><td>Xaibouli</td></tr>
<tr><td>Nong Bok</td></tr>
<tr><td rowspan="2">Lower XBF3</td><td>Xaibouli</td></tr>
<tr><td>Nongbok</td></tr>
<tr><td rowspan="2">D/S of Nakai Dam & U/S of Nakai Reservoir</td><td>Nam Phao/ Kata/ Ngoy Phouan/ Phiat</td><td>Khamkeut</td><td>See note (1)</td><td>Yes</td><td>Yes</td><td colspan="3">Pre-COD activities to continue as required</td></tr>
<tr><td>Upstream of Nakai Reservoir</td><td>Nakai</td><td colspan="6">Refer to Chapter 6</td></tr>
</table>

Notes:

(1) Water supply is one possible compensation activity that may be considered. At the time this document was prepared detailed village plans had not be completed for the Khamkeut or Xe Bang Fai hinterland villages so it is unknown whether WASH will be part of the final compensation strategy.

Based on (i) the timing of the industrial project, (ii) the engineering features of the industrial project (including, dam, head race channel, diversion tunnel, trans-basin release of turbine waters etc…) and (iii) the budget specification of the program, prioritization of the activities as described above are paramount to addressing adequately the impacts on households in the project areas.

It is expected that field validation of the estimated impacts will continue to be carried out through consultation with village administrations and households as implementation proceeds. Some villages have already been removed from the list of impacted villages (PIV) due to indications from the field assessments that there would be no impact on villagers' assets or livelihood patterns. Conversely, some villages may be added to the list for the opposite reason. Thus, the mechanism for reviewing impacts is a real-time process carried out through consultations at the time of forming VDCs. This is described in Chapter 7 of the DSIP.

4.1.3 Main Implementation Activities

The main implementation activities progress simultaneously:

- Community Development and household plans Activities
  - Village meetings/discussions and formation of the VDC
  - Meeting with Districts to design together the proposed program of activities and obtain appropriate approvals
  - Establishment of the Village Funds and transfer of funds (when necessary)
  - Consensus on the type of sub-projects to be undertaken
  - Formation of Focus Groups and Farmer Groups who desire sectoral investments (when necessary)
  - Approval of Household livelihood restoration plans ("household activity plans")
  - Implementation of HH Plans (aquaculture, rice fish culture, home gardens, handicrafts etc.)

- Village Infrastructure Implementation Activities may include:
  - Water supply and Sanitation Program
  - Water supplies for riverbank gardens relocated to higher ground
  - Water gate rehabilitation
  - Pontoon Irrigation pump adjustment

- Village Demonstration Activities
  - Paddy and diversified crop demonstration in key farmers fields in each village
  - Post harvest and farm mechanization in each village
  - Livestock demonstration models in key Households
  - Vaccination program for animals

- Extension Services
  - Extension services –working together with and assisting district level extension agents to help farmers in paddy production, crop diversification; engagement of college students for further assistance
  - Extension services for livestock and training village vet services technicians
  - Vaccination of animals

4.1.4 Pilot Village Experience

The experience in the 20 Pilot villages (2006-7) showed that initially, many households were reluctant to implement any livelihood development programs. For example, difficulty was encountered in convincing households to develop fish farming. Instead of a large scale fish farm development in each village, DS staff identified capable and hard working villagers who were willing to attempt fish farming as a livelihood option. The Downstream Program (DSP) has supported these individuals both with

finance and with technical assistance. Subsequently after the successful production cycle of one fish farmer, many more villagers became interested in fish farming.

The Downstream Program has worked closely with RMU and District Working Groups to establish demonstration projects in each village, not only for fish farming but also for pig raising, home gardens, crop diversification, handicraft, and *Jatropha curcas* plantations. Through the process of setting up and running demonstration projects, focus group leaders are identified who are then trained as trainers both within the village and for dissemination of information in neighbouring villages.

With the expansion of production in horticulture, agriculture, and handicrafts potential problems in trading and marketing need to be addressed whereas in rice, fish, and pig production there appears to be no foreseen trading or marketing problems. *Jatropha curcas* production can be used both for sale to factories for processing as bio-diesel and also directly as a mixture with purchased fuel for farm machinery.

With the farmer to farmer approach, the program will develop slowly during the first year or two of activity in each village. However, this approach and the success of livelihood demonstration projects in each village have clearly indicated the interest and eagerness of villagers in the chosen livelihood options. In the pilot villages, after one year of demonstration, many households became interested in taking up one of the livelihood options. In some cases, households make use of the village funds and then invest personal funds to scale up the livelihood options.

4.1.5 Unexploded ordnance detection & removal

Associated Potential NT2 Impact

Portions of the Downstream Area were subjected to past military activity in various forms:

- **US Air Force Bombing Missions**. Annex 6 contains a map generated with data supplied by UXO Laos which shows the approximate locations of the reported missions in the Downstream Area. While the locations shown are not exact, the map does provide a good indication of the bombing density.
- **Bombing missions by the Royal Lao Government**. There are no maps available showing these missions.
- **Ground fighting**. This is substantiated by the types of ordnance found. Very little reliable historic data on where the ground battles took place is available.

One of the largest problems with the US bombing is that “cluster bombs” were dropped. This is a bomb which, at a certain elevation, released small round bomblets which were designed to explode either on impact, after a time delay or when touched. It is estimated that there was a 30% failure rate and there are many bomblets still left either on the ground, or embedded in the soil at shallow depths. Other types of UXO are also common in central Laos, including artillery, aircraft bombs, grenades, mines, mortars, rockets and sub-munitions.

Based on the review of several data sources, including historical bombing records, village level surveys within the existing 20 downstream pilot villages, and review of UXO clearance activities undertaken as part of the construction of the Nam Theun 2 Project, it is known that UXO are still present in many areas where the Downstream Program is, or will, operate. Furthermore, it is acknowledged that the degree to which UXO contamination may exist within the downstream program villages varies significantly. Variations appear to exist from village to village, and more broadly from district to district.

The highest degree of contamination appears to be in highest in the northern portions of the downstream area (Gnommalath District), with the lowest in the southern areas (Xaibouli and Nongbok districts). Data is not available for Khamkeut District.

Unexploded Ordnance (UXO) detection and removal activities are not directly related to any potential NT2 impact. UXO activities will be undertaken by the Downstream Program to support activities which are included within the Downstream Program that includes activities which may result in exposure to UXO. Activities that may have UXO exposure are activities which require earth movement in areas not previously cultivated or will require soil excavation to depths below what is normally required by customary agricultural activities. Examples of Downstream Program activities that may result in exposure to UXO include:

1. Those that NTPC will directly undertake which may involve use of contractors, or using district and / or village inputs under direct supervision of NTPC (e.g. borehole construction for water supply)
2. Those that NTPC will support through provision of materials and / or technical advice (e.g. fish pond construction, establishment of new home gardens, household and community toilet construction)

Consultation

Prior to any activity which may result in UXO exposure, the Downstream Program will complete village level surveys via community consultations to further understand whether villagers have any knowledge or concern regarding UXO in their village. Annex 6 includes a copy of the village survey form. A minimum of two forms per village must be completed, one by village headman, one by a village elder.

Technical Description of Measures to be Implemented

Regardless of the survey results, the Downstream Program will provide UXO detection and clearance to support DSP activities in all DSP target villages in Gnommalath and Mahaxai districts due to the intensity of past military conflict in these districts. All other DSP target villages in Khamkeut, Xe Bang Fai, Nongbok and Xaibouli will receive UXO support if the village questionnaire determines that the village has had past experience with UXO or villagers express a concern about UXO. This approach is consistent with instructions received from the Resettlement Committee (refer to Annex 6 for a copy of correspondence from RC).

UXO detection and clearance support will include conducting shallow and deep searches, marking and disposal of any UXO detected. Technical specifications for the UXO detection and clearance work are included in Annex 6. It is important to note that the DSP will not provide village wide UXO detection & clearance; only areas required for specific activities will be searched (e.g. location of borehole, the area for a fish pond, the area for a toilet, etc...)

Records / certification of UXO activities will be collected and provided to the National Regulatory Authority (NRA), the Lao national organization responsible for coordinating all UXO work.

Key Dates / Schedule

UXO detection and clearance activities for the Downstream Program began in early 2007 to support construction of demonstration fish ponds in the villages of Phathoung, Nongping and Mahaxai. UXO support activities have continued according to the above described approach to include support for toilet construction, borehole construction and additional fish ponds.

There are no specific key dates for UXO activities - UXO support activities must be scheduled to be completed prior to DSP activities commencing.

UXO support will continue as long as required to support Downstream Program activities.

Budget

A budget of $240,000 been allocated to UXO activities, which has been estimated using the following assumptions:

- Riparian villages will require UXO support pre-COD, and hinterland post-COD
- All 48 villages target villages in Gnommalath and Mahaxai districts will require UXO support (of which 25 are riparian)
- Of the 135 target villages in Nongbok, Xaybouli and Xe Bang Fai districts, 20% of the villages will require UXO support (following village level questionnaire discussed above). This would require 12 riparian and 16 hinterland villages
- Of the 37 target villages in Khamkeut, 50% will require UXO support, or 19 villages (following village level questionnaire completion discussed above)
- An average of $2,500 is required for each village

Pre-COD budget: 56 villages (19+ 12 + 25) X $2,500 = $140,000
Post-COD budget: 39 villages (23 + 16) X $2,500 = $100,000

The above budget is considered an estimate, as it is difficult to develop an exact / fixed budget for UXO support due to the number of variables involved, which include the number of villages that will require UXO support, villager participation levels in Downstream Program activities (e.g. how many toilets will be constructed, how many fish ponds, etc..), contractor unit rates, the efficiency of the contractor when daily rates are used,.

Monitoring / Indicators

NTPC staff will regularly monitor UXO detection and clearance activities as part of normal contract administration to ensure that the correct areas are being cleared and to ensure that clearance activities are completed according to schedule in order to avoid delay to implementation of Downstream Program activities.

During periods when the UXO contractor is mobilized, the contractor shall be required to report daily to NTPC on progress made, problems encountered, and to identify what work is planned for the next day.

The UXO contractor will be required to submit clearance certificates on a monthly basis; these certificates will be thoroughly reviewed and checked by NTPC staff to ensure the work is completed according to requirements.

Indicators which will be monitored include:

- *Number of days worked by the UXO contractor*
- *Number of field technicians engaged*
- *Area cleared (for large areas)*
- *Number of toilets, boreholes, fishponds, etc…*
- *Number and type of UXO encountered by clearance teams*

4.2 Compensation Program: Measures Related to Specific Impacts

4.2.1 Measures Relating to Erosion and Sedimentation

Potential NT2 Impact

Operation of NT2 will result in additional discharge in the Xe Bang Fai throughout the year. Weekly fluctuations in discharge from NT2, and consequently water levels, are expected. These water fluctuations, together with the increased discharge may accelerate riverbank erosion along the Xe Bang Fai.

Direct compensation will be provided for measurable losses associated with erosion caused by the NT2 project, as outlined in the specific instances below.

4.2.1.1 Inventory of Assets and Structures

Consultation

The inventory of assets and structures is being conducted by NTPC, with assistance from RMU and DWG representatives. The results of this inventory survey will be disclosed to GoL and IFI shortly after the completion of the report.

Technical Description of Measures to be implemented

In early 2008 a detailed inventory of all infrastructure will be completed along the Xe Bang Fai. The inventory will include household and community infrastructure, including those PCR items that are not currently catalogued. Typical infrastructure items included in the inventory include:

Table 4.8.Typical infrastructure

Community Infrastructure	Household Infrastructure
Irrigation pumps / pipes	Houses
Transformers, electric / telephone poles.	Sheds
Roads / access paths / tributary & river crossings	Barns
Bridges	Toilets
Temples, other PCR infrastructure	Water storage tanks
Schools, Health centers	Animal shelters
Other community owned infrastructure	Shops, restaurants, other businesses
Water storage tanks, pumps, piping and other water supply infrastructure	Water storage tanks, pumps, piping and other water supply infrastructure

For each village, the inventory will include the following steps:

- Analysis of high resolution Ikonos satellite imagery, preparation of a draft list of infrastructure
- Ground truthing of satellite imagery analysis, including photography of each item of infrastructure (needed to verify infrastructure use)
- Preparation of comprehensive catalogue of infrastructure and identification of key infrastructure to be monitored.

Key Dates / Schedule

Table 4.9. Assets and Structures – Key Dates

Activity	Date
Preparation for inventory	Jul – Dec 2007
Inventory of infrastructure	Jan –Mar 08
Preparation / issuance of inventory report	April 08

Budget

Inventory activities will be done using NTPC DSP operational budget.

Monitoring / Indicators

No specific monitoring required for inventory.

4.2.1.2 Asset relocation / protection : Non-PCR Structures

Owing to the regulating dam and the 27 km channel the water level fluctuation in the Xe Bang Fai will be almost eliminated during the week and should remain limited (0.5 to 1.5m) during the weekend, with a slow gradient (about 20 cm per hour).

Additionally, human activities commonly result in disturbance of vegetation along the Xe Bang Fai riverbanks (riverbank gardening, ferry / boat landings, livestock activities). It is expected that through implementation of other components of the Downstream Program that the impact of these human activities will be reduced, and subsequently will help to progressively reduce the natural erosion of the river.

It is therefore not expected that a significant incremental erosion of river banks will be created by the project. A multi-faceted monitoring program is being undertaken to conduct information to determine "natural" (pre-NT2 discharge) rates of erosion. The monitoring program will continue after NT2 discharge commences (refer to Chapter 8 for additional information on the monitoring program).

Should the monitoring reveal more rapid erosion in some parts of the river that is attributable to operation of NT2, appropriate measures will be designed and implemented by NTPC and GoL at that time.

4.2.1.3 Asset relocation / protection : PCR Structures

Following completion of the infrastructure inventory described above, a report on all PCR items (currently expected only to include Buddhist temples) identified will be prepared. The report will include information on the physical location of the PCR infrastructure, and more specifically:

- satellite image for each temple compound, with an indication of what each structure is (sala, dormitory, fence, etc..) and distance from the top of riverbank
- photographs of the structures
- a summary table, listing all temples, village names, districts, infrastructure items, distances from top of riverbank
- description of the infrastructure inventory (methodology, time, etc..)

The PCR inventory report will be provided to the EMO, which will coordinate with the relevant GoL PCR counterparts to prepare a PCR action plan. To develop the action plan, each PCR item will be investigated with regards to its history, ownership, cultural value. Field visits will be conducted to each item to prepare recommendations regarding future actions, which may include increased monitoring,

protection, and / or relocation of items. The plan will then be discussed jointly between NTPC and the GoL and an agreed action plan will be developed.

Key Dates / Schedule

Table 4.10. Assets and Structures : PCR Structures – Key Dates

Activity	Date
Preparation of PCR inventory report	Apr 2008 *(complete)*
Preparation of PCR action recommendations (EMO)	June 2008
Consultation / discussion / agreement on action plan	Jun – Jul 2008
Implementation of activities, as required	Jul 2008 and onward

Budget

As the extent of activities to be implemented is unknown at this stage, required funding for activities will be from the general contingency fund.

4.2.2 Measures Addressing Water Level Fluctuations / Increased Dry Season Flow

4.2.2.1 Irrigation Pumps

Operation of the NT2 project will result in fluctuating water levels within the XBF. Pontoon mounted irrigation hose connections may need to be modified to enable the pump structures to cope with the anticipated water level fluctuations without damage.

The provision of flexible hose connectors of the about 19 irrigation pumps connections along Xe bang Fai will be carried out in order to accommodate future water fluctuations. This is aimed to be completed prior to discharge during commissioning phase.

Associated Potential NT2 Impact

Operation of NT2 is expected to result in weekly water level fluctuations in the Xe Bang Fai. Irrigation pontoon pumps must be able to safely operate without the need for human intervention (e.g. adjustment of hoses) during the weekly fluctuation.

Consultation

Irrigation pumps are generally owned and operated by individual villages. Prior to finalizing modification plans for any pump, the relevant village will be consulted to ensure that plans are acceptable and to gain their inputs.

Technical Description of Measures to be Implemented

Specific modification measures to be implemented may be unique to each pontoon pump system. However, based on preliminary assessments it is anticipated that the main modification will be provision of additional flexible hose, electrical wire.

Key Dates / Schedule

Irrigation pontoon pump modifications must be completed prior to discharge of water to the Xe Bang Fai.

Table 4.11. Irrigation Pumps – Key Dates

Activity	Estimated Date
Preparation for inventory / assessment	Sept – Nov 2007 *(completed)*
Inventory of irrigation pumps & initial assessment of capacity to manage fluctuation	Nov 07 – Jan 08 *(complete)*
Preparation / issuing of inventory & assessment report	Dec 07 – May 08
Identification of pumps that need modification	May – Jun 08
Develop detailed plans for modifications	Jun – Jul 08
Consultation / agreements	Jul 08 – Aug 08
Procurement of materials / services	Aug – Oct 08
Field modification activities	Oct – Dec 08
Monitoring	Following NT2 discharge

Budget

An estimated budget of $60,000 / pump has been established.

Pre-COD budget: $60,000
Post-COD budget : none

Monitoring / Indicators

Following commencement of discharge from NT2 to the Xe Bang Fai irrigation pontoon pumps will be inspected to ensure that they are adequately able to operate throughout the weekly water level variations caused by NT2.

4.2.2.2 Access Restoration

Potential NT2 Impact

NT2 discharge to the Xe Bang Fai will result in dry season water levels being increasing, typically 3 to 4 meters in the Upper Xe Bang Fai region and 1 meter or less in the lower Xe Bang Fai region. While the dry season water level increases will significantly decrease irrigation pumping costs, some access dry season access routes may be impacted. The term “access route” is used to refer to any road, path or trail that was used prior to operation of NT2 but will not be passable after discharge from NT2 commences due to the increased water levels. Examples of access routes include:

- Temporary wooden or bamboo bridges built across the Xe Bang Fai or tributaries
- Rapids in the Xe Bang Fai that can be crossed by livestock or people during the dry season
- Places where people, livestock or vehicles are able to drive across tributaries

Consultation

Identification of access points that may be impacted is done through consultation with relevant district and village officials, as well as with villagers themselves.
Plans for mitigating impacts to dry season access routes will be developed by NTPC following consultations with villages to obtain their inputs. Plans will be approved by village and district authorities prior to implementation.

Technical Description of Measures to be Implemented

Specific measures to be implemented to ensure minimal impact on dry season access routes will be unique to each location. Activities may include installation of some culverts, rerouting access paths to locations that will not be impacted by the increased water levels.

Key Dates / Schedule

Issues regarding NT2 impacts to dry season access routes must be resolved prior to discharge of water to the Xe Bang Fai, in early 2009.

Table 4.12. Access Restoration – Key Dates

Activity	Date
Preparation for inventory / assessment	Sept – Dec 2007
Field inventory / identification of access points that may be impacted	Jan – Apr 08
Develop detailed plans for modifications	May – Jun 08
Consultation / agreements	Jun 08 – Jul 08
Procurement of materials / services	Jul – Oct 08
Field modification activities	Oct – Dec 08
Monitoring	Following NT2 discharge

Budget

While the inventory and assessment has not been completed, it is estimated that a maximum of 20 access routes may need some degree of modification. An estimated budget of $5,000 per location has been established, for a total budget of $100,000.

Pre-COD budget: $100,000
Post-COD budget: none

Monitoring / Indicators

Access routes modified as part of the DSP will be inspected during the dry season following NT2 discharge commencing to verify that modifications have been appropriately made.

4.2.2.3 Riverbank gardens

Associated Potential NT2 Impact

NT2 discharge to the Xe Bang Fai will result in dry season water levels being increasing, typically 3 to 4 meters in the Upper Xe Bang Fai region and 1 meter or less in the lower Xe Bang Fai region. In villages where riverbank gardens are cultivated some garden area will be lost due to the elevated water levels.
The survey / registration of approximately 200 Ha of river banks gardens along the Xe Bang Fai is presently ongoing.

As specified in the CA, households losing riverbank gardens are entitled to replacement land of equivalent productive value, at a site acceptable to the household. In addition, households receiving replacement agricultural lands are entitled to ancillary benefits.

Consultation

Survey and registration of river bank gardens, as well as planning of replacement gardens along the Xe Bang Fai is done through consultation with villagers, village authorities and relevant government authorities.

Technical Support Measures to be Implemented

Households that are identified as losing riverbank gardens will be directly compensated for this loss through assisting them develop alternative productive gardens.

Those households who wish to relocate their riverbank gardens will have water supply provided to enable year round use of the newly established garden. Such water supply systems would be customized for each village, and may most likely include pumping water from the Xe Bang Fai, construction of small earthen weirs, or use of water from hand dug or machine drilled boreholes.

Where practical, relocation of the riverbank gardens will be coordinated with the home garden development initiatives undertaken as part of the livelihood development activities.

Land for the relocated riverbank gardens will be identified through consultation with each village, together with the RMU and DWGs. In some villages this may require clearing of currently unproductive land, while in others existing home gardens may be expanded.

The Program will make any effort to identify land with equivalent productivity and will provide technical assistance for improving the new land. More details about the approach are located in section 4.3.3 – Home gardens under the General Livelihood and Income restoration Measures.

Key Dates / Schedule

This activity has yet to be scheduled in detail but will commence early in 2008.

Budget

While the inventory of existing riverbank gardens has not been completed and compensation costs cannot be established, it is estimated that a maximum of budget (on average) of $5,000 is necessary for each Xe Bang Fai riparian village. Furthermore, it is assumed that prior to COD water supply activities for irrigation will be completed in 48 villages, with the remaining 23 riparian villages post-COD.

Pre-COD budget: 240,000
Post-COD budget: 115,000

Monitoring / Indicators

Monitoring will be undertaken to assess the development of the replacement gardens and water supply systems to identify problems and more specifically, to identify those replacement gardens which are not fully utilized to understand the reasons and adjust the implementation strategy as necessary.

4.2.2.4 Other Household Assets

Associated Potential NT2 Impact

As stated above, an infrastructure survey has recorded the number, size and location of various categories of fixed assets throughout the downstream Xe Bang Fai area. At present, it is impossible to

determine how patterns of flooding and erosion attributable to the project may eventually affect land or fixed assets owned by households with any degree of accuracy. To meet CA requirements, intensive monitoring arrangements have been established to identify such adverse impacts, and contingency arrangements are in place to compensate private owners for lost assets, and to provide for income restoration if productive assets are affected.

Implementation arrangements

Though monitoring will begin before then, most impacts associated with flooding or erosion are not likely to occur until 2010 and thereafter. Though affected households have recourse to the grievance process provided in the CA, it is the responsibility of NTPC/GoL to ensure that any adverse impacts on households that are attributable to the project are identified and mitigated in a timely manner and in accordance with CA provisions. Following current assets survey and prior to COD, the Program will elaborate monitoring procedures and methods for confirming impacts, determining compensation, consulting with affected households on proposed compensation/ rehabilitation arrangements, ensuring timely delivery of compensation and / or other assistance.

Budget

As the extent of impact on household assets is contingent on flooding and erosion patterns that are yet to be determined, compensation costs can not be reliably estimated. For budgeting purposes, compensation costs are included under contingencies. The adequacy of contingency funds set aside for these and other purposes will be reassessed in due time after COD.

4.2.3 Measures Addressing Decreased Water Quality

Water Supply / Sanitation / Hygiene

Water supply, sanitation and hygiene (WASH) activities will be implemented in project affected villages downstream of the power station, with work initially focusing on the riparian villages to ensure that villages which depend on the Xe Bang Fai for domestic water have an alternative water supply prior to NT2 discharging water to the Xe Bang Fai.

There are three components to the WASH program:

Water supply improvements: NTPC will provide an improved water supply, primarily through provision of new boreholes with AfriDEV hand pumps, refurbishing existing boreholes and hand pumps where practical. Some support for the construction of new and rehabilitation of existing open wells will also be provided.

Sanitation facility improvements: NTPC will provide support for toilet construction, for individual households which are interested, as well as for schools and health centers which do not have toilet facilities. For community toilets NTPC will provide all required materials including porcelain pour flush toilet, cement, concrete rings for septic tanks, PVC pipe, reinforcing steel, sheet metal roofing, wooden door, wall materials. Villagers will be required to provide labor. NTPC's support for household toilet construction will include concrete rings, cement, sheet metal roofing, PVC pipe and a plastic bucket. In villages that experience frequent flooding, NTPC will encourage villagers to construct toilets that are above normal flood levels.

Hygiene awareness & training programs: Together with relevant government agencies, NTPC will implement a village level sanitation & hygiene awareness / training program.

4.2.3.1 Water supply

Associated Potential NT2 Impact

Water quality in the downstream area may be affected, due to the degradation of the biomass submerged in the Nakai Reservoir (especially during the first few years), and increase in suspended matter. Many households living in the downstream area use water from the Nam Kathang, Nam Gnom and Xe Bang Fai for domestic purposes. Such use of natural surface waters may not be possible following commencement operation of NT2.

Consultation

Village water supply action plans are prepared following consultation with each village. During consultations, NTPC and district staff explain how NT2 may impact the water quality in Xe Bang Fai (or Nam Kathang / Nam Gnom, depending on the village location), and obligation for the Downstream Program to provide alternative water supply. Villagers are asked during consultations to provide ideas of what type of water supply they view as being feasible for their village, and village water supply action plans are built upon the information collected. However, not all ideas expressed by villagers during consultations can be considered, primarily due to technical reasons (e.g. village may suggest gravity feed system, but a year round supply of safe water may not be available). If villager ideas can not be considered, NTPC and district staff provides explanation as to why the Downstream Program can not consider the idea.

Technical Description of Measures to be implemented

Water supply technologies

The Downstream Program is required to provide alternative water supply to those villages whose current water supply may be impacted by operation of NT2. Downstream Program water supply activities must ensure the following:

- Year round availability
- Of adequate quality for domestic use
- Of sufficient quantity to satisfy domestic needs of impacted households

Several technologies are commonly used for rural water supply in Laos. A description of these technologies, and a brief assessment of their general suitability for use in the downstream area is as follows:

- Rainwater collection: Rainwater collection, typically from rooftops and stored in jars, can provide a source of high quality. However, rainwater collection is not feasible for use by the Downstream Program as it can not fulfil the water supply objectives, noted above, due to the following:
    - Unreliable supply; for many months of the year most DS villages experience little or no rainfall. To collect sufficient water during the wet season for use throughout the dry season would require a significant investment in water storage facilities.
    - Inconsistent quality: rainwater collected from brief rain events (especially at beginning and end of the wet season) generally does not provide water of sufficient quality for use due to the accumulation of dust and other debris on the collection surfaces during dry periods.

  Due to the above, the Downstream Program does not provide support for rainwater collection activities.
- Springs / Gravity feed systems (GFS): Use of surface water for gravity fed systems is common in mountainous areas. However, few, if any, villages in the downstream area are located in

close proximity to a spring which can provide reliable water supply in sufficient quantity and quality. Consequently, the Downstream Program will only consider providing support for GFS following verification of a suitable water supply source.

- Open wells ("Nam Saang"): Hand dug wells are common source of domestic water in rural Laos. However, the open wells may have difficulty in achieving the downstream water supply objectives for the following reasons:
    - Inconsistent quality; contamination of the water supply source is quite easily achieved
    - Inconsistent quantity: Since open wells are typically quite shallow, many wells have limited or no water during the dry season.

  Consequently, the Downstream Program does not encourage investment in open wells, but will consider providing support if the village expresses a strong demand. However, if open wells are selected by the community for water supply, the Downstream Program recommends also constructing deep borehole(s) to ensure safe, year round water supply in the event that problems are encountered with the open wells.
- Treatment of surface water: It is possible to extract water from the Xe Bang Fai (or Nam Kathang / Gnom) and treat it sufficiently for domestic use. However, such systems are typically more expensive to construct (as well as to operate and maintain) than other options.
- Deep boreholes: If constructed properly, deep boreholes can provide a year round supply of water of sufficient quantity and quality to satisfy domestic needs.

Given the above options for village water supply, the Downstream Program assumes that the large majority of water supply activities will be construction of deep boreholes, to be equipped with AfriDev hand pumps. For villages where the Downstream Program must implement water supply activities, approximately 1 borehole will be provided for each 20 households. The Downstream Program may also support rehabilitation of existing boreholes (cleaning / development of borehole, installation of new platform and hand pump, disinfection).

While it is assumed that the majority of water supply activity will involve construction of deep boreholes, it is important to note that other alternative water supply systems are not excluded from consideration. Other options are explored during village consultations to determine the most feasible activity for each village.

Deep boreholes

In order to achieve the water supply program objectives of providing safe, year round water supply, the Downstream Program has adopted a standard borehole design for use in the program. The standard design is

- 20 to 60m in depth. The specific depth for each borehole is determined during drilling, depending on the yield of the well.
- Fully cased with 4" PVC. Full casing is provided to prevent the borehole from collapsing in the future.
- Sanitary cement grout seal to prevent surface water contamination

Refer to Annex 7 for a diagram of the standard design for borehole construction.

After completion of borehole construction, and prior to the borehole being equipped with a hand pump, a water sample is collected and tested for the following parameters (MOH requirements)

1) PH
2) Electro-conductivity
3) Turbidity
4) Iron FE
5) Manganese
6) Nitrate NO3
7) Arsenic
8) Fluoride
9) Total hardness
10) Coliform
11) Nitrite NO2
12) Chloride Ion CI
13) Taste & odor

Further water quality testing is done after installation of the hand pump as part of NTPC water quality monitoring program, executed by the EMO.

Hand pumps

The Downstream Program, together with relevant GoL authorities, has selected AfriDev hand pumps as the single hand pump to be installed. While AfriDev hand pumps are generally more expensive than other hand pumps commonly used in Laos, the selection was made due to AfriDev pumps being:

- capable of extracting water from deep wells. Deep well hand pumps may not be required in some locations, but will be in others.
- commonly used in developing countries and have a proven history of reliability and ease of maintenance. AfriDev pumps are also common in Laos.
- easy to use. Compared with many other hand pumps, such as the Tara hand pump, AfriDev hand pumps do not require a strong person to operate. Young children, the elderly, etc.. do not have difficulty in using AfriDev pumps.

Refer to Annex 7 for a diagram of an AfriDev hand pump.

Hand pump platforms

If waste water is allowed to accumulate around a well, it will become a source of infection for users, since stagnant water or mud is a serious health risk as it can provide a breeding ground for many types of parasites and or disease carriers. Consequently, concrete platforms will be constructed for each hand pump to prevent waste water from accumulating, as well as to prevent contamination of the well through infiltration of waste water into the aquifer.

Two designs platform designs have been developed; ground level and elevated. The ground level platform is commonly used and in many cases highly suitable. The elevated platform design elevates the hand pump by approximately 1m from the ground surface and has been developed for use in areas which frequently flood. During consultation, villagers are presented with both standard deigns and allowed to choose how many of each design they want. To date, the Downstream Program has found that demand for the elevated platform is quite low, as villagers typically consider the elevated platform to:

- Require additional effort to use. Users must climb up and down the stairs to retrieve water, thereby increasing the effort required to fetch water.
- Be unnecessary: During times of flooding, villagers can typically use rainwater.

Refer to Annex 7 for diagrams of the hand pump platforms.

As noted above, the Downstream Program may provide assistance in refurbishing existing boreholes. In some instances this may include demolition of existing platforms, if ineffective, and construction of a new platform.

Key Dates / Schedule

Prior to January 2009, the Downstream Program will implement water supply activities in

- 82 riparian villages downstream of the power station
- 6 hinterland villages. These villages were part of the original group of 20 pilot villages. Agreements were made for water supply in 2006 by consultant teams, and consequently activities are being implemented prior to COD in accordance with prior discussions to maintain a good working relationship.

Table 4.13. Water Supply – Key Dates

Activity	Date
Water supply construction completed in 82 riparian villages plus 6 hinterland pilot villages	Prior to January 2009
Strengthen village and district level operation and maintenance systems (including introduction / implementation of user fees system)	Post COD

Budget

Pre-COD :
At the time of preparing this document, it is estimated that 453 productive boreholes will be constructed prior to COD. Of the 453 boreholes required:

- 346 are known (village consultations and agreements are complete)
- 107 are estimated (based on implementation rate of 1 borehole per 20 households for villages that have not had final consultations).

The cost of one borehole, equipped with an AfriDev hand pump is estimated to be $3,700. This unit estimate includes the cost of:

- drilling / casing a borehole with an average depth of 45m, based on established contract unit rates (i.e. contracts that have already been signed or negotiated for borehole construction)
- 10% of all boreholes drilled not having sufficient water to warrant installation of a hand pump (i.e. the borehole is considered a failure)
- Purchasing and installing an AfriDev hand pump
- Cost of constructing a hand pump platform construction (25% of which are assumed to be slightly elevated)

Consequently, a pre-COD water supply construction budget of **$1,500,000** has been established. It should be noted that while the above budget is based exclusively on borehole construction and hand pump installation, the budget is considered to be sufficient for other water supply systems, should village consultations result in other water supply activities.

Post-COD budget :
At the time of preparing this document, it is unknown what overall compensation strategy will be adopted by the Downstream Program for hinterland villages. Water supply may form one component of the hinterland village strategy, but will be decided upon by mid-2009 prior to COD. Should water supply be selected by villagers as a preferred compensation option, funding will be from allocated the "livelihood restoration fund" for the target village.

A post-COD budget of **$150,000** has been established for establishing a comprehensive operation and maintenance program for the constructed water supply systems. As part of these activities a user fee system will be introduced and implemented to ensure the long term sustainability of the program.

Monitoring / Indicators

Water quality: following construction of the borehole, but prior to installation of the hand pump, water quality is tested to determine whether the borehole should be equipped. In addition, water quality will be monitored as part of an overall groundwater monitoring program implemented by the EMO, which will include approximately 20% of all boreholes being tested every 6 months.

Additionally, as part of the operation and maintenance program, information will be collected regarding borehole / pump failure to enable adjustments to be made in the program.

4.2.4 Combating Increased Flooding on Lower Xe Bang Fai

4.2.4.1 Flood protection – Water gate rehabilitation

Associated Potential NT2 Impact

There are 15 water gate structures located on tributaries of the lower Xe Bang Fai. While these gates will not be impacted by operation of the NT2 project, the Downstream Program will support rehabilitation of the gates to enable more efficient operation, which should help to reduce flooding impacts within the lower Xe Bang Fai and is expected to improve fish migration. This intervention will also indirectly restore impacts of NT2 by improving fish stocks in the Xe Bang Fai by improving access to spawning grounds currently blocked by improper operation of the water gates.

Additionally, the Downstream Program will investigate the feasibility of constructing four new gate structures in the lower Xe Bang Fai region, at the request of the GoL.

Technical Description of Measures to be Implemented

Rehabilitation will at first concentrate on improvement of the mechanical and structural parts of the gates, which may include the following activities:

a) Cleaning of the sediment in the front and rear of concrete aprons for the gates
b) Repair of gabion wing walls which may have collapsed
c) Repairing / replacing screws on slide gates that are bent or otherwise damaged
d) Repair of flaps gates
e) Replacing missing stop-logs, slide gates and other components

Table 4.14. Water Gate Rehabilitation Locations

No	River Name	Village Name	District
1	Hauy Sayna	Ban Dangsavanh	Xaibouli
2	Hauy Sikhay	Ban Sikhay	Xaibouli
3	Hauy Saleuong	Ban Phontan	Xaibouli
4	Hauy Kangpa	Ban Kangpa	Xaibouli
5	Hauy Phinh	Ban Phakpeuatai	Xaibouli
6	Hauy Kae	Ban Phakpeuatai	Xaibouli
7	Hauy Phapak	Ban Somsaat	Xaibouli
8	Hauy Hair	Ban Hauy Hair	Xaibouli
9	Hauy Ke	Ban Natai	Nongbok
10	Hauy Bounh	Ban Hatxiengdee	Nongbok
11	Hauy Lo	Ban Hatxiengdee	Nongbok
12	Hauy Maemang	Ban Hatxaifong	Nongbok
13	Hauy Sadeou	Ban PhonsaoA	Nongbok
14	Hauy Bangkat	Ban Danpakse	Nongbok
15	Hauy Phafa	Ban Sibounhuang	Nongbok

NTPC will also assist relevant government authorities in improving the operation of gates to ensure that they are closed only at the appropriate times (flood peaks) and remain open during other times to minimize tributary backwater and facilitate fish migration.

At the time this document was prepared, the detailed information regarding the GoL's request to include the construction of 4 new gate structures was not available. The Downstream Program will

work with the GoL to identify the location and conduct feasibility studies regarding the construction of these gates.

Key Dates / Schedule

Water gate rehabilitation work is expected to be implemented according to the following schedule:

Table 4.15. Water Gate—Key Dates

Activity	Date
Rehabilitation of existing flood gates	
Pre-feasibility studies	2005 / 2006 *(already completed)*
Update / synthesize basic flood gate data	Nov – Dec 2007 *(draft report under review)*
Prepare detailed rehabilitation plans for all water gate structures	Jan – May 2008
Consultations / workshops / agreement with GoL for each water gate	May – Jun 2008
Wet season monitoring of all gates	Jun – Oct 2008
Bidding / procurement	Jun – Aug 2008
Rehabilitation	Oct – Dec 08
Wet season monitoring of gates	Jun – Oct 2009
Operational strengthening	Starting in early 2009
Construction of 4 additional gate structures	
Investigation of proposed gates, collection of information	Apr – June 2008
Feasibility studies	June – Sep 2008
Agreement to construction achieved by GOL / NTPC / RMU	Sep – Oct 2008
Detailed construction planning	Nov 2008 – Apr 2009
Bidding / procurement	May – July 2009
Construction	Nov 2009 and onwards
Operational training / strengthening	Post-COD

The Program will manage to survey fish ponds managed in semi-intensive or intensive way so as to be able to plan possible investment for protecting them. The survey will not concern any kind of pond that is used in some way for trapping fish / keeping high volume of water during the flood.

Budget

Pre-COD :
A budget of $210,000 has been established for the rehabilitation of the 15 water gates, or approximately $14,000 per gate structure. It is anticipated that three gates will be rehabilitated prior to COD, with all remaining work to be done shortly after COD.

Post-COD :
At the time this document was prepared, a budget of $200,000 has been allocated to the construction of additional water gate structures.

Monitoring / Indicators

A monitoring program will be established concurrently with physical rehabilitation of the water gate structures to assist with proper operation and maintenance of the gates.

4.2.4.2 Sanitation

4.2.4.2.1 Sanitation Construction

Associated Potential NT2 Impact

During the wet season, discharge from the NT2 power station operation is expected to increase tributary flooding. Many villages currently practice promiscuous defecation and the slightly higher water level may slightly increase the risk of transmission of water borne disease.

Consultation

Village sanitation action plans are prepared following consultation with each village. During the consultations NTPC and district staff explain the benefits that the sanitation construction program has, what the Downstream Program will and will not provide, what inputs are expected from villagers themselves (described in more detail below), and that participation in the program is completely voluntary. Registration for the toilet construction program is done several days after the initial consultations to enable household members to discuss amongst themselves.

Technical Description of Measures to be Implemented

Household toilet construction
The Downstream Program will provide support for construction of household toilets for those households who are interested. Two toilet designs have been developed; ground level and elevated. The elevated toilet design elevates the toilet by approximately 1m from the ground surface and has been developed for use in areas which frequently flood. During consultation, villagers are presented with both standard deigns and allowed to choose which design they prefer. To date, the Downstream Program has found that demand for the elevated toilet is quite low, as villagers typically consider the elevated toilet as requiring additional effort for construction and use.

For household toilets, the Downstream Program provides each participating household with concrete rings and cover for septic tank, corrugated sheet metal for roofing, cement, to join concrete rings and construct floor, plastic bucket (40 L) for water storage to flush the toilet, and any necessary PVC pipe and fitting and glue to connect the pour flush toilet to the septic tank.

The Downstream Program currently requires participating households to contribute 50,000 kip, which is used to purchase the porcelain pour-flush toilet bowl. This requirement for household contribution was initially included in the program as a way to ensure that households will use the program supplied materials for toilet construction (and not for other purposes), and to foster great sense of ownership. However, this financial requirement is currently being reviewed and may be adjusted. Potential changes may include:

- Requiring households to deposit some amount of money (50,000 kip or less, depending on ability of household to pay), which will be returned after construction is complete.
- Not requiring a financial contribution from those villages which are extremely poor.

Community
The Downstream Program will provide support for construction of toilets at schools and health centers. For community toilets, the Downstream Program provides all required construction materials (including bricks for wall construction, wooden doors, nails, etc.). Villagers must provide labor. The Downstream Program will assist in training villagers in proper construction techniques.

School toilet blocks typically include one toilet stall to be dedicated exclusively for teacher use and a minimum of two additional stalls (one for boys, one for girls). If there are more than 2 classrooms at the school, additional stalls are added as needed. Health center toilet blocks typically include two stalls, on for men and one for women. Based on experience in the initial 20 pilot villages, an average 3.5 community stalls are required per village.

Key Dates / Schedule

Prior to January 2009, the Downstream Program will implement sanitation construction activities according to the same schedule as water supply construction. More specifically, in

- 82 riparian villages downstream of the power station
- 6 hinterland villages. These villages were part of the original group of 20 pilot villages. Agreements were made for sanitation construction in 2006 by consultant teams, and consequently activities are being implemented prior to COD in accordance with prior discussions to maintain a good working relationship.

After COD, the Downstream Program may implement sanitation construction activities in the remaining hinterland villages, but such activities will depend on the overall compensation strategy for hinterland villages.

Table 4.16. Sanitation Program—Key Dates

Activity	Date
Sanitation construction completed in 82 riparian villages plus 6 hinterland pilot villages	Prior to January 2009
Sanitation construction in hinterland villages, as required	Post COD

Budget

Pre-COD :
At the time of preparing this document, it is estimated that the Downstream Program will provide support for approximately 6,500 household toilets, which represents a participation rate of 70%. Additionally, it is estimated that an additional 300 community toilet stalls will be constructed with support from NTPC. This estimate represents an average of 3.5 toilet community stalls in each of the 88 pre-COD villages (82 riparian and 6 hinterland). The estimate of 3.5 community toilet stalls per village is based on experience in 20 pilot villages.

The cost of one household toilet or one community toilet stall is estimated to be $65. This unit estimate includes the cost of all items listed above that NTPC will provide for household toilet construction.

Consequently, a pre-COD sanitation construction budget of **$450,000** has been established.

Post-COD budget :
At the time of preparing this document, it is unknown what overall compensation strategy will be adopted by the Downstream Program for the remaining hinterland villages. Sanitation construction may form one component of the hinterland village strategy but will be decided upon by mid-2009 prior to COD. Should sanitation construction be selected by villagers as a preferred compensation option, funding will be from allocated the “livelihood restoration fund” for the target village.

Monitoring / Indicators

No specific monitoring required for sanitation activities is required. Data will be collected through updates to the required "socio-economic / health baseline study".

4.2.4.2.2 Sanitation/ Hygiene Training & Awareness

Associated Potential NT2 Impact
See sanitation construction (above)

Consultation

As part of the sanitation construction village consultations, Downstream Program staff provide information regarding the Downstream Program sanitation / hygiene training and awareness program. During these consultations, the Downstream Program assesses villager interest in the program. Village participation is completely voluntary.

Technical Description of Measures to be Implemented

Within the sanitation / hygiene training and awareness program there are three separate components:

- Sanitation / hygiene training for district counterparts: This component aims to improve district counterpart capacity and knowledge to enable the district sanitation / hygiene specialists to conduct village level activities. Training is typically conducted by the Khammuane Provincial Health Department.
- Sanitation / hygiene training for village representatives: Typically, four people within each village are selected, to help facilitate implementation of awareness programs within the target villages. This training is typically conducted by Downstream Program staff, together with district counterparts.
- Sanitation / hygiene promotion in school and communities: Activities are organized at a village level to educate villagers about the importance of hygiene and sanitation. Activities target school children (through activities conducted within school classrooms) and also at a community level to reach adults.

As part of the sanitation / hygiene training and awareness program, schools and health centers which receive support for toilet construction also receive a hand washing station.

Key Dates / Schedule

The same key dates and schedule apply to the sanitation / hygiene training and awareness program as the sanitation construction program. *(refer to section 4.2.4.2.1 above)*

Budget

Pre-COD budget:
Activities began in early 2007 and increasing with time. A budget of **$70,000** has been established to support sanitation / hygiene training and awareness activities prior to COD.

Post-COD budget :
At the time of preparing this document, it is unknown what overall compensation strategy will be adopted by the Downstream Program for the remaining post-COD hinterland Xe Bang Fai villages. Sanitation / hygiene training and awareness activities may form one component of the hinterland village

strategy. However, regardless of the hinterland village compensation strategy, some additional activity will be required for the villages where activity commenced prior to COD.

Consequently, a budget of $100,000 has been established, to be distributed over the 30 month period of January 2010 to July 2012.

Monitoring / Indicators

No specific monitoring required for sanitation activities is required. Relevant data will be collected through updates to the required "socio-economic / health baseline study".

4.3 Compensation Program: General Livelihood and Income Restoration Measures

4.3.1 Rationale

As specified in the CA, households and communities will be compensated for lost assets and, as warranted, assisted through livelihood restoration measures. Some forms of compensation and assistance are to be targeted at households, to mitigate impacts on them, including loss of assets and loss or reduction of incomes. Other forms of compensation or assistance are targeted at communities, to mitigate for loss of common property resources or community infrastructure. The livelihood restoration program which aims to compensate for fisheries losses will develop a range of improved or replacement livelihood activities to be accessed by Households within Project Impacted Villages (PIVs). The design of a livelihood compensation program for the approximately 25,000 potentially affected households over a nine year period is complex due to the uncertainty of project impacts and the lack of detailed knowledge for many of the target villages.

Each riparian Xe Bang Fai village will be provided income restoration funding, based on a set value per household to allow for livelihoods and assets to be restored on a village by village basis. However restoration investment per household is proportional to the degree of impact for each village in the different identified impact zones.

The production systems include widespread use of common resources (fisheries, grazing lands). The programs designed at the beginning by the downstream team are based on a "limited development options menu" system; that is, a small number of existing activities are provided rather than a wider range of activities based on the allocated budget provided to the village. New activities, technology and methods will then be introduced through the demonstration component of the livelihood restoration program, and if these are well received, accepted and successful, these will be added to the menu system.

4.3.2 Approach

The present approach is to involve households through demonstration projects, village funds, and technical assistance. Representatives of other villages are invited on study tours and for training sessions in demonstration villages. In the process efforts will be made to ensure access of the poor and vulnerable households to compensation and livelihood restoration activities.

At the village level, the program will secure support for vulnerable households and ethnic groups. Presently, vulnerable households include those households that can provide little labor (such households consist mostly of one women with young children and their old grandparents, but no husband and no children at an age at which they can provide labor), or are of an ethnic minority, or are single headed, and are poor.

Poor and vulnerable households will be identified through a participatory tool that includes wealth ranking. The program will identify the main constraints and the activities for which the poor/vulnerable households have interest in and a capacity to implement. The situation of the poor households and the need to provide compensation (aside from the present credit system) will be discussed at the village level in the VDC. It is essential that other restoration actions (beyond the Village Fund in its current form) be discussed and accepted by the whole community.
Possible options for compensating the poor and vulnerable household groups could be to propose more demonstrations, to identify and promote suitable activities (low labour and land need, low risk / low investment / fast return), to increase the grant component (compared with loan from village fund) or to provide loan with more lenient conditions.
The DSP will also manage to provide closer technical support to this group to ensuring the success of their activity.

Capacity building for district staff will be provided as part of the general strategy. However, the general scaling up of activities combined with the close support of numerous poor households could lead to increased capacity building and possibly to recruit additional DSP staff to work in each district.

Pilot Village Approach

Commencing in early 2006 trials were held in 20 villages.

During the pilot village intervention stage, the initial strategy was direct and previously determined. Set of livelihood options were provided for the Project Impacted Villages (PIV) and Households were required to submit a family business plan to loan from the village funds.The approach and scheduling was as follows:

- Pre-consensus activities (January - February , 2006)
- Debriefing of Khammouane Province Governor (February 2, 2006)
- De-briefing to District working Groups (February 9, 2006)
- Consensus activities and formation of VDC and Focus Groups and sign off by the District (April 15-June 27)
- VDC formed Village Savings and Credit Funds stored in village bank accounts held at BCEL Thakhek (April 15 ,2006)
- Demonstration farms for the pilot villages (July 15, 2006 –December 2007)
- Start of village fund for specific activities as requested by villages via their focus groups (April 15, 2006 onwards) (started in Beung Xe)
- Further demonstration for the rest of the pilot villages and micro-credit for all villages that come up with proper Household livelihood restoration plans via their focus groups. Dec 15, 2006 to Dec 2007

Subsequent Groups of Villages

The process is similar to that used in the pilot villages with a number of changes based on lessons learned adhering to the concept of adaptive management. After the completion of the profile meeting and other preliminary consultation workshops an implementation schedule will be developed following the general flow provided below:

a) Pre-consensus
b) Consensus and formation of the VDC and Focus Groups
c) VDC will form a Village Funds management facility and a bank account (as required only in particular villages)
d) Start of demonstration farms
e) Start of village fund for specific activities as requested by Households via their focus groups (as required only in particular villages)
f) Proposed water supply/sanitation development schedule

The present approach is expected to be applied to all PIVs in the Xe Bang Fai downstream area but will adapted if necessary during the revision of the DSIP in 2009.

The livelihood team (comprised of both NTPC and GOL counterparts), initiates contact with the villages through a village profile (VP) meeting. During the VP meeting, the PIV is introduced to the NT2 Project, its possible impacts to their village and how the Downstream Program of NTPC aims to provide development opportunities to the PIVs. During this consultative information dissemination session, the PIVs produce a master list from the menu of preferred livelihood options based on their interests and present initiatives.

A second consultation is then conducted to analyze the risks associated with the proposed livelihoods. This activity determines if the specified livelihood suits the village's environment and which of these can be conducted within the budget provided. This analysis also focuses on how the proposed activities relate to the District Development Plan. While the livelihood options identified are accessible through the village fund scheme, the Downstream Program directly funds other activities, thereby not requiring households to participate in the village fund activities (such as demonstration, extension services, grants for aquaculture small equipment and feeding and fertilizing inputs).

During the second consultation, villagers form groups for each livelihood component and nominate a few representatives to conduct the field testing of the livelihood. The representatives are identified as the most capable individuals that can demonstrate how to implement the new technology or newly introduced livelihood. This demonstration component is viewed as a means to prove success and learn lessons within each component.

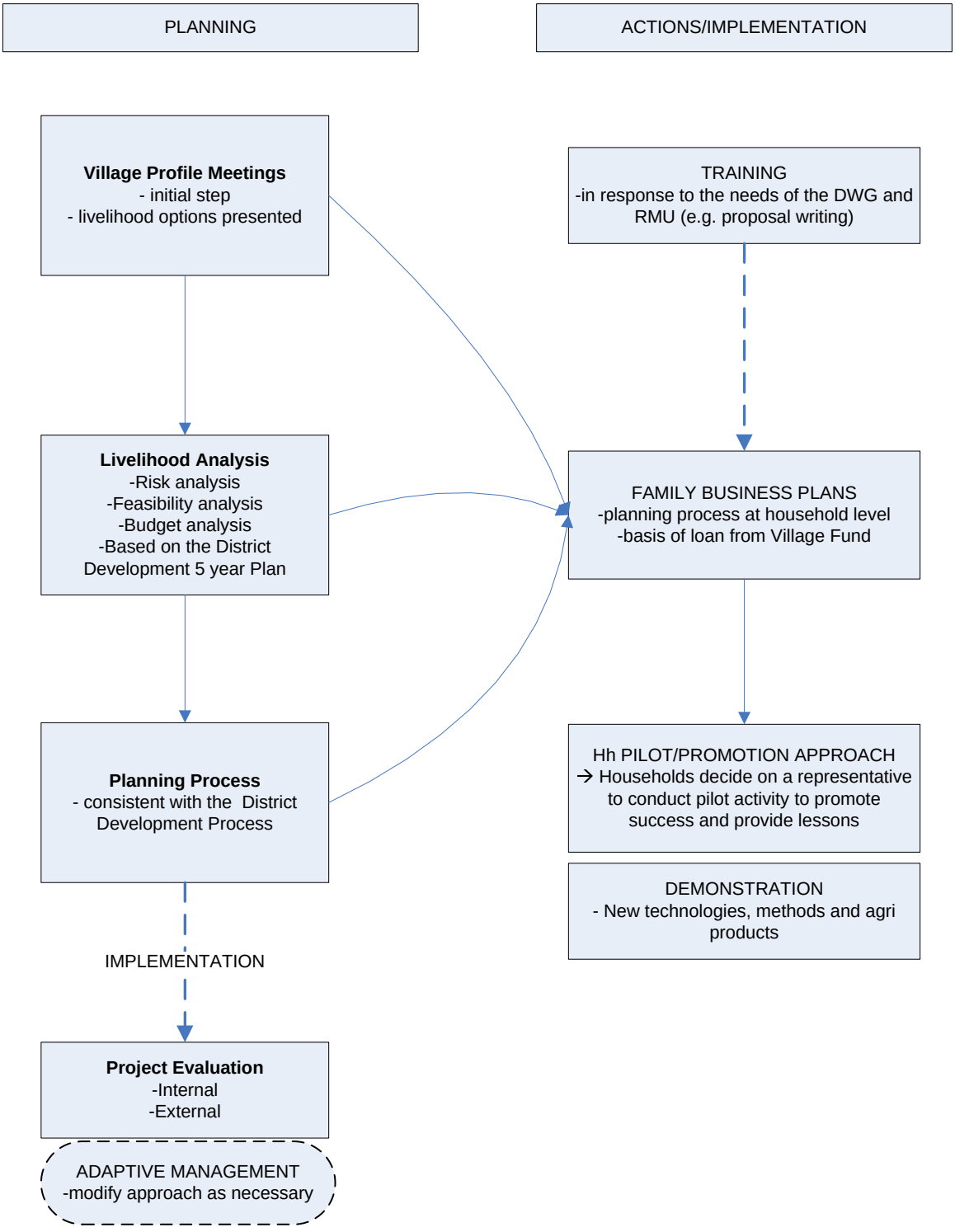
A third consultation is held, which includes a participatory planning session with District authorities and technicians. This activity is aimed at building the capacity of the local counterparts, and ensures that the livelihood plan complements the present development process of the District Government.

In line with the family business plans and household pilot promotions, demonstrations of new technologies, crops and activities are also provided. The livelihood team also conducts trainings, such as proposal writing, to build the capacity of the *Village Technicians*, DWG and RMU representatives.

The household representative for each component is identified as the *Village Technician*, and will also become the Village Promoter, who serves as the trainer in new target villages to promote the activities.

The flow chart in Figure 4.5 depicts the process.

Figure 4.5. Livelihood Program Flowchart



4.3.3 Agriculture / Horticulture / Home gardens

Agriculture / horticulture

The project strategy is to try to harness the opportunities and promote adaptive management which can be realized by addressing some of the present constraints in agriculture in the Xe Bang Fai Basin Villages. This implies improving the crop production environment and modernization of crop agriculture by introducing appropriate technology such as new crops, improved varieties, integrated pest management, integrated soil-fertilizer-water-seeds-seedling and pest management, suitable farm machines to increase farm productivity and to reduce production costs. This strategy is necessary due to;

i. the lack of access to agricultural extension service,
ii. the challenges of infrastructure (some areas are not accessible during the rainy season), and
iii. the need to enhance existing technology,

The essential element of the strategy is to identify feasible or model farming systems in the major production environments, for example:

- rain fed, flood prone rice-based;
- rain fed, relatively flood free rice areas;
- flood prone irrigated rice-based;
- flood free, irrigated rice areas;
- home gardens;
- horticulture;
- integrated farming; and,
- rice-fish livestock farming systems

A small number of key capable farmers are nominated per village to demonstrate the success of agricultural activities. Capacity building for effective and timely delivery or performance of essential agricultural support services and functions (e.g., seed supply, inputs distribution, extension, farmers training) will be carried out at all levels (village, district and province) for medium-to long-term sustainability of the development activities.

Home gardens

Objective:
All impacted households are entitled to be compensated for loss of river bank gardens.
NTPC will provide water supply (refer to section 4.2.2.3), training needs and some inputs for home gardens. The village will provide the land, labour, and local material, if possible:

Approach:

- Consultation with villagers on probable impact and compensation (Explanations on goal and objective) *(conducted by RMU and livelihood and Infrastructure teams of NTPC) This activity will also include:*
  - Riverbank garden registration, including owner's name (based on the census book), assets and signature
  - Form signed by head of village (as known and approved, indicating that it will be used as official document)
  - The team will conduct a survey to identify new locations for home gardens, and look into the possibility of providing a water supply system)
- The form will be sent for signatures to the district and RMU
- Design (provide different options for the design for water supply system)

- A second consultation is conducted with the villagers regarding the water supply system (details are discussed regarding construction, investment, contribution from villages for construction, selection of appropriate design)
- Implementation (*Construction of water supply system by infrastructure team)*
- A third consultation will be organized for home garden by NTPC/DWG livelihood team (village assessment for home garden)
- Provide training and other inputs needed *(by NTPC)*
- Follow up progress of the new home gardens *(by RMU, NTPC, DWG)*
- Review, and evaluate result of the home gardens *(by RMU, NTPC, DWG)*

At the time this document was prepared, registration of riverbank gardens has been completed for 13 villages. Pilot activities are expected to commence by late April 2008.

4.3.4 Livestock

Most of the households consider livestock as a method of saving for contingencies and extra expenses in times of sickness or food security (rice) or extra expenses for livelihood improvement. Water buffaloes and cattle could be considered as long term saving account, while pigs as a medium term, and poultry or ducks as immediate cash income. This approach to livestock husbandry has three consequences in terms of herd management:

- The livestock management is oriented to assets conservation instead of livestock production; the villagers don't rear livestock to make money by selling animal products but instead to save their assets. The number of animals is thus more important than their productivity.
- As livestock are not grown for commercial goals but as a way of saving the existing assets, Households are generally reluctant to invest in inputs to enhance their production level. The goal for livestock raising is to secure or to optimise the live capital instead of the production. For large ruminants, for example, largest males are usually sold first (to make more money) and the smaller ones are kept for rearing. Through this approach the Households adopt a regressive or decreasing breeding scheme.
- The sale strategies are also strictly linked to their needs and to the protection of their overall assets. For example Households often prefer to sell all their animals when a threat occurs such as disease or a lack of feed. There is limited knowledge or foresight regarding the importance of vaccination to protect animals against disease or to buy extra feed in times of a flood or drought. For example, the sale of one chicken may allow the protection by vaccination of 100 others. Similarly feed procured before a flood can save a large number of animals. In some villages half of the livestock is sold at very low prices before a flood because of the fear of losing all animals due to feed shortage during the flood.

Livestock could incur indirect losses due to lower feed availability from increased frequency of additional floods. The activities are intended to be more an additional support to general enhancement of livelihood in the downstream than compensation for an uncertain impact.

The lack of animal feed, animal health knowledge and access to capital are the main constraints for livestock development in the NT2 downstream area.

The goal of the livestock component is thus to focus first on animal health and the transfer of knowledge for local improved feed provision. These issues must be addressed not only at the village level but also for the total area covered by the NT2 impacted districts. The related training and other inputs lessons learned for the 20 villages would be extended to the whole project area. Animal health actions will bring benefits to all the Households and relatively more to the poorest. These actions will thus be strongly promoted as a priority with adequate support to enable access for the poorest.

Accordingly, the project is also introducing and promoting new and more intensive rearing practices which include new breeds through the demonstration activities. In addition, for ruminants, priority will be given to cattle to improve their low productivity.

The activity will thus consist of several packages, available through both the village funds and demonstrations:

a) Vaccination of all animals against disease
b) Development of improved raising techniques for pig, cattle and goat
c) Development of several demonstrations for pigs, for production purposes showing the use of improved breeds, proper feed and maintaining vaccination and other health maintenance requirements.
d) Promotion of forages for cattle and pig feeding

Budget

Pre-COD budget:
Agriculture / livestock activities began in the 20 pilot villages in 2006 and have been increasing both in intensity and in the number of target villages since then. A budget of **$70,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of $330,000 has been established to support post-COD activities.

4.3.5 Aquaculture

Consultations conducted by Schouten and Inthavong in the Xe Bang Fai basin showed that the existing pond culture of the area is extensive fish culture. Fish yields from extensive fish culture relies heavily on the successful drainage of water, and it has been observed that ponds that cannot drain by gravity, or require pumping for drainage, exhibit low yields due to uncontrolled populations of pests such as water bugs, tadpoles, frogs and predatory fish. Moreover, fish ponds can experience drastic reduction of water levels and water volume during the dry season causing increased concentration of accumulated metabolites especially when low water volume coincides with high standing fish crop. Low water volume can also cause an increase in water temperature beyond the range for optimal fish growth.

The conditions in Xe Bang Fai River Basin are then not considered as being optimal for the development of commercial fish pond culture by Schouten and Inthavong with existing fish pond yields being very low (200 kg/ha/year) and only fish pond culture on subsistence level using no fertilization and only occasionally termites and ants as feed.

The consultations conducted identified that there is still room to improve the conditions in which fish culture is practiced, and technical knowledge must be enhanced to maximize the potential. The low quality of fish seeds presently available and the scarce use of complete (expensive) feed from Thailand have also been identified as key issues in successful fish culture.

The aquaculture section of the livelihood component aims to provide and assist with the following:

1. Assess vulnerability to floods of existing fish ponds and propose levee construction for selected ponds to extend the production period.
2. Fish pond construction—pond construction, both excavated unlined ponds and concrete tanks (for catfish raising) are accessed through the Village Fund Scheme. The Downstream Program also directly provides free of cost to participating households

- materials for pond development (such as lime and urea)
- basic equipment (such as flood protection netting, nursing cage netting) and
- inputs for the first cycle (fingerlings and feed material for nursing).

The quantities and specific materials provided to each household vary depending on actual farmers situation (e.g. farmers who have previously done aquaculture compared with those who have no experience) and household plans regarding the type of aquaculture. The Downstream Program provides these initial inputs to reduce the initial investment cost for the farmer, thereby making repayment of village fund loans easier and also provides strong motivation for farmers to nurse the fingerlings, rather than directly releasing them to the pond, thereby improving the likelihood of the aquaculture activity being successful.

Households are also provided with on-the-job training and technical assistance to promote proper methods in fish raising.

3. A technical feasibility analysis including a soil analysis of potential fish ponds to assess the soil suitability for fish ponds. Special attention will also be paid to the improvement of pond bottom for speeding up bottom sealing and reducing water seepage.
4. The fisheries co-management consultant will be asked to discuss with aquaculture team the possibilities to use some of the natural ponds and wetlands for aquaculture purpose. Further flood protection around these natural ponds / wetlands will be considered at the same time.
5. Technical assistance with Extensive and Integrated Fish Culture—Assistance is provided through training and the provision of technical assistance in improving methods utilized in fish culture. On-the-job training on spawning, hatching, nursing, grow out and biofertilizer is conducted to increase capacity.
6. Catfish hatchery — This activity aims to provide quality fingerlings locally for distribution in cooperation with organizations such as LARRec, Lak 4 hatchery center and Pakbor Hatchery Center.
7. Indigenous fish species production—Indigenous fish raising is promoted and training is provided to produce locally raised fish of good quality.
8. Technical Information Centre—a technical information centre per district is to be established as a centre for information dissemination. This establishment is the point of technical exchange in each district.
9. Local fish feeding technical training—Fish feed is mainly imported from Thailand and is usually in high demand, inflating prices. The aquaculture component provides training and technical instruction on how to produce local feed utilizing local materials to reduce reliance on imported feed. Establishment of small scale feed production units for both fish and livestock is considered.

Budget

Pre-COD budget:
A budget of **$95,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of **$185,000** has been established to support post-COD activities.

Note that the expenditure identified for Aquaculture pre-COD is for demonstration programs as discussed above. Once the demonstrations are operational and well established, these will be scaled up for post COD.

4.3.6 Natural Fisheries Co-Management

For the purposes of the Downstream Program, the natural fisheries co-management is defined as:

- a partnership arrangement in which government, the community of local resource users and external agents and other resource stakeholders share the responsibility and authority for the management of a resource

- covers various partnership arrangements and degrees of power sharing and integration of local (informal, traditional, customary) and centralized government systems

- partnerships are pursued, strengthened and redefined at different times in the management process, depending on the existing policy and legal environment, the political support of government for community-based initiatives, and the capacities of community organizations to become partners.

The Fisheries co-management component is in the detailed design phase. External support is going to be recruited in the early second quarter of 2008 to work with the Downstream Program including all stakeholders (RMU/DWG/Village) to define the parameters of the fisheries co-management program. Consultancy should be completed by end of June. Activities shall include, but not be limited to:

1. Program Design
    a. Program Organization—key players, key staff, staff requirements, overall scope and aim of the program,
    b. Program budget—overall budget with breakdown into specific line items as provided but not limited to the following: personnel, equipment, transportation, per diem, misc.
    c. Program schedule—Overall schedule with breakdown to specific villages for all activities, as provided but not limited to the following: planning, workshops, activities, misc.
    d. Technological design— Methodology, procedures and technological needs of the program
    e. Logistics- All foreseen logistical needs of the program.
2. Stakeholder identification

    Stakeholders and agencies involved in fisheries co-management in the Khamkeut, Gnommalath, Xe Bang Fai, Mahaxai, Nongbok and Xaibouli districts are to be identified.

    a. Stakeholders—who are the stakeholders/agencies involved in fisheries co-management
    b. Roles and Responsibilities- the identified roles and responsibilities of each stakeholder/agency
    c. Interest—identified interest of each stakeholder/agency
3. Regulation identification

    Presently implemented key laws, decrees and regulations that are relevant to fisheries and wildlife, with particular focus on community level regulations in the project areas are to be identified.

4. Technical advice and assistance
5. Coordinate with relevant government agencies

    The Consultant will coordinate with all related GOL agencies to produce the program design, stakeholder identification, regulation identification and any other activities related to fisheries co-management.

The key role of GOL agencies as equal counterparts in NTPC initiatives must be emphasized and all activities conducted by the Consultants should reflect this.

6. Obtain community participation

The Consultant will coordinate with all related GOL agencies to ensure community participation. The consultant will also ensure that the program design, stakeholder identification, regulation identification and any other activities related to fisheries co-management is conducted with the participation of the community.

Acceptance of initiatives and activities are key factors to project success and the Consultant must promote and ensure community participation in all NTPC initiatives.

7. Provide information in the preparation and modification of implementation strategies in line with NTPCs adaptive management approach.

The Consultant will provide input to enhance and update the implementation strategy of the DS Program. The consultant shall provide information for the preparation and modification of implementation strategies in line with NTPCs adaptive management approach.

Co-management has been identified as an effective tool in resource management that involves all important stakeholders. This method ensures collaboration and cooperation of all users and supports the decentralization of management responsibilities to resource user groups. The following key steps are expected to be utilized in the detailed planning phase (but may be revised according to the specialist consultant's inputs) for implementation:

Step 1: Site Selection

- Identify villages with potential to participate in fisheries co-management
- Invite the village to participate and provide information on co-management process
- Identify the area (habitat) to be included in the management plan

Objective	Activities	Who is Involved
Invite people to participate in co-management	• site visit to explain co-management • interview expert fishermen • provide information about the project	• village authorities • expert fishers • DAFO • PAFO • DLF

Identifying and inviting villages to participate in fisheries co-management can be a complex task that involves time and consideration to identify all of the stakeholders and understand the issues. A process that excludes legitimate users of the fishery could lead to ineffective enforcement of regulations. Similarly, the lack of will or social cohesion within a community can jeopardize the effectiveness of the process. It must first be determined if there are fishery resources worth managing and then determine of if there is sufficient understanding and support from the users of the aquatic resources to participate in co-management.

Step 2: Fisheries Data Collection

- Examine local knowledge of fisheries
- Collect baseline information on fisheries and livelihoods

Objective	Activities	Who is Involved
• Use local knowledge to understand current issues for fisheries that are unique to each village • Generate information on fisheries that can be used for management	• PRA • Habitat survey • Develop an inventory of fishing gear, fish species, migratory information	• village authorities • expert fishers • DAFO • PAFO • DLF

Step 3: Assign Responsibilities for Co-management

- Define the roles and responsibilities for co-management between the village authorities and DAFO/PAFO

Objective	Activities	Who is Involved
• Determine the people responsible for reporting on the co-management agreement	• Village meeting to explain the roles and responsibilities • Assign a person or group responsible for communicating with DAFO	• village authorities • DAFO • PAFO • DLF

Step 4: Establish Draft Regulations for Co-management

- Follow a participatory process that includes expert fishers to draft the village regulations for co-management

Objective	Activities	Who is Involved
• Assist the village in drafting the regulations for fisheries co-management	• Village meeting to explain how regulations could be developed and who should be included • Discuss the draft regulations with people in the villages, expert fishers, neighboring villages • Record the feedback from the different groups of people	• village authorities • expert fishers • neighboring villages • DAFO

Step 5: District Approval of Fisheries Co-management Agreement

- District government approval of village regulations on fisheries co-management

Objective	Activities	Who is Involved
• Get the approval of District Government for the village regulations on fisheries co-management	• Village meeting that includes all the villages involved in the agreement (including expert fishers)	• village authorities • expert fishers • DAFO • PAFO • DLF

Step 6: Identify Rural Development Activities in Support of Co-management

- Identify possible village development activities in support of rural livelihoods and fisheries co-management

Objective	Activities	Who is Involved
• Identify village development activities that would support the co-management agreement	• Village consultations to understand the strengths and weaknesses of each village • Consultations with other rural development projects to identify partners	• village authorities • DAFO • PAFO • DLF

Step 7: Develop Participatory Monitoring and Evaluation Methods (PME)

- Develop methods for fishers and DAFO to monitor and evaluate the impact of co-management on freshwater biodiversity, habitat, and livelihoods

Objective	Activities	Who is Involved
• Monitoring and evaluation of co-management by the fishers, village authorities and government • Develop an action plan for PME	• Village workshops to determine methods for PME • Training needs assessment for PME • Training of key people involved in PME	• village authorities • expert fishers • DAFO • PAFO • DLF

Budget

Pre-COD budget:
A budget of **$25,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of **$225,000** has been established to support post-COD activities.

4.3.7 Handicraft

Indigenous crafts and practices, though not identified as a livelihood that can substantially increase or maintain income are included in the livelihood restoration options. These activities target individuals that have restricted access to other livelihood options and this also maintains and preserves cultural heritage. Indigenous crafts and practices, such as textile dyes, dyeing, weaving are usually carried out and produced by women, some of which have neither opportunity nor access to venture into livelihood options that require intensive labour or activities that are far from their home. The handicrafts component aims at providing women with the opportunity to create income, provide women with non-reproductive activities and maintain the cultural heritage of weaving in Laos.

Strategy:
Handicraft and particularly weaving is not a very common activity in the target villages. There were several issues to address for helping women to develop handicraft sustainably. The strategy, supported by a part-time consultant, has mainly consisted in:

- Organizing the production groups
- Improving tools and producing them locally by motivating the men
- Training villagers to identify and use village natural resources for producing natural dyes
- Improving designing and weaving skills
- Training group members on marketing issues
- Supporting groups to market their products inside and outside their village

Results:
Significant results have been reached:

- Some villages are already autonomous for what concerns the marketing
- Groups are able to produce natural dyes, and improve regularly the quality
- Groups have gained more skills through exchange visits with other villages
- Networking inside and outside participating villages about handicraft marketing
- Groups have learnt how to promote and sell their products during festivals

Current issues

- Too many inputs are still coming from outside the village
- Particularly little handmade cotton is locally available. It is mixed with industrial cotton bought from Vientiane
- The quality of the product is still too low and many aspects need further improvements: use of handmade cotton, design, quality of natural dyes
- Transportation and logistics for handicraft marketing is still supported by NTPC

Program
The program of activities for the next months aims at lifting these problems and developing networking. Extension is also considered.

- Encourage the handicraft groups to plant more cotton and motivate other villagers (inside and outside the village) to do the same
- Provide further training to the handicraft groups
- Support groups to market by themselves
- Networking with district trade for support these group about logistic and transportation for handicraft activity
- Net working with tourist center at district and province level
- Assist groups in preparing handicraft products for display in festive events
- Evaluate activity at village, district and provincial levels
- Share skills and experience with other groups
- Provide handicraft training for new groups
- Use skillful members of current groups for training new groups in same or additional villages

Budget

Pre-COD budget:
A budget of **$25,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of **$50,000** has been established to support post-COD activities.

4.3.8 Marketing issues

The marketing potential for commercial production of non-rice crops and vegetables from the NT2 project area in domestic and regional markets is relatively untapped. Presently, farmers sell directly to traders/suppliers, losing the opportunity to demand for better prices. The marketing component aims to assist target farmers to link their livelihood activities to markets directly, provide networks within villages and districts to provide bulk sales and strengthen ties amongst farmers within clusters. The marketing component aims to provide target farmers with training and knowledge, building their capacity to expand to wider markets with confidence.

Marketing activities are already in place, yet they are relatively weak and require strengthening to maximize the potential within target villages. Providing assistance which in turn allows for better organization within the villages and districts, the target farmers are able to communicate and negotiate better with traders.

The marketing concept was tested on the feed corn production activity of the agriculture/horticulture component. The following steps describe activities conducted:

- An initial assessment is carried out to identify existing high potential products at district and village levels. Information is collected on the trade cycle, including product, traders, middle man or companies. This activity is led by the district trade department and NTPC project staff.
- The data gathered is then analysed and summarized identifying the high potential products and main links in the trade cycle. This activity is led by the district trade department, NTPC project staff and DAFO)
- Once identified, the team provides a venue for the traders and producers to interact and familiarize themselves with each other. Trade network meetings are organized by sub sector. At these meetings prices, quantities and quality of products are discussed in detail. This activity is led by the district trade department and project staff)
- Training is provided for producer groups on subjects related to business management and organization to provide capacity for small business venture management.
- In certain situations, producers and traders come to an agreement and the district and Downstream project staff help to facilitate the agreement between the two. This provides the target farmer with knowledge regarding negotiations and contractual obligations, skills which he or she can use for future interactions with traders.
- The trade network meetings is also a venue for the district and the Downstream Program to identify gaps in which further assistance is required by the trade farmers, either in trainings or technical support.
- Trade network meetings can be held twice (pre and post production). A third meeting can also be conducted, at the end of the cycle to evaluate the process and modify the approach as required.

Budget

Pre-COD budget:
A budget of **$10,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of **$15,000** has been established to support post-COD activities.

4.3.9 Summary Livelihood Budget

The summary budget is provided below for the activities above.

Section	Activity	Total Budget (USD)	Pre-COD (USD)	Post-COD (USD)
4.3.5	Agriculture / Livestock	400,000	70,000	330,000
4.3.6	Aquaculture	280,000	95,000	185,000
4.3.7	Fisheries Co-Management	250,000	25,000	225,000
4.3.8	Handicraft Development	75,000	25,000	50,000
4.3.10	Marketing / Trade	25,000	10,000	15,000
		1,030,000	**225,000**	**805,000**

4.4 The Village Income Restoration Fund

4.4.1 Strategy

The Downstream Program will fund the livelihood development activities essentially through a micro-finance component (called Village Income Restoration Fund) that will provide finance for PAHs to take up new or improved livelihood options, contribute to the development of a savings habit, and provide an on-going credit facility to be managed and owned by the villagers themselves even after the end of the DSP. The Village Income Restoration Fund (in short Village Fund) is established after the setup of the Village Development Committee (VDC) and is part of the VDC (refer to section 7.3.4 on VDC).

The property of the money transferred by NTPC is effectively transferred to the households but is managed by the Village Income Restoration Fund until the end of the Downstream Program.

The strategy has been designed based upon community need for finance, community capacity to manage money and future contingencies.

Existing community capacity is relatively weak and much effort will be made to facilitate the development of management capacity within the community. In order to coordinate and maximize community participation, and increase community capacity to plan, manage, and monitor, it is necessary to establish and strengthen Village Development Committees prior to establishing the Village Funds and or other activity groups.

District capacity for assisting communities on loan preparation and all village fund procedures in general is also rather weak and that is a primary task of the Downstream Village Fund team to build capacity at district level for facilitating the scaling up of the activities.

Since many villages have relatively low capacity to fully administer the village fund when it is first introduced to the village, extensive support is initially provided by NTPC/RMU/DWGs during the first phase of the preparation and approval of household activity plans. In addition to this support, NTPC/RMU/DWGs must check and approve the village fund request for initially transferring money to the Village Fund bank account.

Further in the process the Livelihood/Aquaculture team (NTPC/DWGs) take much responsibility for assisting households in preparing their activity plan and advising the Village Fund board for making decision about the villagers' requests. Authorized mandated members of board then collect the passbook from NTPC, withdraw the cash from the bank account and release the money for the borrowers.

It is believed that further village capacity building in the next 5 years would reinforce the VDC/VF autonomy and allow to simplify the current procedures. The decision level could slide progressively from NTPC/RMU to DWG and VDC. Ultimately, in a proper exit strategy one could think to decentralise fully the VF decisions to the VDC and the auditing authority to the district (District Finance Office). Village Funds team will work more closely with the Livelihood team for further district and village capacity building for the preparation of the household/focus group activity plans.

4.4.2 Setup of Village Fund

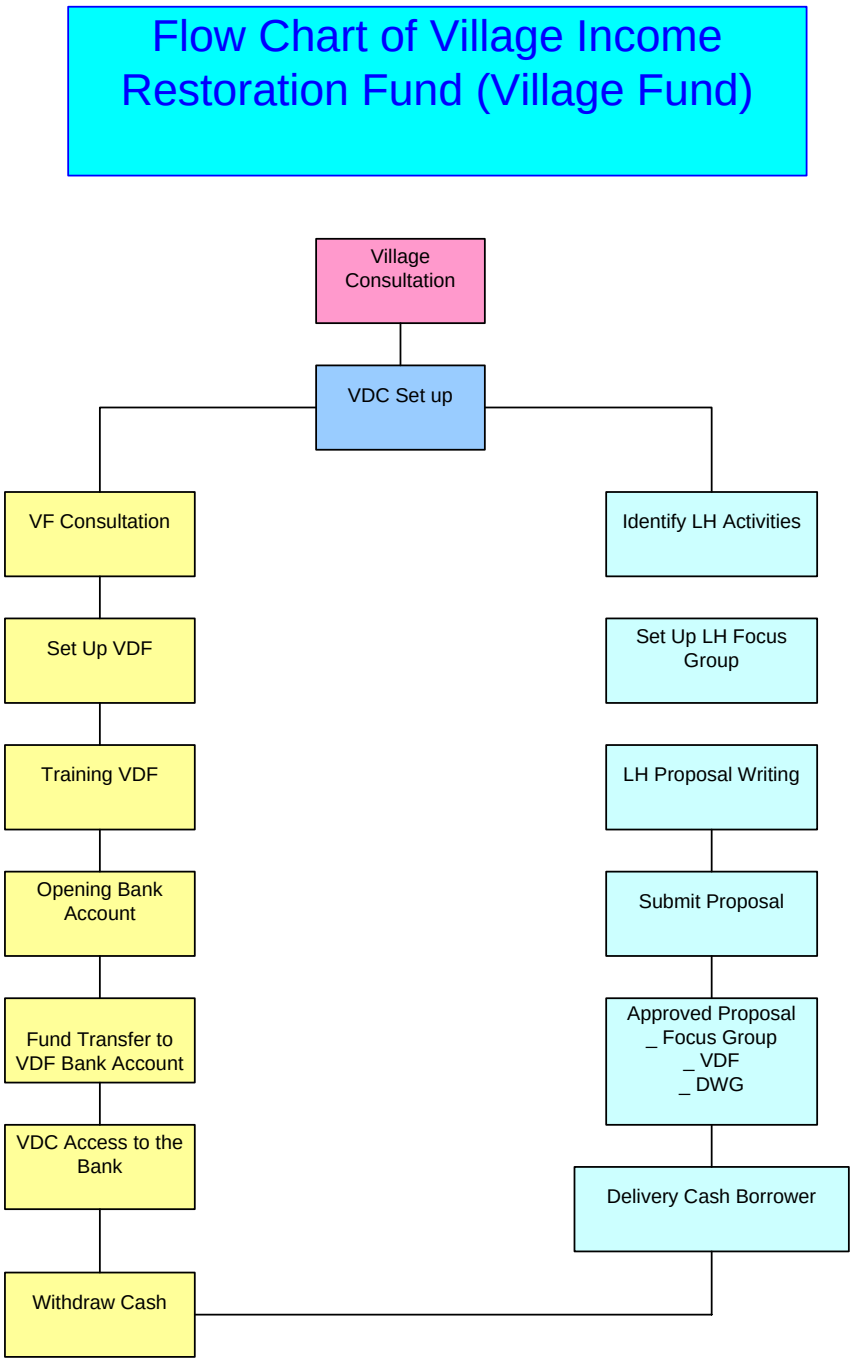
Setup goes through the following steps (see next flow chart):

- Consultation meeting: dissemination of village fund objectives, reaching agreement with villagers and village authority, searching for candidates to the village fund board
- Establishment of the village fund board through free election

- Training course on accountancy system and village fund management for village fund board

Afterwards the Village Fund team provides monthly on-the-job training about accountancy and fund management.
Annex 5 contains the general policy and principles for Village Funds, which were drafted by the Village Fund team assisted by the Livelihood team, and used for the setup of the Village Funds in original 20 pilot villages and the additional 22 Xe Bang Fai villages where activities have started during the dry season 2007-2008.

Figure 4.6. Flowchart of Village Funds Setup and Management



4.4.3 NTPC disbursement for village funds

Allocations to the twenty Pilot villages have been made through the second half of 2006 and first half of 2007. Allocation of 50% of the amount due was done for the additional 22 Xe Bang Fai villages of the second round and further allocation (the remaining 50%) is being considered to a large number of villager requests for expanding the village fund to full funding levels prior to COD.

After creation of the VDC, Village Funds will be established in 8 additional riparian Xe Bang Fai villages before COD.

4.4.4 Arrangement for loan distribution

- Village Fund board together with livelihood team conduct meeting for identifying interested villagers and form focus groups
- Villagers prepare activity plans with the help of livelihood team (NTPC/RMU/DWG)
- Activity plans are approved at village level by focus group leader/VF board/DWG
- Representative of village fund board meet NTPC village fund team to get passbook and withdraw cash from village bank account
- Village fund board deliver cash to borrowers

4.4.5 Assessment & modification of the village fund component

After 2 years of development it seems appropriate to evaluate the strategy, the operations and the results of the village fund component. The assessment and subsequent modification is expected to proceed as follows:

- *Detailed review / assessment:* A consultant will be engaged to evaluate the current village fund system and provide short term recommendations (for improving the functioning of the system in assisted villages) and proposals for a long term strategy. All stakeholders will be engaged during the review process including NTPC, RMU, DWGs and villagers. The consultant's review may recommend reinforcing the current DSP team (NTPC / RMU / DWG) to engaging the assistance of a dedicated micro-credit institution, and / or result in the involvement of the commercial banking sector.

- *Review of recommendation:* Recommendations made by the consultant will be presented and discussed in a workshop with all concerned stakeholders.

- *Implementation of change:* Following agreement on required changes (*if any)* to the village fund component of the Downstream Program, implementation of change will be done as follows:
    - 8 new riparian villages will utilize the revised approach
    - Changes will be introduced in the existing 20 pilot villages and 22 additional Xe Bang Fai riparian villages where the village fund has already been implemented.

4.4.6 Limitations of current Village Fund regarding poor & vulnerable households

The lessons learned from former village revolving fund experiences in Lao PDR and elsewhere show that the credit is most often used by the middle income households, less by better off household (they do not really need it) and even less (if any) by the poorest households (they lack confidence, essential inputs like labour force and fear to get indebted).

As all impacted households should be compensated the Downstream Program plans the following steps to reach this objective:

1. Identify the poor household. DSP currently does not have that information. In new villages where DSP will start to work as well as in the first 42 villages DSP/RMU/DWGs will conduct Village Wealth Ranking and village mapping using participatory appraisal tools. This has already started in 10 Xe Bang Fai villages and the first Khamkeut village downstream of Nakai dam (Ban Khammouan). Village mapping was also done in 12 other Xe Bang Fai villages.
2. In village wealth ranking, community range all HH in one of three (or four) groups (better off, middle, poor, [poorest]) according to their perception and criteria.
3. Further discussions should be conducted with all groups (new villages) or the "Poor" group (first villages) to understand the constraints they face and their capability and interest for specific activities.
4. RMU/DSP/DWGs will analyse results and discuss possible ways to address these issues
5. Situation of poor HH and need of compensation for poor HH (other than credit in its current form) would be discussed at village level in the VDC. It is essential that other restoration actions (beyond the current Village Fund) be discussed and accepted by the whole community in order to avoid major social problems within the community.
6. Possible options for reaching the poor group could be to propose them more demonstrations, to identify and promote suitable activities (low labour and land need, low risk / low investment / fast return), to increase the grant part (compared with credit), to provide loan with more lenient conditions.
7. DSP will manage to provide closer technical support to them for insuring the success of their activity.
8. DWG staff will be further trained according to the needs for closer support and the technical capacities of district staff

5 Activities to be Implemented – Downstream of Nakai Dam

37 villages in Khamkeut District, Bolikhamsay Province have been identified as having some degree of reliance on the Nam Theun or its tributaries between the Nakai Dam and the Theun Hinboun project head pond. Data collected from profiles meetings conducted as part of the fish catch monitoring program indicates that of the 37 villages:

- 2 villages obtain over 70% of their total annual catch from the Nam Theun
- 21 villages obtain between 15 to 70% of their total annual catch from the Nam Theun (2 of which are adjacent to the Theun Hinboun headpond)
- 14 villages obtain less than 15% of their total annual catch from the Nam Theun

Individual households within the 37 villages in Khamkeut District rely to a variable extent on the fish that they catch in the Nam Theun for either self-consumption or income or purchase fish from fishermen who obtain fish from the Nam Theun River.

.

5.1 Emergency Contingency Protein Replacement Program (ECPRP)

Prior to closure of the diversion tunnel and subsequent reduction in flow downstream of Nakai Dam, an Emergency Contingency Protein Replacement Program (ECPRP) has been developed and will be implemented until livelihood and income restoration measures are effective.

5.1.1 Measures implemented

The ECPRP has multiple components, namely:

- Monitoring for reduced protein supplies following reduction in flow in the Nam Theun
    - Method 1: Long term FCM data collection and analysis
    - Method 2: Accelerated FCM data collection and analysis
    - Method 3: Food consumption monitoring
- Triggering the emergency protein support program
- Provision of emergency protein support *(provision of support must be triggered by the monitoring programs)*

5.1.2 Description of measures

5.1.2.1 Monitoring Method 1: Long Term FCM data collection and analysis

Since 2006 fish catch monitoring has been ongoing in Khamkeut District (see below § 8.6) for additional information) in 11 villages, with 55 households participating in daily FCM.

5.1.2.2 Monitoring Method 2: Accelerated FCM data collection and analysis

The FCM program (Method 1) is designed to assist with identification of impacts that operation of NT2 causes and will be used to assess whether emergency protein support is required. However, data is typically available for review several weeks after households record the daily values. To ensure that the data is available to identify NT2 impacts following diversion tunnel closure, daily household FCM data collection is accelerated (Method 2) through the following steps:

- Daily fish catch forms will be collected from participating households on a weekly basis
- Data for seven variables monitored through the daily FCM program (Method 1) will be entered into a database upon receipt of the field forms. Variables include, total kilograms of fish recorded for fish:

1. from the Nam Theun
2. from tributaries to the Nam Theun
3. from wetland and stream and other habitats
4. used for household consumption
5. sold to traders
6. sold within the village
7. processed (fermented / dried) or given to others as gifts

- Data will be reviewed on a weekly basis to identify adverse trends in fish catch.

5.1.2.3 Monitoring Method 3: Food consumption monitoring

During February and March 2008, NTPC (Health Program Management Unit and Downstream Program) jointly designed a food consumption monitoring program with the RMU and Khamkeut District Government officials (including from the District Health Office, Lao Women's Union, and Department of Agriculture and Forestry).

The food consumption monitoring program includes 7 of the potentially impacted villages in Khamkeut, with a total of 53 households participating. Households have been selected to represent different groups within each village, namely frequent fishers, occasional / average fishers, infrequent fishers, non-fishing households, and poor / vulnerable households.

Participating households are required to record food consumed each day for the household, separated by meal. Specifically, households record:

- Type of food eaten
- Source of food item (caught, raised purchased, given), and if wild fish, the source (Nam Theun, tributary, wetland, etc..)
- Approximate amount for each item
- Number of people sharing the meal

Forms are collected by the health centre and district health office each week, who have received training on the monitoring program prior to implementation. At the time of collection, the health officer will review the data provided, address any issues the households may have regarding their participation in the monitoring program, and speak with village authorities and villagers regarding overall conditions in the village.

Upon collection of the forms, the forms (or keyed data) will be provided to NTPC and the RMU for analysis. In June 2008, a meeting will be organized between the DHO, NTPC and RMU to discuss the status of the monitoring program and to identify ways that the program may be improved, with changes being made as necessary.

5.1.2.4 Triggering the emergency protein support program

Should either one of the last two monitoring methods described above (accelerated fish catch monitoring and food consumption) identify negative trends in protein security in the village being monitored, other villages in the same area which are not participating in the monitoring program will be investigated to assess whether these villages are also experiencing similar problems.

At the same time, representatives from the NTPC, the RMU, DHO and other Khamkeut Government officials will meet, review the data and jointly develop an action plan as required. This review and agreement on any necessary action shall occur within 48 hours of monitoring data receipt. Should review of the monitoring data determine that any of the 37 villages are experiencing protein security problems that could possibly be attributable to the NT2 project, the RC will trigger the emergency protein support program upon recommendation from District GOL, RMU and NTPC.

5.1.2.5 Emergency protein support program

For those villages where the monitoring program has identified a protein security problem, emergency support will be provided. Protein support will not be provided to villages where an impact has not been identified.

The approach for providing emergency protein support involves separating villages into three categories based on information from the FCM village profile meetings (in Method 1):

- Villages where less than 70% of the annual fish catch consumed or sold in the village is from the Nam Theun. In these villages, only households that fish in the Nam Theun will receive support.
- Villages where 70% or more of the annual fish catch consumed or sold in the village is from the Nam Theun. In these villages all households will receive emergency support.
-

Should emergency support be required in any village, protein support will be distributed to target village(s). The type of protein support to be provided will be determined jointly by NTPC, the RMU and the DHO. It is expected that the support would include provision of dried meat (buffalo or beef), dried fish, eggs and some fresh meat / fish.

In procuring the protein support, efforts to use locally available products will be made. However, at the time of preparing this document NTPC was in the process of purchasing 10,000 kg of dried meats (beef / buffalo / fish) from other sources to be stored for use in case problems occur in procurement.

The quantity and type of support provided would depend on the impact identified and would be determined following the meeting between NTPC (DSP and HPMU), the RMU, DHO and other Khamkeut Government officials which triggered the protein support program. In accordance with Khamkeut District and GoL requests, any protein support provided will be done so with sensitivity to the issue of social equity with other villages.

Distribution within the village would be done by a village committee established for the purpose of assisting with the protein support program. The committee would be responsible for receiving supplies of protein support, distributing to households and maintaining simple records (e.g. quantities provided to which households, dates)

5.1.2.6 Key Dates / Schedule

At the time that this document was prepared, it was expected that the protein monitoring programs and any protein support will be reviewed in September 2008 and extended as required, based on the progress of livelihood activities in the target villages.

Activity	Date
MONITORING	
Monitoring Method #1 (normal fish catch monitoring)	Ongoing since 2006
Monitoring Method #2 (accelerated fish catch monitoring)	1 Apr 2008 – Sep 2008
Preparation for accelerated form collection and data entry	*Mar 08*
Extraction of selected variables from historic database	*Mar 08*
Collection of daily FCM forms, limited data entry, and review of results	*April – Sept 08 (weekly)*
Monitoring Method #3 (food consumption monitoring)	Jan – Sep 08
Design of the monitoring program	*Jan* – Mar 08
Training of health centre and district health representatives by NTPC (HPMU / DSP)	*19 Mar 08*
Implementation of monitoring program	*20 Mar – Sept 08*
Data collection by households	*April – Sept 08 (daily)*
Data forms collected by district	*April – Sept 08 (weekly)*
Data analysed by DHO, NTPC, RMU	*April – Sept 08 (weekly)*
Review of monitoring program (DHO, NTPC, RMU), modifications / adjustments	*June 2008*
Review of monitoring program (DHO, NTPC, RMU), agreement on modifications / adjustments / need to continue	*Aug 2008*
TRIGGERING THE EMERGENCY PROTEIN SUPPORT PROGRAM	
Review of monitoring data (DHO, NTPC, RMU), trigger emergency protein support (on village by village basis)	*As required*
EMERGENCY PROTEIN SUPPORT PROGRAM	
Design of the EPSP	*Jan – Apr 2008*
Procurement of emergency supplies	*March 2008*
Provision of emergency protein support	*As required*
Review of program (DHO, NTPC, RMU), agreement on modifications / adjustments and whether need to continue	*Aug 2008*
Preparation & approval of continued ECPRP	*September 2008*
Extension of ECPRP	*As required*

5.1.2.7 Budget

A specific budget allowance is not required for the ECPRP from the Downstream Program budget as it will not be used to purchase any protein replacement that may be required. NTPC will provide any required funds for this activity from the same NTPC budget as the Nakai food supplement program.

5.2 Livelihood and Income Restoration Measures

The Downstream Program will implement livelihood and income restoration programs in all 37 target villages but will focus in the immediate period on those villages which have been assessed to be likely

to experience impacts first due to heavier reliance on Nam Theun for fish and aquatic products for household consumption or sale within the village or to traders. These villages are listed in Annex 4.

5.2.1 Measures to be implemented

The Khamkeut livelihood and income restoration strategy involves the following steps (for each village):

- Initial village consultation to identify villager priorities for alternative livelihood activities and collect necessary village information
- Review of initial consultation information, preparation of household activity plans followed by a draft "village action plan"
- Village consultations to present discuss and revise the draft "village action plan"
- Approval of the "village action plan" by District GOL and NTPC
- Implementation of activities, including establishment of a village development committee (as required) and subsequent review, evaluation and revision of the village action plan as activities are implemented

5.2.2 Description of steps

5.2.2.1 Initial village consultations

For each target village, an initial village consultation will be organized, during which the NT2 project will be described in general, and specific impacts on the Nam Theun below Nakai Dam will be explained in detail[1] (e.g. reduction of water, starting when, changes in water quality, expected reduction in fish, etc.). The purpose of the Downstream Program will then be explained, followed by:

- Village data collection. The day before village meeting, one member of the consultation team will meet with the village authority to obtain basic village profile data (number of households, ethnic composition of the village, information on other projects working in the village or area, the presence / status of basic infrastructure, number of hectares of rice fields, number of fish ponds, etc..). The consultation team member will also conduct field observations to verify the accuracy of the data provided.
- Wealth ranking of the village
- Discussion of potential livelihood development activities (separated into three groups: poor / average / well-off). Each group will prepare a prioritized list of preferred activities and single group discussion will further be conducted where the three groups present their lists of preferred livelihood activities
- Detailed village mapping.
- Village walks for observing resources and ways of conducting agriculture activities

The schedule of initial consultations is provided in Annex 4 and a summary of results of the first village (Ban Khammouan in Bolikhamsay Province) is included in Annex 10.

5.2.2.2 Preparation of draft "Village Action Plan"

Following the initial village consultation NTPC, together with the Khamkeut DWG and the RMU, will develop for each village a unique "Village Action Plan" (VAP).

The draft VAP will include detailed information regarding:

- what activities the Downstream Program will support in the village (following review of the preferences identified by villagers while taking into account both the technical / economic feasibility of the activity and any relevant district policies). Activities are expected to

[1] Note that the FCM has already provided information on project impacts since 2006. Initial consultations are expected to reveal reasonable knowledge from the villagers regarding the NT2 project and its impact.

emphasize short term (immediate results) but also include long term activities (e.g. livestock, where results / benefits are not expected for several years).
- the schedule for activity implementation
- identify the roles and responsibilities of all stakeholders (Villagers, Khamkeut DWG, RMU, NTPC)
- identify potential links to the emergency protein support (refer to section 5.1.1.4)
- Identify what, if any, special arrangements are required to ensure that poor and vulnerable households participate in the program
- Provide criteria regarding eligibility that are to be used to identify which households may participate (e.g. if new households move to the village, or if a household leaves the village)

At the time of preparing this document, the compensation strategy for most villages is expected to focus on livelihood restoration activities, but may include some other activities (such as water supply or sanitation).

5.2.2.3 Finalization & Approval of the "Village Action Plan"

Following preparation of the draft VAP, a second consultation with the village will be organized. During this consultation the draft VAP will be explained in detail to the village. Villagers will be asked to provide comment, and subsequently the draft VAP may be revised.

Following revision of the draft VAP, the plan will be submitted for formal approval to the village, the Khamkeut DWG, the RMU and will also be approved by NTPC. Copies of the approved plan will be provided to the village, the RMU and Khamkeut DWG.

5.2.2.4 Implementation of activities

Implementation of activities will begin in each village only after approval of the Village Action Plan. Depending on the activities selected and agreed upon for each village, establishment of a Village Development Committee may be required, as being organized for villages in the Xe Bang Fai area under the Downstream Program.

As activities are implemented in each village, periodic evaluations will be made on the progress of activity and assessment of whether additional activities are appropriate for the village. Amendments to the Village Action Plan will then be prepared and submitted for approval to the Khamkkeut DWG, RMU and NTPC.

5.2.2.5 Key Dates / Schedule

Activity	Date
Design of the livelihood & income restoration approach with RMU / Khamkeut DWG	Jan – Mar 2008
INITIAL CONSULTATION IN TARGET VILLAGES	
Workshop on initial village consultation procedures	26 Mar 2008
Initial village consultation in demonstration village (Ban Khammuane)	27 Mar 2008
Workshop on demonstration village	28 Mar 2008
Continuation of initial village consultations (5 villages)	1 to 5 Apr 08
Continuation of initial village consultations (11 villages)	Late Apr to mid May 08
Continuation of initial village consultations in remaining 17 villages	As agreed with RMU / DWG

VILLAGE ACTION PLAN PREPARATION	
Preparation of draft VAP for demonstration village (Ban Khammuane)	Early Apr 08
Review / approval of VAP for demonstration village	Late Apr 08
Preparation, review & approval of additional draft VAPs for remaining initial 16 villages	May – Jun 08
Preparation, review & approval of additional draft VAPs for remaining 17 villages	As agreed with RMU / DWG
IMPLEMENTATION OF ACTIVITIES	
Implementation of activities for demonstration village (Ban Khammuane)	May 2008 – as required
Implementation of activities for additional initial 16 villages	June – as required
Implementation of activities for remaining 17 villages	As agreed with RMU / DWG

5.2.2.6 Budget

At the time this document was prepared, an initial budget of $500,000 was allocated to livelihood development activities in Khamkeut District.
It is important to note the following:

- The overall Downstream Program budget is limited to $16 million dollars, resulting in the need to rationally allocated funding according to the impact anticipated. This will be done through analysis of the fish catch monitoring data now available for Khamkeut and the Xe Bang Fai basin.
- Operation costs for implementing livelihood activities (transportation, staff, consultancies, etc.) are not part of the budget, but rather the overall DS operation budget. RMU and Khamkeut DWG expenses are also included in a separate budget
- It is assumed that approximately 50% of the budget or $250,000 will be required to support activities prior to COD, with the remaining money to be spent post-COD.

5.3 Grievance procedure

The grievance system is being established and strengthened as required to address the needs of the NT2 project for all 37 villages by mid-April 2008 (see below § 7.3).

5.4 Miscellaneous Notes

- The Theun Hinboun Power Company (THPC) is currently planning the Theun-Hinboun Extension Project (THXP) which would result in the resettlement of approximately 800 households. At the time this document was prepared, NTPC understood that three of the 37 villages that may be impacted by NT2 are identified as potential host villages for the THXP resettlement population. NTPC understands that these host villages will receive significant investments in infrastructure and livelihood development assistance. An additionally three of the 37 target villages located adjacent or near the THPC head pond have also been identified as being included in THPC's "Downstream Program" compensation and livelihood restoration program (THPC's downstream program also includes villages along or near the head pond). NTPC began coordinating with THPC / THXP in January 2008 to avoid any duplication or conflicting developments for both the THXP resettlement host villages and also the THPC downstream program villages. It is expected that a formal agreement will be executed by GoL,

THPC / THXP, NTPC to define what, if any, activities the Downstream Program will implement in the host villages.

- The second Downstream Program socio-economic & health baseline monitoring will be organized in the coming months, including for Khamkeut District target villages (see below § 8.7).
- At the time this document was prepared, NTPC had established a "NTPC coordination office" within the Khamkeut District Government building in Lak Sao. The room has been furnished and equipped (desks, chairs, lighting, internet access, etc., to provide staff working on the Downstream Program in Khamkeut District with adequate office facilities.

6 Activities to be Implemented – Upstream of Nakai Reservoir

Located upstream of the Nakai Reservoir are 31 villages (Refer to Annex 3, "Group A") in Nakai District that have been identified as having some degree of reliance on the Nam Theun or its tributaries upstream of the Nakai Reservoir. Households within these 31 villages rely to a variable extent on the fish that they catch for either self-consumption or income. All 31 villages are located within the Nakai-Nam Theun NBCA and consequently fall within the responsibility of the Watershed Management and Protection Authority (WMPA).

The WMPA is active with a rural development programs in the entire watershed area, within which villages are quite remote with households largely relying on surrounding natural resources for their livelihood, including fisheries. The WMPA program endeavors to strike a balance between conservation and development activities using approaches such as training and paying local villagers to monitor poaching of wildlife.

Any impact that impoundment and operation of Nakai Reservoir has on the fish resources in the area upstream of Nakai Reservoir will be identified by the fish catch monitoring (FCM) program, which has been ongoing in this area since 2007 (see section 8.6), involving 41 households located throughout 10 villages.

Due to the WMPA's ongoing development programs in the area upstream of Nakai Reservoir and the desire to ensure a homogenous approach to development activities in the target villages, should any impact be identified in the watershed area, the Downstream Program will request that the WMPA address this impact as part of their on-going activities in these villages.

At the time this document was prepared, a formal acknowledgement of this arrangement was being pursued.

7 Organisation for implementation

7.1 Staffing

The PMU for Downstream Program implementation will have staff from NTPC, the Resettlement Management Unit (RMU) and the District Working Groups (DWGs). Initially, NTPC will have the largest number of staff who will assist in starting the project in the consensus work, village livelihood and the infrastructure work (water supply, flood protection and irrigation), and design the demonstrations in farm fields and livestock demonstration models.

The following teams of staff are required to support pre-COD activities:

a) NTPC will supply approximately 25 sectoral specialists, as well as a data management/ IT specialist
b) RMU staff consisting of about nine sectoral specialists (irrigation, handicraft, agriculture, livestock, justice, water supply, fisheries, village funds (2)) and a finance and accounting officer will support the NTPC staff over a period of 5 years and the finance an accounting person for 8 years
c) DWGs staff consist in each district of the following sectoral specialists over a period of 8 years:

For the 5 Districts located downstream of the NT2 power station (Xe Bang Fai basin):
- Fisheries: 2 from DAFO
- Agriculture: 1 from DAFO
- Livestock: 1 from DAFO
- Irrigation: 1 from DAFO
- Grievance: 1 from Justice office
- Water supply and hygiene: 2 from the district health office
- Village Funds: 2 people from finance district office or LWU
- assistance to Fish Catch Monitoring data collection as needed

For Khamkeut District, at the time this document was prepared it is expected that the following will be required (to be adjusted as livelihood activities are better defined during early 2008 – see Chapter 5 for more information)
- Fisheries: 1 from DAFO
- Agriculture: 1 from DAFO
- Livestock: 1 from DAFO
- Irrigation: 1 from DAFO
- Grievance: 1 from Justice office
- LWU: 1
- For FCM: 1 part-time

7.2 NTPC organisation

Adhering to the adaptive management approach utilized by development projects, NTPC is now reinforcing its internal organisation to successfully address the future activities and the new challenges;

- A full time Downstream Program Manager is assigned to this program (a separate manager was named for Project Lands). The position was filled by an international expert for the short and medium term, with a special focus on management of and support to the team, monitoring, medium and long term strategy proposals, and is responsible for directly coordinating with the GoL for matters relating to the Downstream Program. This position is envisioned to be filled by a Lao national some time after COD.

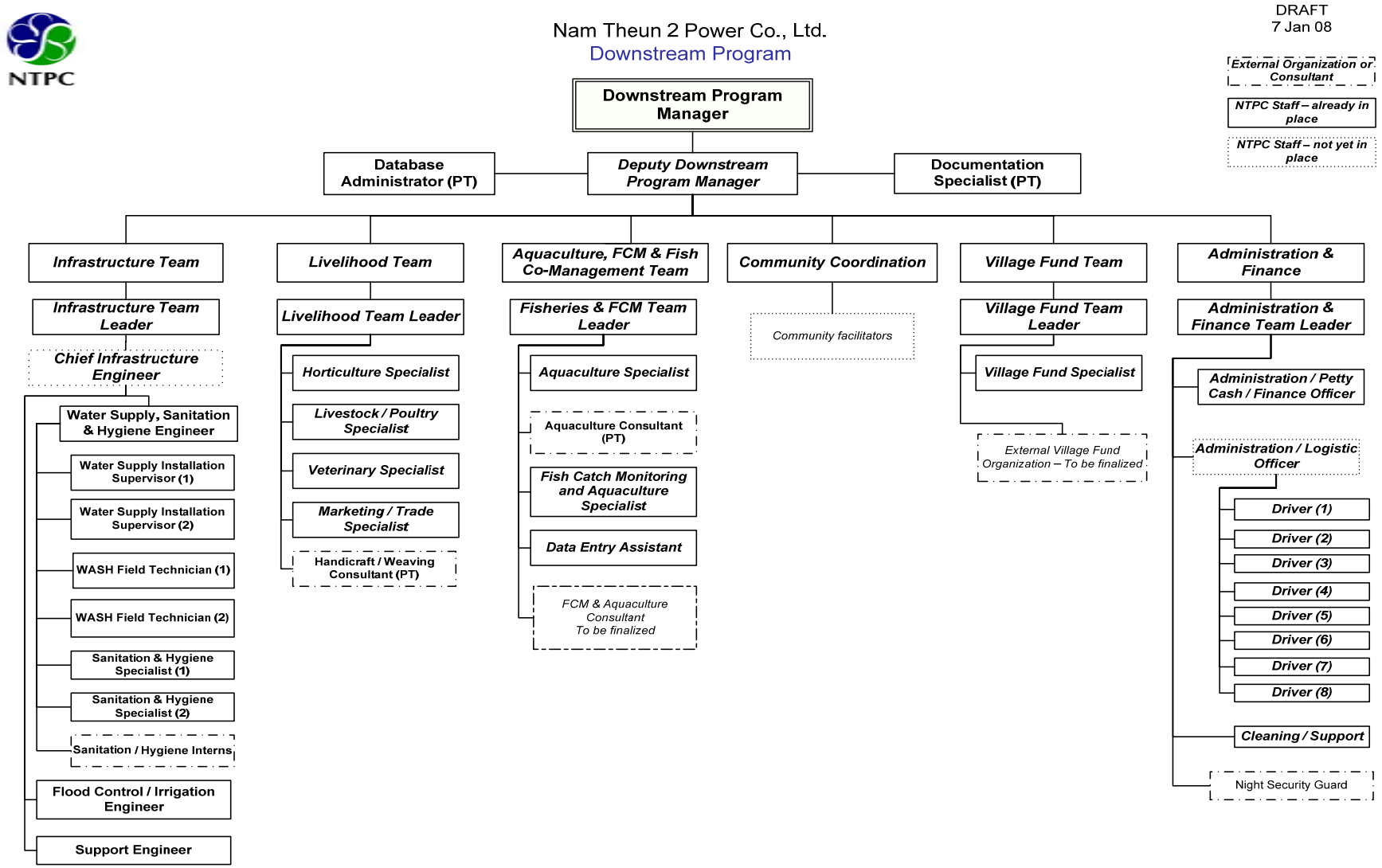
- A Deputy Manager with rural development experience has been assigned to support the team and supervise technical coordination. Until mid-to late 2008 it is expected that this position will be filled by an international expert. However prior to 2009 it is expected that the position of Deputy Manager will be filled by a Lao national.
- A community coordination team has been established to improve work coordination and efficiency at all levels: project (between teams), RMU, district and village. The community coordination team is responsible for implementing village profiles in new villages and implementing additional village wealth ranking and other participatory data collection in first 42 pilot villages. Community Coordination team would also be in charge of coordinating with VDC how to more efficiently compensate the village poor households. That team should thus become a more cross-sectoral team. The community coordination team will coordinate with RMU/DWG for the establishment of VDC.
- Village Funds/ micro finance team will be dedicated to provide further capacity building of DWG staff (2 per district) and Village Fund boards in order to reinforce their autonomy with the decision level sliding progressively from NTPC/RMU to DWG and VDC. Village Funds team would work more closely with the Livelihood team for further district and village capacity building for the preparation of the HH activity plans
- Livelihood team will be reinforced by a veterinarian. In addition to their routine tasks concerning their background field each NT2 senior livelihood team member will be in charge of 1 district for assisting and supporting DWG for work organization at village level including planning and reporting (capacity building through on the job training)
- At the time this document was prepared, the livelihood team was considering further reinforcement by recruiting and posting 1 livelihood junior staff in each target district.
- Fisheries/Aquaculture team: in addition to the 4 senior staff dealing with aquaculture (3) and Fish Catch Monitoring and fisheries co-management (1) and the data entry assistant one junior FCM and aquaculture officer is under recruitment. Further reinforcement can be considered in accordance with the proposals of the fisheries co-management consultant.
- Administration and Finance team fully supports preparation of RMU and DWGs budget planning

NTPC is also looking for several external reinforcements to enhance its present strategy.

- A consultant will evaluate the current village credit system and make short term recommendations (improving the functioning of the system in the assisted villages) and proposals for a long term strategy. It could go from a reinforcement of the current DSP team to assistance by a micro-credit institution and/or the involvement of the commercial banking sector or other option from the consultant
- A fisheries consultant will assist DSP to analyse the FCM database. In doing so assistance will build capacity in the improvement (of the design), the management, and the analysis.
- It is expected that the same consultant who assists with FCM database analysis and reporting will also assist in designing the strategy for the development and the implementation of the fisheries co-management activities
- Socio-economic survey for baseline data collection

The organizational structure of DSP could be revised according to the results of the missions and the strategic decisions that could be made.

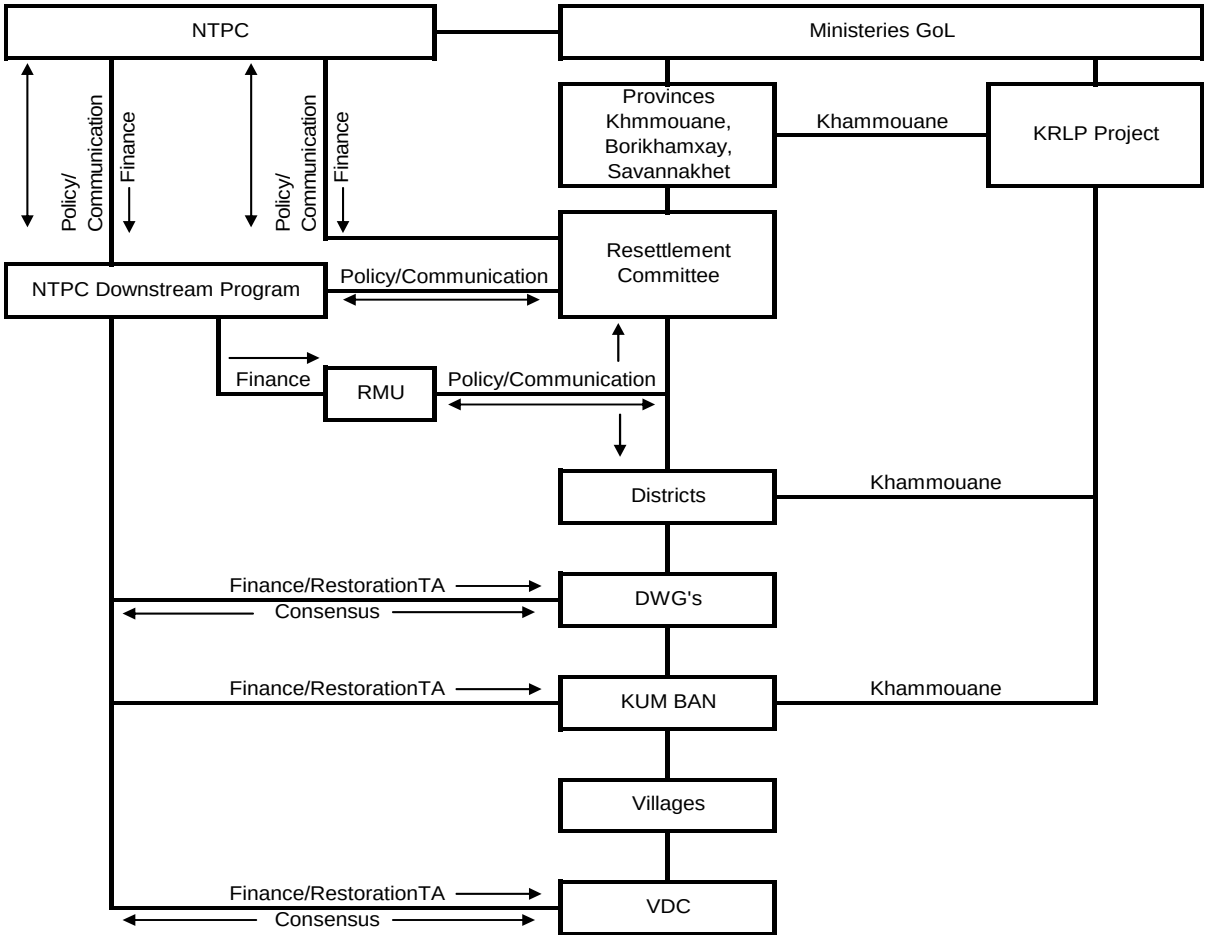
Figure 7.7. Downstream Staffing



7.3 Institutional Organization

The institutional framework for implementation is depicted in the flowchart below. It envisions the use of the Resettlement Management Unit or RMU, District Working Groups and Downstream Program office to oversee the implementation of a village level institutional structure for the implementation (VDC: Village Development Committee).

Figure 7.8. Institutional Organization for Implementation



7.3.1 RMU

The RMU contribution includes the participation of specialists in agriculture, livestock, fisheries, irrigation, water supply, community development, village funds and justice who will work together with Downstream Program team on the overall program for the impacted villages. Amongst other tasks RMU together with DWGs will establish the VDC according to the organisation structure approved by the Resettlement Committee.

NTPC-Downstream Office provides technical and logistical support to the members of the RMU.

7.3.2 District level institutional arrangements

It is essential to the grass-roots approach employed to involve the district level authorities to ensure the harmonious integration of the livelihood restoration measures with existing development plans for the affected villages. District level provides information related to NT2 impacts and is also the one that should be increasingly in charge (following capacity building) to provide and technical assistance to households, and assist, monitor and audit VDC. Increased participation of the district authorities and technicians would ensure the smooth implementation of future phases of the project and the exit strategy of the Downstream Program.

7.3.3 Village level institutional arrangements

NT2 livelihood restoration activities need to be managed and coordinated by the community at the village level. Village Development Committees (VDCs) are not a new structure to be introduced by NT2, they have been a part of the Lao development strategy for several years. VDCs may be found in many areas and projects in the Lao PDR – however implementation arrangements and the effectiveness of those VDCs in different development scenarios vary widely and not all projects establish the body.

NT2 will work through and with VDCs in each village. Some villages may have a VDC already established and in those villages without a VDC, NT2 will facilitate activities for the community to set-up the VDC. VDCs have an important coordinating and monitoring function to perform. Target villages will receive intensive development input from the NTPC and GoL over the next few years. This development impetus is initiated external to the village and subsequently there are new tasks and functions required of the village organization in order to manage this input, particularly in regards to coordination and monitoring. Activity groups (Focus groups) that are organized within target villages as well as the Village Fund (Village Income Restoration Fund) are under the umbrella of the VDC.

The Downstream Program has developed the following approach to improving livelihoods in project affected villages:

1. Set up a Village Development Committee in each village (see diagram following page);
2. Set up the Village Income Restoration Funds in villages as required;
3. Set up livelihood demonstration projects in as many villages as possible, such as (i) fish farming, (ii) pig raising, (iii) home gardens (horticulture), (iv) diversification of dry season agricultural crops, (v) handicrafts, (vi) planting Jatropha curcas for biofuel, and (vii) trading/marketing.
4. Develop a range of livelihood activities in line with the demonstrations

7.3.4 Village Development Committee

The village structure will thus include an appointed Village Development Committee to oversee the general implementation of the project responsible at the village level for:

a) Consultation / coordination and information dissemination
b) Operation and Maintenance of facilities
c) Operation of the Village Income Restoration Fund activities – as required
d) Livelihood focus groups

VDC concept is presented and explained by RMU/DWGs that help the village to establish the VDC according to the agreed organisation structure (see flow chart below). The Community Coordination team will support that process.

The VDC facilitates community meetings, planning and the establishment, follow-up and monitoring of focus groups to ensure that tasks are being attended to, such as reporting, maintenance and repairs, fee collection. In the first instance the VDC also serves to resolve conflicts and address grievances which may arise as a result of implementing activities and impacts from the NT2 project.

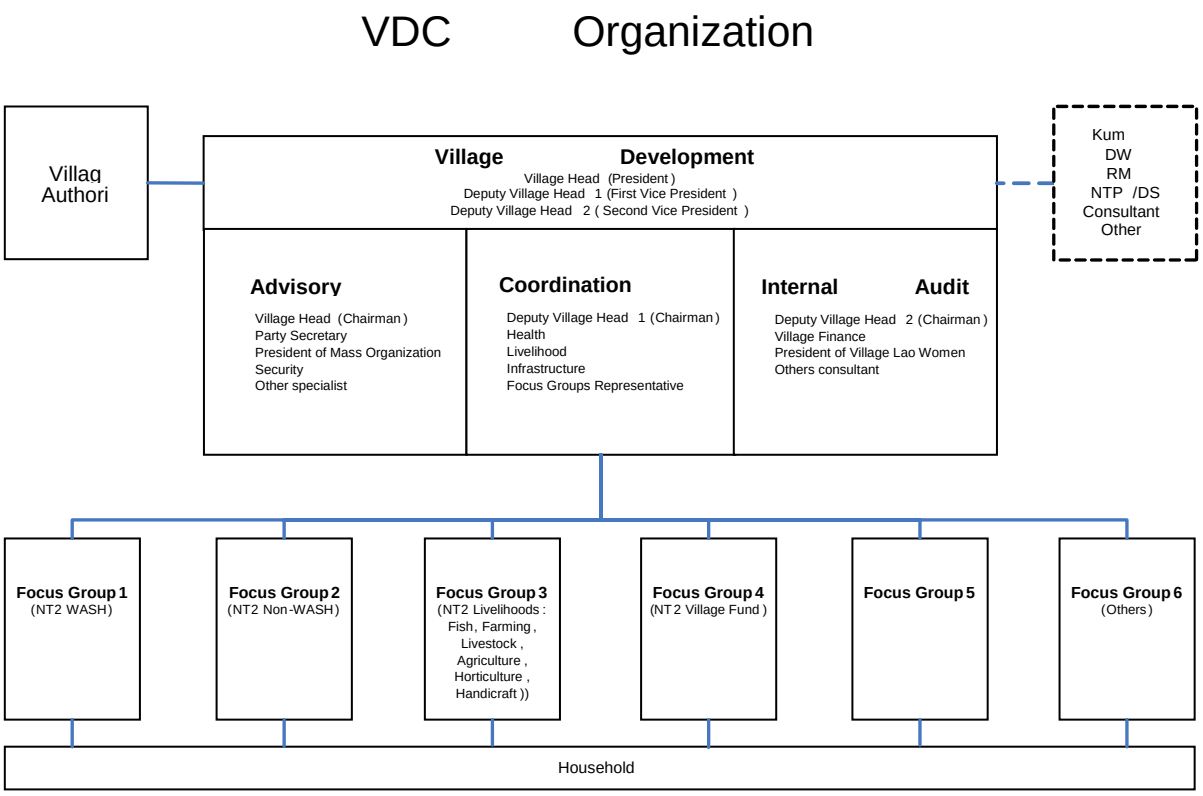
In the case of the NT2 Village Funds, the VDC will play a role in ensuring transparent and equitable management, that accounts and records are maintained accurately and are up to date, seasonal accounts are audited, that committee members are diligent and managing according to the village fund's rules and regulations.

There will be focus groups for each activity of the project (i.e., agriculture, aquaculture, water supply and sanitation, livestock, flood protection/erosion, etc.) which will include interested members of the village, village representatives, village specialists (if any) and vulnerable/marginalized households of the village. The focus groups will analyse and make detailed decisions about the specific issues related to each activity.

The VDC will also ensure that investments in infrastructure are managed sustainably by, for example, making sure that there is a sub-committee to manage, operate and maintain village water supply schemes. A pre-COD budget of 150,000 USD and a post-COD budget of 50,000 USD have been established to support activities related to training activities required for VDC establishment and operations.

The current TOR of the VDC do not implicitly include reference to the poor households but NTPC/RMU through the Community Coordination team will manage to highlight the case to VDC and discuss how to effectively reach the village poor households.

Figure 7.9. Village Development Committee organization chart



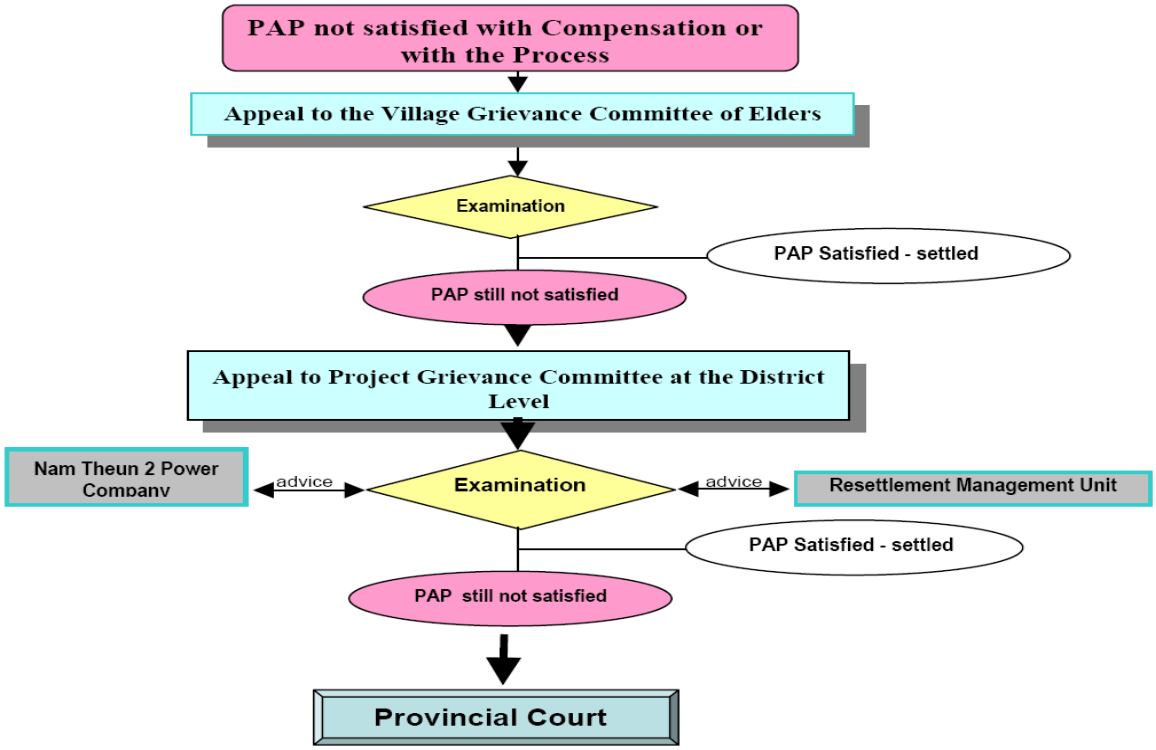
7.4 The Grievance Procedure

7.4.1 General

The Downstream Program, as with other NTPC E&S Programs, is required to assist the GOL in setting up the Grievance Procedure, which consists of Grievance Committees at Village, District and Provincial levels. The CA Schedule 4, Part 4, Clause 7, Item 7.7, requires that "all PAPs will have full access to the Grievance Procedure."

The flowchart below (extracted from the CA) depicts the procedure in broad outline.

Figure 7.10. The Grievance Procedure



The Grievance Mechanism reviews and adjudicates upon grievances submitted by any individual, firstly at the village, then at the district and finally at the provincial level, if each earlier step could not resolve the grievance. The GOL's RMU, the DWGs and NTPC will provide technical specialists or witnesses to any grievance hearing.
As depicted in the flow chart above, the basic steps to lodging grievances are as follows:

Step 1. Dissatisfied Villager:
The dissatisfied Villager prepares a Grievance Application to the VGC (Village Grievance Committee).

Step 2. VGC (Village Grievance Committee):
VGC receives the application and should complete the investigation within 15 days of receipt. After 15 days the Villager will meet with the VGC to be advised of the outcome. If the Villager is satisfied with the response the issue is closed, if not the issue will be transferred to the next level for further investigation.

Step 3. DGC (District Grievance Committee):
VGC sends the Villager's application to DGC, DGC collaborates with DSP/NTPC and RMU for another 15 days of investigation after receipt. After 15 days DGC, DSP/NTPC and RMU informs the Villager of the outcome of the investigation and the decisions made. If the Villager is satisfied the issue is closed, if the arbitration is unsatisfactory to the Villager then the issue will be transferred to the next level, possibly through the District Court.

Step 4. District People's Court & RC (Provincial Governor/ Chairman of the Resettlement Committee).
DWG will send the case file to the District People's Court & RC to investigate and make a decision. If the outcome still doesn't satisfy the Villager it will be handed over to the final level.

Step 5. Provincial Court
This is the last level of investigation. A Decision made by this court will be final and binding.

Most grievances are expected to be settled by step 3.

Although GOL takes the lead on the development and operation of the Grievance Procedure, NTPC is responsible for providing sufficient support to the GoL to enable the Grievance Procedure to be established and operate effectively. Specific activities by which NTPC will assist the GoL include:

- Develop schedule of implementation (village, district, provincial level)
- Develop organization charts, procedures, flow charts, communication materials
- Identify appropriate GoL counterparts
- Develop terms of references for different positions
- Develop budgets for supply of necessary materials
- Conduct training to RMU / District level counterparts
- Supervise DWG training of village grievance officers

In early January 2008, NTPC and the RMU began to establish the grievance procedure for all Downstream Areas. A Provincial Grievance Coordinator was appointed as the main liaison for all grievance related activities. RMU/NTPC also appointed a Grievance Advisor to facilitate the activities described above.

The detailed design of the Grievance Procedure for the Downstream areas will be undertaken, with the following targets:

- May 2008 : Grievance Procedure established in all 37 Khamkeut District villages
- By January 2009: Grievance Procedure established in Riparian Villages of the Xe Bang Fai.
- After January 2009: Grievance procedure established in Hinterland Villages of the Xe Bang Fai after Riparian Villages have been established.

Specific activities for each zone are provided below.

7.4.2 Downstream of the Nakai Dam—Khamkeut District

The 37 Villages of Khamkeut District have been prioritized for VGC establishment as reservoir impoundment will begin in May 2008. After numerous consultations and discussions, it has been established that the NTPC procedure is to be included in the GOL grievance procedure to avoid duplication and parallel action being undertaken.

Steps to be carried out to establish and strengthen the grievance procedure is as follows:

1. Data collection—NTPC together with the RMU will obtain information regarding the 37 villages to establish needs for training and information dissemination regarding the grievance procedure. The data collected will assist in RMU/NTPC in developing the following :

   a. schedule of implementation (village, district, provincial level)
   b. organization charts and procedures
   c. list of GOL counterparts
   d. Communication materials
   e. Training needs
2. VGC establishment—NTPC will provide assistance to the RMU in establishing VGCs that are not presently set up.
3. DGC training—The RMU and NTPC in collaboration with relevant GOL offices (District Justice Office, Provincial Justice Department, etc.) will provide training to the District Grievance Committee on the GOL Grievance Procedure and NTPC related grievances. This activity aims to develop the capacity of the DGC to provide training to the VGC.
4. VGC Training—The VGCs are grouped into 4 clusters.
   a. Cluster 1: Ban Phonetan, Pung, Kuanchan and Thabak
   b. Cluster 2: Man Phanmuang, Nongkok, Nangoi, Phonelom, Nongsong,
   c. Nakham, and Phonengam.
   d. Cluster 3: Ban Kohai, Phonesaat, Vangpha, Thongkae, Phonevilai,
   e. Namthi, Nongmek, Namdeun, Phonexai, Phonesi, Vangko and Nathone.
   f. Cluster 4: Ban Thongcharoen, Nongpong, Phonemuangnoi, Phonephaeng,
   g. Phiakeo, Phonehong, Senoudom, Changsawang, Nongdong, Namphao Khammouan, Ohonethong, Sopphuan and Dongbang.

The structure of the training will provide the villages within a cluster to establish a support network for knowledge and experience sharing and administratively easier.

A number of meetings, workshops and consultations will be provided to address the GOL grievance procedure, NTPC related grievances and proper recording and documentation of all NTPC related grievances.

Data collection, consultations and the establishment and training of VDCs will occur before April 2008 to provide the villagers with a functioning grievance mechanism prior to impact.

5. Information dissemination—Continued information dissemination campaign will be conducted to ensure all 37 villages are providing the following information :
   a. NT2 related impacts for Downstream of the Nakai Dam (mainly related to fisheries)
   b. The grievance redress mechanism—the Grievance mechanism of the GOL and the NT2 component.
   c. Grievance procedure protocol—how to submit a grievance and how it will be addressed if it is a relevant NT2 related grievance.

This activity will ensure that all Project Affected Villages have equitable and transparent access to the grievance procedure. This activity will be ongoing from April 2008 onwards.

7.4.3 Downstream of the NT2 Power Station—Xe Bang Fai

Grievance Procedure related activities for Downstream of the NT2 Power station riparian villages (82 villages) are to be established by January 2009. These activities will be based upon lessons learned and systems set up during the establishment of procedures, systems and protocol for the Khamkeut District.

Grievance Procedure related activities for Downstream of the NT2 Power station hinterland villages (101 villages) are to be established after riparian villages are established.

8 Monitoring and Evaluation

As part of its CA obligations, the NTPC is required to compensate for livelihood impacts in the downstream areas due to project operation. In order to achieve this, the NTPC has designed and implemented a number of activities.

As well as implementation, NTPC is required to establish internal monitoring of these project activities and targeted physical processes and biological systems within the downstream areas pre and post COD. In addition, NTPC benefits from extensive value added input during monitoring missions which comprises LTA, POE, IAG, IFIs and NGOs as well as independent monitoring by the IMA.

The present section on monitoring & evaluation of E&SD activities relates to a component of the entire monitoring framework and concerns specifically internal monitoring & evaluation of Downstream Program data collection, data entry and analysis by NTPC for the requirement of the CA with respect to:

1. Implementation of monitoring
2. Independent Monitoring & Evaluation
3. Physical Monitoring – Xe Bang Fai Riverbank Erosion,
4. Physical Monitoring – Water Quality
5. Physical Monitoring – Hydrology and floods
6. Fish Catch Monitoring
7. Socio economic status and health of villagers in downstream areas,

8.1 Independent monitoring

An IMA for the Downstream Program was appointed by the GoL in November 2007. The IMA monitoring is described in full in the Monitoring Framework Document.

8.2 Physical Monitoring - Xe Bang Fai Riverbank Erosion

The Xe Bang Fai Riverbank Erosion Monitoring Program (REMP) is a multi-faceted monitoring program that is being implemented to :

- Allow assessment of what impact operation of NT2 has on Xe Bang Fai riverbank erosion, through the collection of pre-NT2 discharge baseline data and calculation of the pre-NT2 discharge rate of riverbank erosions and later comparing this data with rate of post-NT2 discharge riverbank erosion. This is done in collaboration with EMO.
- Assist in preparing contingency plans to be implemented if NT2 impacts riverbank erosion planning.

The REMP has five components

- Cross sectional surveys
- Suspended solids measurements
- Photographic evidence (video / photograph)
- Aerial photograph / satellite imagery analysis
- Critical infrastructure monitoring

8.2.1 Cross Sectional Surveys

Cross section surveys for the Xe Bang Fai and Nam Kathang / Gnom river channels are undertaken using common topographic surveying instruments (total station, auto-levels, tape measures). Measurements are made several times over many years, using the exact same locations. Concrete benchmarks established and maintained at the top of both riverbanks to ensure consistency in the survey location.

Cross sectional data allows identification of trends in riverbank erosion through analysis of quantitative data, but since cross sections are measured at a discrete number of points they can not quantify the overall physical impact of riverbank erosion

To date, cross section surveys have been completed in 1995, 2001, 2002, 2004 and in 2007. In May 2008 a review of the cross section survey data will be undertaken. Additional cross section surveys are expected to be completed in late 2008, early 2009, early 2010 and early 2011.

8.2.2 Aerial photograph / satellite imagery analysis

Historic aerial photograph and satellite imagery is available for many portions of the Xe Bangfai river. The Downstream Program is currently working to identify and collect this information. The imagery will be analyzed to identify long-term trends in erosion in the Xe Bangfai to improve overall understanding of riverbank erosion and migration.

8.2.3 Suspended Solids analysis

As part of the water quality monitoring work being done in the Xe Bang Fai (refer to section 8.3), suspended solids are measured at multiple sampling sites. The Downstream Program is currently working to collect this information into a single database to enable trend analysis of the historical suspended solid concentration throughout the Xe Bangfai basin. While the concentration of suspended solids in the Xe Bang Fai can not specifically be related riverbank erosion, it is expected to provide quantitative data to support other aspects of the REMP.

8.2.4 Video / photographic documentation

Riverbank erosion along the Xe Bangfai typically occurs at specific, limited locations. For example, within one village there may be portions of the adjacent riverbank that have recently eroded, while other portions remain unaffected by erosion. In late 2008 the Downstream Program plans to document the pre-NT2 discharge conditions of the Xe Bangfai using both video and photographs. Both right and left banks would be documented.

While this documentation can not assist in quantifying pre vs. post NT2 discharge rates of riverbank erosion, it is expected that the video and photographs will be useful in future discussions regarding the issue of riverbank erosion.

8.3 Physical Monitoring - Water Quality

The EMO Water Quality Monitoring and Assessment Program (WQMAP) has been ongoing since January 2005 and includes monitoring of 11 sites in the Xe Bangfai catchment (5 in the Nam Kathang, 2 in the Nam Phit and 4 in the Xe Bangfai) with 7 primary parameters measured on a weekly basis and 18 secondary parameters measured on a monthly basis. Sampling protocol for the ongoing water quality monitoring program in the Downstream areas is summarized as follows.

Surface Water

- Ongoing: 7 primary parameters (Temperature, dissolved oxygen, conductivity, pH, dissolved oxygen saturation, total suspended solids) on a weekly basis and 18 secondary parameters (NH3-N, alkalinity, BOD, NO2-N,NO3-N, faecal coliform, Na, K, oil and grease, Fe, Mn, Cl-, Ca, Pb, COD, SO4-2, Mg, total phosphorous) on a monthly basis at 11 sampling sites.
- In 2009, two automated Water Quality Monitoring Stations (AWQMS) will be installed to support the Downstream component of the WQMAP. One will be located on the Nam Kathang downstream of the Regulating Dam, and the second on the Xe Bang Fai downstream of Downstream Channel

Groundwater

- No groundwater sampling was conducted in the Downstream Areas during 2007.
- In 2008 groundwater monitoring will commence as the Downstream Program's water supply program is implemented (sampling is only possible after hand pumps are installed). Downstream groundwater monitoring for 2008 is expected to include physio-chemical parameters measured at least every 6 months for a representative sample of groundwater sites

8.4 Physical Monitoring - Hydrology / Flood

The Operation & Maintenance Division of NTPC is responsible for hydrological monitoring throughout the project area, including the downstream Area. Based on operational and Concession Agreement requirements, NTPC has established three sub networks for the hydrometric and weather monitoring stations:

1. Nam Theun Network: The Nam Theun network is comprised of 18 monitoring stations to measure water levels with four rated water stations, two reservoir water levels and twelve rain gauges.
2. Nam Kathang Network: The Nam Kathang network is comprised of 3 rated water level stations and rain gauges in Nam Kathang Noi and Nam Kathang Gnai.
3. Xe Bang Fai Network: The Xe Bang Fai network is comprised of four rated water level stations and rain gauges at Ban Hai, Ban Natangchai, Mahaxai and Ban Boungbao on the Nam Kathang

Data collection is presently ongoing and all stations will be telemetered via satellite for remote data collection.

8.5 Fish Catch Monitoring

The Fish Catch Monitoring (FCM) program was established in 2006 to establish baseline information regarding fish catch, and subsequently for impacts caused by the NT2 project, as required by the Concession Agreement.
Several methodologies are utilized within the FCM program to document existing fishing practices and are summarized as follows:

8.5.1 Village Profile Meetings

Data is obtained using socio-economic questionnaires in large village group meetings. This method of data collection is particularly effective at collecting qualitative fish catch data (e.g. species listings), as well as to identify how many households fish in specific areas (e.g. how many households fish in the Nam Theun) and villager perceptions on recent trends in fish abundance and the perceived reasons for any changes. During the village profile meetings general information regarding wealth distribution and other basic socio-economic details related to livelihood are also collected.

8.5.2 Daily Fish Catch Monitoring

Daily fish catch monitoring is used to collect detailed quantitative fish catch data from a sample of fishing households. This methodology involves daily monitoring of selected fishing households in villages to represent different geographical areas. Training is provided to the fishing households to proper documentation of fish catch. Record keeping forms and weighting scales are also provided to each of the household monitors to ensure that the quality of data. Daily fish catch forms are collected by a fish catch monitors employed by the Downstream Program, who are either recruited through or work for the relevant district authorities.

8.5.3 Household Interviews

Individual fishers are interviewed using a detailed questionnaire to assess fish catch. This method obtains perception based data as the individual fishers are requested to estimate catch of specific species of fish over a long period (e.g. a year, a season)

8.5.4 Fish traders interview

Fish trader interviews are conducted twice a year by a District Fish Catch monitor. Phase one planning typically occurs between January to June, with actual fish trader interviews occur between July and August. Planning for phase two occurs from June to December, with interviews being held from January to February.

The

Figure 8.11 below depicts the overall implementation of the fish catch monitoring program:

8.5.5 Fish Catch Monitoring

As noted above, FCM has now been ongoing in all project areas for at least one full year. All data collected from the FCM program is entered into a database and paper forms are archived.

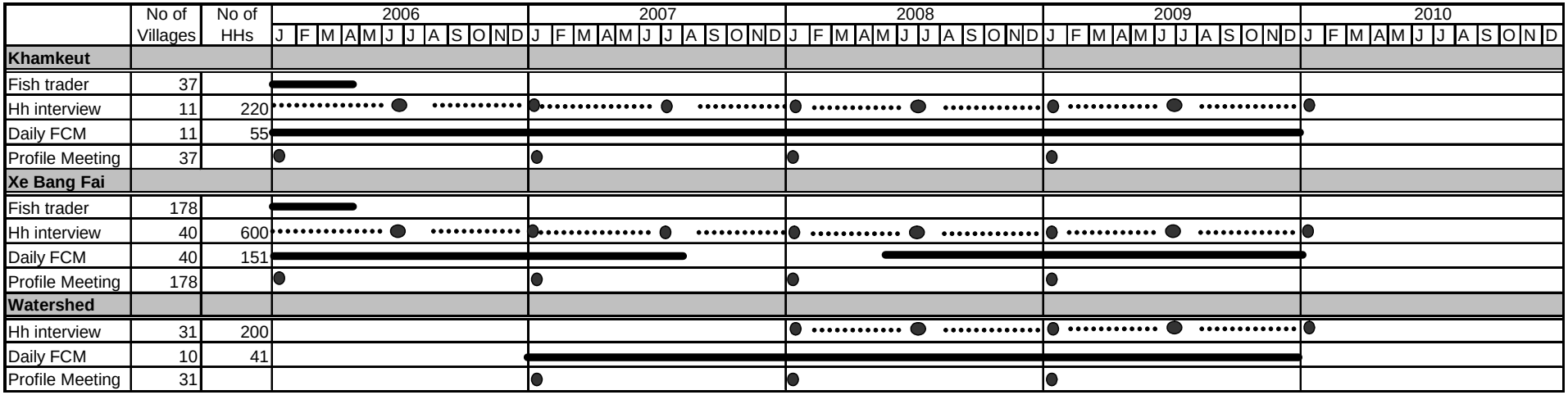
The Downstream Program will prepare a comprehensive report on the fish catch monitoring program, including a discussion of monitoring techniques, chronology of data collection, analysis of data, and extrapolation of monitoring results to the overall population. The report is expected to be available by 1 July 2008.

8.5.6 Budget

Pre-COD budget:
A budget of **$135,000** has been established to support activities prior to COD.

Post-COD budget :
A budget of **$165,000** has been established to support post-COD activities.

Figure 8.11. Fish Catch Monitoring Schedule



8.6 Socio-economic / Health Monitoring

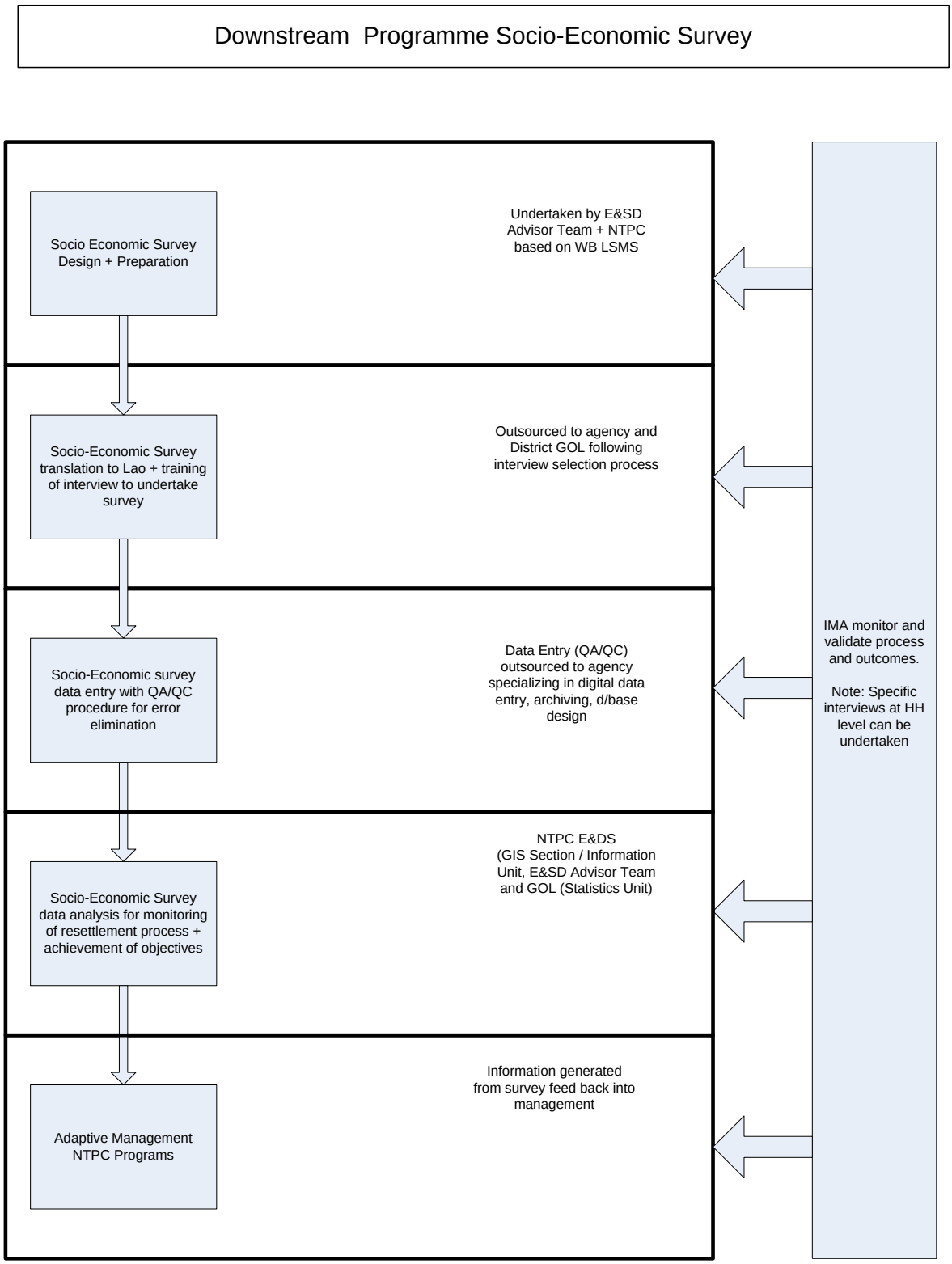
The first socio economic baseline survey was undertaken in mid 2006 (FC + 12 months).

The survey sample varied between 8.5 to 11.2% of total households and was distributed in 20 villages selected in the 6 impact zones of the XBF area. The survey included a household survey as well as PRA type survey. Data collected provided information useful for the design of the Downstream Program and included social infrastructure, food security, health, incomes, household assets, riverbank gardens and livestock assets.

The second socio economic baseline survey will be undertaken within 12 months prior to COD..

It is intended that there should be some overlap between this first baseline survey and the second one so that a statistically significant number of HHs will be tracked over a period of time (2006-08). The process for designing, collecting and processing the information is described in Figure 8.12 below.

Figure 8.12. Socio-Economic Survey Process



The following sections describe the scope of work for the design, collection and data management intended to be applied to the Downstream Program to produce the socio-economic survey.

Design & Collection:

- Assistance with Preparation of Survey Methodology/Design: The Downstream Program will engage a consultant to assist in the development of the survey design and methodology, survey instruments including questionnaire forms and associated survey materials.
- Translation of Survey Instruments: Language requirements for implementing survey and translation of all survey instruments developed by in English into Lao language will be required in order to train enumerators and conduct the survey in Lao.
- Engaging data collection resources, which may be government staff, an NGO or a private company that specializes in data collection..
- Execution of Survey Activities: A process for QA/QC will be formulated to document such supervision to allow for corrective action to survey procedures and instruments to mitigate issues that may arise during the course of survey implementation.

Data management:

- Data base development and entry: Data collected from the field survey will be entered into a electronic database.

Data analysis

Analysis of survey data will be undertaken by the Downstream team as well as consultant as required. Data will be made available for review to external monitoring missions and used to guide internally, the implementation of the program pre COD and post COD. The data will also be made available to the IMA and the RC.

9 Downstream Program Budget Allocation

9.1 Budget Allocation (1 April 2008)

An overall capped budget of $16 million is defined in Concession Agreement, with no more that 8 MUSD to be spent before COD.

Following the presentation of this Implementation plan, NTPC Shareholders have accepted to front load the spending curve with up to $10 million before COD (and $6 million after). Refer to Table 9.1 below for a summary of the budget allocation as of 1 April 2008.

- The left column of Table 9.1 includes a reference to both the geographic area and section of the DSIP where a description of the activity is provided.
- The above budget allocation will be reviewed during implementation of the Downstream Program, taking into account the progress of activities, actual expenditure, and adjustments made to the estimated impact of NT2 operation on the different areas and zones.

The present focus of the budget is to conduct pre-COD activities addressing direct and indirect losses, prioritizing zones that have been classified as potentially being heavily impacted. Monitoring activities that are undertaken as part of the Downstream Program provide valuable information regarding the effectiveness of the programs being implemented as well as regarding the potential impact (pre-operation) or actual impact (post-operation) caused by NT2 operation.

More specifically, data from the fish catch monitoring program, is expected to be available for all Downstream areas by mid-2008, which will then be used to update estimates of fishery resource usage, and potential losses. Should the results of these such studies reveal the need for reallocation of budget within zones, a review of the budget will be carried out, which shall be adjust accordingly, adhering to the adaptive management process stipulated in the CA.

Table 9.17. Downstream Program Budget Allocation, 1 April 2008

DS Area / Ref.	Activity	Total	Pre-COD	Post-COD	Notes of explanation
ALL	**GENERAL CONTINGENCY FUND**	**865,000**	**865,000**	**-**	
1.0	General Contingency Fund	865,000	865,000	-	*Remaining pre-COD contingency budget will be transferred to Post-COD*
ALL	**STUDIES / PLANNING**	**868,000**	**868,000**	-	
Misc.	Studies / Planning / Data	745,000	745,000	-	*Includes data collection (e.g. topographicical, remote sensing) preparation of plans and other studies*
1.6.1	GOL Pre-feasibility irrigation study	54,000	54,000	-	
1.6.2	GOL Pre-feasibility flood study	69,000	69,000	-	
Xe Bang Fai	**LIVELIHOOD RESTORATION FUNDS**	**2,192,000**	**832,515**	**1,359,485**	
4.4	Phase 1: 20 Pilot villages	478,679	478,679		*14 riparian, 6 hinterland villages*
4.4	Phase 2: 21 Riparian villages	240,380	240,380		*7 Upper, 3 Middle, 11 Lower XBF1*
4.4	Phase 3: 8 Riparian villages	113,456	113,456		*5 Upstream upper, 3 Lower XBF1*
4.4	Phase 4: 39 Riparian Villages	883,620		883,620	*20 Lower XBF2, 9 Lower XBF3, 10 Nam Kathang / Nam Gnom*
4.4	Phase 4: 95 Hinterland Villages	475,865		475,865	*31 Lower1, 19 Lower2, 2 Lower3, 19 Middle, 12 Upper, 12 Nam Kathang / Gnom / Phit*
4.4	Training for VDC & Village Fund	200,000	150,000	50,000	
Xe Bang Fai	**INFRASTRUCTURE RELATED**	**3,435,000**	**2,770,000**	**665,000**	
4.1.5	Unexploded ordnance detection & removal	240,000	140,000	100,000	
4.2.1.1	Inventory of Assets and Structures	-	-	-	*NTPC internal budget, with IKONOS imagery from "studies / plans"*
4.2.1.2	Asset relocation / protection : Non-PCR	-	-	-	*Contingency Funds to be used, as required*
4.2.1.3	Asset relocation / protection : PCR	-	-	-	*Contingency Funds to be used, as required*
4.2.1.4	Irrigation Pump modifications	60,000	60,000	-	
4.2.2.1	Access Restoration	100,000	100,000	-	
4.2.2.2	Riverbank gardens	355,000	240,000	115,000	
4.2.3.1	Water supply activities	1,650,000	1,500,000	150,000	
4.2.4.1	Water gate rehabilitation / construction	410,000	210,000	200,000	
4.2.4.2	Sanitation Construction	450,000	450,000	-	
4.2.4.3	Hygiene / Sanitation Awareness &	170,000	70,000	100,000	

DS Area / Ref.	Activity	Total	Pre-COD	Post-COD	Notes of explanation
	Training				
Xe Bang Fai	**LIVELIHOOD / INCOME RESTORATION**	**1,005,000**	**215,000**	**790,000**	
4.3.5	Agriculture / Livestock	400,000	70,000	330,000	
4.3.6	Aquaculture	280,000	95,000	185,000	
4.3.7	Fisheries Co-Management	250,000	25,000	225,000	
4.3.8	Handicraft Development	75,000	25,000	50,000	
4.3.9	Marketing/Trade	25,000	10,000	15,000	
Khamkeut	**DOWNSTREAM OF NAKAI DAM (Khamkeut District)**	**500,000**	**250,000**	**250,000**	
5.0	Livelihood Restoration Funds	500,000	250,000	250,000	
ALL	**OPERATION COSTS**	**2,663,268**	**1,964,221**	**699,047**	
7.0	NTPC office, vehicle, equipment, non-Technical staffing costs	2,463,268	1,814,221	649,047	
7.0	Training for VDC & Village Fund	200,000	150,000	50,000	
ALL	**RMU / DWGS**	**1,186,000**	**604,000**	**582,000**	
7.0	Resettlement Management Unit / District Working Group	1,186,000	604,000	582,000	*RMU / DWG costs include office rental, vehicles, staffing, DSA, training, and other operational costs*
ALL	**TECHNICAL ASSISTANCE**	**2,986,736**	**1,352,121**	**1,634,615**	
7.0	Technical Assistance (Consultancies)	620,000	460,000	160,000	
7.0	Technical Assistance (In-house expertise)	2,366,736	892,121	1,474,615	
ALL	**MONITORING**	**300,000**	**135,000**	**165,000**	
8.2	Independent Monitoring	-	-	-	*NTPC internal budget*
8.3	Physical Monitoring - Riverbank erosion	-	-	-	*NTPC internal budget*
8.4	Physical Monitoring - Water quality	-	-	-	*NTPC internal budget*
8.5	Physical Monitoring - Hydrology / Flood	-	-	-	*NTPC internal budget*
8.6	Physical Monitoring - Fish Catch Monitoring	300,000	135,000	165,000	
8.7	Socio-economic / Health Monitoring	-	-	-	*NTPC internal budget*
ALL	**TOTAL**	**$16,026,004**	**$9,865,856**	**$6,160,148**	

ANNEX 1

Determination of Project Impacted Villages

Changes from Social Development Plan, March 2005 village list to current Downstream Program Village List
Updated: 2 December 2007

The most comprehensive list of potentially impacted villages (PIV) within the Social Development Plan Vol. 3 Downstream Areas is contained in Chapter 8, Annex 8-2, Annex 1 (p. 51), and contains 368 villages. A comparison with the November 2007 DSP PIV list is as follows:

Downstream Area	Number of Potentially Impacted Villages SDP, March 2005	Downstream Program Potentially Impacted Village List, May 2007
Upstream of the Nakai Reservoir (watershed)	31	31
Downstream of Nakai Dam (Khamkeut District)	70	37
Downstream of NT2 power station	267	183
Total	**368**	**251**

Differences between the SDP and current PIV lists are described below, separated by geographic region.

Upstream of the Nakai Reservoir (watershed)
The current DSP PIV list for "upstream of Nakai Reservoir" includes 31 villages, while the SDP PIV list contains 31.

The current PIV list represents a comprehensive list of all watershed villages. As fish catch monitoring progresses some villages may be removed if they are determined not to be a PIV.

Downstream of Nakai Dam (Khamkeut District)
The SDP PIV list includes 70 villages (Volume 3, Chapter 2.5), which represents *all* villages in Khamkeut District. It is understood that all Khamkeut District villages were included due to the lack of accurate survey data available at the time of writing. However, the SDP also asserts there to be 40 affected villages in the Khamkeut downstream of the dam area (Section 2ii, Table 2, Executive Summary)

Since the SDP was published in 2005, fish catch monitoring in Khamkeut District has identified many villages which will not be impacted. Subsequently, these villages have been removed from the PIV list, leaving a current total of 37 villages.

Downstream of NT2 Power Station
The SDP PIV list includes 267 villages and was prepared in early 2005 using multiple village lists that were outdated and in many cases contradictory to each other. The current PIV list identifies 183 villages and is based on the latest national census, held in 2005.1

.

Merging villages

However, 216 of the 267 SDP PIVs are included in 176 of the 183 villages in the current PIV, and 40 villages (216 – 178 = 40) have merged with other villages and are no longer considered as distinct villages. This process of "merging villages" is part of the national policy in Laos, which requires that villages with less than 40 households be relocated or merged with each other in order to provide more efficient village infrastructure and services, such as road access, electrical connections, water supply and educational facilities in a more efficient manner. The process of relocation / re-grouping ("merging") villages has been ongoing for many years and continues to this day. In June 2007 a major merging of villages was announced. The Downstream Office has calculated that this most recent merging would bring down the number of PIV to approximately 185. However this merging has brought together under the one name and administration villages which are located quite distant from each other. After careful consideration DS decided not to revise its existing village list as 1) DS livelihood restoration and WASH programs will need to maintain separate sets of activities in many of these merged villages because of internal distances, and 2) it is expected that there will be further changes to village demarcation in the life of the project and to be frequently changing village lists would create great confusion. Therefore the NT2 list of villages is set in time before the June 2007 mergers, and will remain until project completion.

Non-impacted villages

Of the 51 remaining villages in the SDP list that must be accounted for (267 – 216 = 51), 45 villages are non-impacted. NTPC "non-impacted villages" were previously included in the SDP list but subsequently removed from the potentially impacted list after more detailed review of village resource use and flooding patterns (done after the SDP was published). Villages include (SDP ref #): 161-167; 192; 200; 201; 204; 205; 268; 310, 318; 324-333; 335, 337-341; 344; 346-347; 358-368. Many of these 45 villages are located in Thakhek District and / or adjacent to the Mekong.

Miscellaneous

The remaining 6 villages included in the SDP list are "missing" - neither are they on the GOL 2005 national census list, nor are they included in the current PIV list. These villages are Fang Deng (GML), Pak Phung (GML), Lao (XBF), Dongphang (XBF), Nachoi (XBF), Dongmakeak (THK). These 6 villages may have merged with other villages or may represent mistakes in the SDP PIV list.

There are also 7 villages included in the current PIV list that are not included in the SDP list. These villages are Thathod (GML) Houaythat (GML), Dongmakfai (XBL), Nahoun (NBK), Dongkhuang (NBK), Huaythong (XBL), Beungsantheung (NBK).

Summary

Downstream Area	PIVs SDP, March 2005	Current PIV List May 2007	Difference	Comment / Description of Change
Upstream of the Nakai Reservoir (watershed)	31	31		
Downstream of Nakai Dam (Khamkeut District)	40-70	37	-33 villages	33 villages removed as they are not PIVs
Downstream of NT2 power station	267	183	-84 villages	• (-) 45 villages removed as they are not PIVs • (-) 6 villages not included in 2005 census list (mistakes?) • (+) 7 new villages added to current PIV list • (-) 40 villages merged
Total	**368**	**251**	**-117 villages**	***Difference: (-) 84 villages***

NTPC Reference	Village Name	Impact Zone	SDP Ref. No.	District
Villages Downstream of the NT2 Power Station				
141	Phonsaat	Upper XBF	190	Mahaxai
25	Povaneua	Upper XBF	177	Mahaxai
26	Povatai	Upper XBF	178	Mahaxai
27	Phanang	Upper XBF	179	Mahaxai
29	Kengpe	Upper XBF	182	Xe Bangfai
149	Some	Upper XBF	193	Xe Bangfai
24	Mahaxaitai	Upper XBF	176	Mahaxai
137	Phachoumkhong	Upper XBF	191 / 115	Mahaxai
28	Pong	Upper XBF	181	Mahaxai
142	Phonkham	Upper XBF	189	Mahaxai
143	Khamfeuang	Upper XBF	180 / 185	Mahaxai
144	Khampedong	Upper XBF	188	Mahaxai
145	Khampena	Upper XBF	187	Mahaxai
146	Khampeyai	Upper XBF	186	Mahaxai
148	Thamlay	Upper XBF	194	Xe Bangfai
31	Thahat	Upper XBF	184	Xe Bangfai
30	Thakhor	Upper XBF	183	Xe Bangfai
23	Mahaxaikang	Upper XBF	175	Mahaxai
16	Naphong	Upstream Upper XBF	168	Mahaxai
18	Vatthat	Upstream Upper XBF	170	Mahaxai
22	Mahaxaineua	Upper XBF	137 / 174	Mahaxai
21	Kengsavang	Upper XBF	136 / 173	Mahaxai
20	Nakio	Upstream Upper XBF	134 / 172	Mahaxai
19	Somsanouk	Upstream Upper XBF	135 / 171	Mahaxai
17	Dangkang	Upstream Upper XBF	133 / 169	Mahaxai
9	Kenglek	Nam Gnom	124 / 149	Gnommalat
11	Boungbao	Nam Gnom	119 / 150 / 151	Gnommalat
8	Gnommalattai	Nam Gnom	123 /147	Gnommalat
7	Gnommalatneua	Nam Gnom	122 / 129 / 144 / 146	Gnommalat
10	Nongping	Nam Gnom	117 / 127 /148	Gnommalat
3	That	Nam Kathang	116 / 140 / 142 / 143	Gnommalat
129	Donepeuy	Nam Phit / Houay Khama	118 / 120 / 152	Gnommalat
4	Nafaimai	Nam Kathang	126 /145	Gnommalat
6	Nalatkhuay	Nam Gnom	130 / 114	Gnommalat
133	Phitsikhai	Nam Phit / Houay Khama	110	Gnommalat
140	Lak 7	Upper XBF	105	Mahaxai
139	Nakoknai	Upper XBF	108	Mahaxai
138	Lak 9	Upper XBF	106	Mahaxai
134	Phonsang	Nam Phit / Houay Khama	112 / 113	Gnommalat
132	Kouanphan	Nam Phit / Houay Khama	102 / 104	Gnommalat
131	Khoksavang	Nam Phit / Houay Khama	103	Gnommalat
130	Phathoung	Nam Phit / Houay Khama	109	Gnommalat
127	Phonsvanh	Nam Gnom	132	Gnommalat
135	Muangkhai	Nam Phit / Houay Khama	107	Gnommalat
128	Muang	Nam Gnom	111 / 125 / 131	Gnommalat
15	Phonsead	Nam Gnom	159 / 160	Gnommalat
12	Houyyen	Nam Gnom	153	Gnommalat
2	Lao	Nam Kathang	138	Gnommalat
14	Nakatang	Nam Gnom	156 / 157 / 158	Gnommalat
1	Sangkeo	Nam Kathang	139 / 141	Gnommalat
13	Naxok	Nam Gnom	154 /155	Gnommalat
159	Nakhomkao	Middle XBF	211	Xe Bangfai
157	Yangyai	Middle XBF	208	Xe Bangfai
158	Som	Middle XBF	220	Xe Bangfai
36	Palai	Middle XBF	206	Xaibouli

NTPC Reference	Village Name	Impact Zone	SDP Ref. No.	District
35	Hatpek	Middle XBF	198	Xe Bangfai
34	Veunsananh	Middle XBF	197	Xe Bangfai
33	Kasee	Middle XBF	196	Xe Bangfai
160	Nakhomthong	Middle XBF	217	Xe Bangfai
170	Nongbone	Lower XBF 1	215	Xe Bangfai
156	Dongmakba	Middle XBF	214	Xe Bangfai
167	Noi	Middle XBF	207	Xe Bangfai
153	Beunghuananeua	Middle XBF	221	Xe Bangfai
166	Houylangmeu	Middle XBF	216	Xe Bangfai
161	Khokkengkhene	Middle XBF	210	Xe Bangfai
164	Sang	Middle XBF	219	Xe Bangfai
32	Kengkhean	Middle XBF	195	Xe Bangfai
154	Dongsavang	Middle XBF	209	Xe Bangfai
152	Beunghuanakang	Middle XBF	218 / 317	Xe Bangfai
151	Beunghuanatai	Middle XBF	213	Xe Bangfai
194	Nathong	Lower XBF 1	223	Xaibouli
168	Xenoi	Middle XBF	199 / 316	Xe Bangfai
155	Toung	Middle XBF	212	Xe Bangfai
59	Hatxiengdee	Lower XBF 2	236	Nongbok
55	Kangpa	Lower XBF 2	279	Xaibouli
56	Natai	Lower XBF 2	234	Nongbok
57	Thabor	Lower XBF 2	280	Xaibouli
64	Dongphakpheua	Lower XBF 2	238	Nongbok
48	Tonhaen	Lower XBF 1	274	Xaibouli
118	Phontan	Lower XBF 2	311	Xaibouli
63	Phakpheuaneua	Lower XBF 2	283	Xaibouli
58	Pakeetou	Lower XBF 2	235	Nongbok
60	Kengphosee	Lower XBF 2	281	Xaibouli
61	Dongsagam	Lower XBF 2	237	Nongbok
62	Sakong	Lower XBF 2	282	Xaibouli
69	Navangneua	Lower XBF 2	241	Nongbok
126	Nakham	Lower XBF 1	253	Nongbok
81	Thamuang	Lower XBF 3	249	Nongbok
67	Somsaat	Lower XBF 2	285	Xaibouli
46	Yangkham	Lower XBF 1	228	Xe Bangfai
47	Hatkhamhieng	Lower XBF 1	229	Xe Bangfai
86	Danepakse	Lower XBF 3	250	Nongbok
85	Paksebangfai	Lower XBF 3	295	Xaibouli
84	Pong	Lower XBF 3	294	Xaibouli
44	Somsaat	Lower XBF 1	227	Xe Bangfai
82	Nasang	Lower XBF 3	292	Xaibouli
43	Naphoktha	Lower XBF 1	226	Xe Bangfai
80	Phonsaoea	Lower XBF 3	248	Nongbok
79	Thakharm	Lower XBF 3	291	Xaibouli
78	Thaphoxai	Lower XBF 3	290	Xaibouli
77	Sadeutai	Lower XBF 3	247	Nongbok
76	Sadeuneua	Lower XBF 3	246	Nongbok
75	Nongheuathongtai	Lower XBF 2	289	Xaibouli
83	Bouakhai	Lower XBF 3	293	Xaibouli
73	Navangtai	Lower XBF 2	245 / 251	Nongbok
66	Samnadee	Lower XBF 2	240	Nongbok
54	Thadokkham	Lower XBF 2	278	Xaibouli
68	Houyhe	Lower XBF 2	286	Xaibouli
215	Mouangkhai	Lower XBF 2	336	Nongbok
70	Navangnoi	Lower XBF 2	244	Nongbok
71	Hatxaifong	Lower XBF 2	243	Nongbok
45	Hatkhamdee	Lower XBF 1	273	Xaibouli

NTPC Reference	Village Name	Impact Zone	SDP Ref. No.	District
211	Laodokmai	Lower XBF 2	314	Xaibouli
65	Phakpheuatai	Lower XBF 2	284	Xaibouli
37	Kuase	Lower XBF 1	224	Xe Bangfai
38	Manilad	Lower XBF 1	269	Xaibouli
39	Khamsavang	Lower XBF 1	270	Xaibouli
40	Dangsavanh	Lower XBF 1	271	Xaibouli
41	Souvanxai	Lower XBF 1	272	Xaibouli
42	Dangtha	Lower XBF 1	225	Xe Bangfai
72	Naxiengkhane	Lower XBF 2	287	Xaibouli
197	Sixiengmai	Lower XBF 1	306	Xaibouli
217	Khoksavang	Lower XBF 2	252	Nongbok
183	Nanoi	Lower XBF 1	349	Nongbok
184	Dongkhung	Lower XBF 1	256	Nongbok
185	Dongkasinh	Lower XBF 1	232	Nongbok
186	Dongbounyai	Lower XBF 1	259	Nongbok
187	Dongbounnoi	Lower XBF 1	257	Nongbok
49	Beungxe	Lower XBF 1	275	Xaibouli
189	Santisouk	Lower XBF 1	345	Nongbok
190	Phon	Lower XBF 1	255	Nongbok
191	Nongbok	Lower XBF 1	265	Nongbok
192	Sibounhong	Lower XBF 1	260	Nongbok
193	Nongdone	Lower XBF 1	258	Nongbok
181	Nonchick	Lower XBF 1	267	Nongbok
196	Sikhai	Lower XBF 1	355	Xaibouli
180	Laokhung	Lower XBF 1	350	Nongbok
198	Veuntai	Lower XBF 1	312	Xaibouli
199	Veunsivilai	Lower XBF 1	309	Xaibouli
200	Veunxai	Lower XBF 1	304	Xaibouli
201	Veunneua	Lower XBF 1	298	Xaibouli
203	Donggnang	Lower XBF 2	297	Xaibouli
204	Dongpou	Lower XBF 2	305	Xaibouli
205	Naoneua	Lower XBF 2	299 / 356	Xaibouli
206	Beungbouathong	Lower XBF 2	313	Xaibouli
207	Naotai	Lower XBF 2	308	Xaibouli
208	Dongpao	Lower XBF 2	303	Xaibouli
209	Yangkhamneua	Lower XBF 2	307	Xaibouli
210	Yangkhamtai	Lower XBF 2	302	Xaibouli
195	Kang	Lower XBF 1	300 / 301 / 315	Xaibouli
162	Nongphang	Middle XBF	321	Xe Bangfai
52	Hatxaisoungtai	Lower XBF 1	277	Xaibouli
223	Khokkong	Lower XBF 3	343	Nongbok
222	Dongpangpao	Lower XBF 3	266	Nongbok
221	Nonenakham	Lower XBF 3	296	Xaibouli
220	Navangthong	Lower XBF 2	242	Nongbok
218	Nonglee	Lower XBF 2	254	Nongbok
74	Nongheuathongneua	Lower XBF 2	288	Xaibouli
216	Tantheung	Lower XBF 2	239	Nongbok
214	Nongsaphangthoung	Lower XBF 2	264 / 342	Nongbok
147	Koktong	Upper XBF	322	Xe Bangfai
213	Nongsaphangthong	Lower XBF 2	261	Nongbok
50	Namphou	Lower XBF 1	231	Nongbok
150	Sokbor	Upper XBF	323	Xe Bangfai
53	Sorkbor	Lower XBF 1	233	Nongbok
163	Phondeetong	Middle XBF	320	Xe Bangfai
165	Nabeung	Middle XBF	319	Xe Bangfai
171	Naphoktheung	Lower XBF 1	230	Xe Bangfai

NTPC Reference	Village Name	Impact Zone	SDP Ref. No.	District
172	Nalak	Lower XBF 1	353	Nongbok
173	Pongkiew	Lower XBF 1	354	Nongbok
174	Laona	Lower XBF 1	352	Nongbok
175	Nachampa	Lower XBF 1	351	Nongbok
51	Hatxaisoungneua	Lower XBF 1	276	Xaibouli
177	Phonephieng	Lower XBF 1	262	Nongbok
178	Nongpham	Lower XBF 1	263	Nongbok
179	Phonexai	Lower XBF 1	348	Nongbok
169	Dongmakfai	Middle XBF		Xaibouli
5	Thathod	Nam Gnom		Gnommalat
188	Dongkhuang	Lower XBF 1		Nongbok
136	Houytat	Nam Phit / Houay Khama		Gnommalat
176	Nahoun	Lower XBF 1		Nongbok
264	Beungsantheung	Lower XBF 3		Nongbok
265	Huaythong	Lower XBF 1		Xaibouli
Total	183			
Villages Upstream of the Nakai Reservoir				
245	Tong	Nam Noi	78	Nakai
256	Singthong	Nam Theun	95	Nakai
255	Nakang	Nam Theun	96	Nakai
254	Thaphaiban	Nam Theun	97	Nakai
253	Korpong	Nam Theun	98	Nakai
252	Pheung	Nam Theun	101	Nakai
251	Makfeuang	Nam Theun	100	Nakai
250	Nava	Nam Theun	99	Nakai
248	Soklek	Nam Theun	94	Nakai
249	Vangchang	Nam Theun	93	Nakai
246	Peu	Nam Noi	77	Nakai
233	Songkhon	Nam Xot	85	Nakai
244	Phung	Nam Noi	76	Nakai
243	Buuk	Nam Noi	91	Nakai
242	Houaysam	Nam Noi	80	Nakai
241	Vangkhouay	Nam Noi	79	Nakai
240	Nameo	Nam Noi	82	Nakai
239	Seuk	Nam Noi	73	Nakai
238	Dteung	Nam Noi	72	Nakai
237	Maka	Nam Noi	71	Nakai
236	Vanglae	Nam Noi	75	Nakai
235	Thongnoi	Nam Noi	74	Nakai
234	Houaymaxong	Nam Mon	89	Nakai
247	Nameuy	Nam Noi	83	Nakai
230	Kaching	Nam Mon	88	Nakai
232	Thameung	Nam Xot	84	Nakai
229	Navang	Nam Mon	87	Nakai
228	Fangdengneua	Nam Mon	90	Nakai
227	Fangdengtai	Nam Mon	91	Nakai
263	Thongsat	Nam Mon	92	Nakai
231	Nahao	Nam Xot	86	Nakai
Total	31			
Villages Downstream of the Nakai Dam				
116	Nongkok	Theun Hinboun Headpond	54	Khamkeut
105	Phonpheng	Upper Nam Phao	14	Khamkeut
119	Kouanchanh	Nam Kheo	61	Khamkeut
120	Poung	Nam Kheo	67	Khamkeut
121	Nongxong	Nam Ngoy	50	Khamkeut
122	Phonlom	Nam Ngoy	48	Khamkeut

NTPC Reference	Village Name	Impact Zone	SDP Ref. No.	District
123	Phamouang	Nam Ngoy	51	Khamkeut
124	Phongnam	Nam Ngoy	53	Khamkeut
125	Nagnoy	Nam Ngoy	52	Khamkeut
103	Nongpong	Lower Nam Phao	6	Khamkeut
113	Dongbang	Nam Phouan/Phiat	29	Khamkeut
182	Nakham	Nam Ngoy	49	Khamkeut
202	Phontan	Nam Kheo	59	Khamkeut
99	Phonthong	Lower Nam Phao	7	Khamkeut
88	Thongkhae / Nafouang	Nam Kata	42	Khamkeut
90	Phonevilai	Nam Kata	3	Khamkeut
91	Vangpha	Nam Kata	39	Khamkeut
92	Phonsee	Nam Kata	35	Khamkeut
93	Korhai	Nam Kata	34	Khamkeut
94	Nongmek	Nam Kata	41	Khamkeut
95	Namdeun	Nam Kata	40	Khamkeut
225	Nathone / Phonkhoun / Huaydieng	Nam Kata	47	Khamkeut
226	Phonsaat / Phonkeo / Pakkatan	Nam Kata	5	Khamkeut
115	Thabak	Theun Hinboun Headpond	56	Khamkeut
98	Phonxai	Lower Nam Phao	8	Khamkeut
114	Khammouane	Nam Phouan/Phiat	28	Khamkeut
100	Namphao	Lower Nam Phao	3	Khamkeut
101	Chengsavang	Lower Nam Phao	2	Khamkeut
102	Oudom	Lower Nam Phao	1	Khamkeut
104	Namthee	Lower Nam Phao	9	Khamkeut
106	Thoungchaleun	Upper Nam Phao	15	Khamkeut
107	Phonhong	Upper Nam Phao	12	Khamkeut
108	Phonmuangnoi	Upper Nam Phao	11	Khamkeut
110	Houykeo	Nam Phouan/Phiat	32	Khamkeut
112	Sopphouan	Nam Phouan/Phiat	33	Khamkeut
87	Vangkor / Nahang	Nam Kata	45	Khamkeut
97	Nongdong	Lower Nam Phao	4	Khamkeut
Total	37			

ANNEX 2

Tracking Table for Changes to the Database of Villages Included in the Downstream Program

Updated: 20 Oct 2007

Date	# villages prior to change	Description of Change	# of villages added	Revised # of Downstream Program villages
15 Feb 07	223	Remove distinction of hinterland / riparian from villages downstream of Nakai Dam. Previously this was used to indicate severity of impact from NT2, rather than proximity to river or tributary.	0	223 D/S Nakai Dam: 40 D/S Power Station, riparian 86 D/S Power Station, hinter 97
15 Feb 07	223	Add 3 new villages due to results from fish catch monitoring – information provided by Khamsay. Villages include: • Phonsaat / Phonkeo / Pakkatan • Nathone / Phonkhoun / Huaydieng • Nakadok	3	226 D/S Nakai Dam: 43 D/S Power Station, riparian 86 D/S Power Station, hinter 97
15 Feb 07	226	Remove 5 villages from list due to results from fish catch monitoring – information provided by Khamsay. Villages include: • Donexat (111) • Nadeua (109) • Nahai (89) • Namuang (96) • Pakha (117)	-5	221 D/S Nakai Dam: 38 D/S Power Station, riparian 86 D/S Power Station, hinter 97
29 Apr 2007	221	Remove 1 village, Ban Nakadok (224) in Khamkeut District from village list due to results from fish catch monitoring – information provided by Khamsay (email 28 April). Village has relocated to participate in gold mining since the end of 2006.	-1	220 D/S Nakai Dam: 37 D/S Power Station, riparian 86 D/S Power Station, hinter 97

18 Jul 2007	220	Add Watershed villages	+31	251 D/S Nakai Dam: 37 D/S Power Station, riparian 86 D/S Power Station, hinter 97 US Reservoir: 31
20 Oct 2007	220	Change the following Gnommolat District villages from "riparian" to hinterland, due to impact of NT2 only on fisheries, not on garden losses, erosion impacts, or dependence on affected waterway for domestic water supply: • Sangkeo (188 HH) • Lao (130 HH) • Thathod (166 HH) • Nalatkuay (159 HH)		251 D/S Nakai Dam: 37 D/S Power Station, riparian 82 D/S Power Station, hinter 101 *Plus* US Reservoir: 31

ANNEX 3

Table of Villages and Impacts

					Potential Physical / Environmental Impacts						Potential Social - Economic Impacts							
Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group A: Villages upstream of Nakai Reservoir (31 villages)																		
227	Fangdengtai	40	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
228	Fangdengneua	26	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
229	Navang	56	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
230	Kaching	34	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
231	Nahao	45	Nakai	Nam Xot	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
232	Thameung	82	Nakai	Nam Xot	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
233	Songkhon	44	Nakai	Nam Xot	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
234	Houaymaxong	19	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
235	Thongnoi	26	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
236	Vanglae	27	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
237	Maka	56	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
238	Dteung	50	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
239	Seuk	16	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
240	Nameo	41	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
241	Vangkhouay	34	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
242	Houaysam	26	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
243	Buuk	30	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
244	Phung	21	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
245	Tong	30	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
246	Peu	19	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
247	Nameuy	63	Nakai	Nam Noi	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
248	Soklek	65	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
249	Vangchang	47	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
250	Nava	28	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
251	Makfeuang	64	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
252	Pheung	15	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
253	Korpong	36	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
254	Thaphaiban	41	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
255	Nakang	47	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
256	Singthong	29	Nakai	Nam Theun	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
263	Thongsat	29	Nakai	Nam Mon	Y	n/a	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
Subtotal		**1186**	**Est. HHs**	**31**	**villages**													

					Potential Physical / Environmental Impacts						Potential Social - Economic Impacts							
Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group B: Villages downstream of Nakai Dam (37 villages)																		
87	Vangkor / Nahang	108	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
88	Thongkhae / Nafouang	143	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
90	Phonevilai	134	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
91	Vangpha	99	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
92	Phonsee	68	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
93	Korhai	175	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
94	Nongmek	88	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
95	Namdeun	149	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
97	Nongdong	183	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
98	Phonxai	66	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
99	Phonthong	68	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
100	Namphao	190	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
101	Chengsavang	125	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
102	Oudom	163	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
103	Nongpong	503	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
104	Namthee	146	Khamkeut	Lower Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
105	Phonpheng	252	Khamkeut	Upper Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
106	Thoungchaleun	259	Khamkeut	Upper Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
107	Phonhong	187	Khamkeut	Upper Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
108	Phonmuangnoi	188	Khamkeut	Upper Nam Phao	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
110	Houykeo	127	Khamkeut	Nam Phouan/Phiat	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
112	Sopphouan	44	Khamkeut	Nam Phouan/Phiat	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
113	Dongbang	129	Khamkeut	Nam Phouan/Phiat	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
114	Khammouane	108	Khamkeut	Nam Phouan/Phiat	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
115	Thabak	176	Khamkeut	Theun Hinboun Headpond	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
116	Nongkok	131	Khamkeut	Theun Hinboun Headpond	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
119	Kouanchanh	116	Khamkeut	Nam Kheo	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
120	Poung	44	Khamkeut	Nam Kheo	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
121	Nongxong	88	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
122	Phonlom	69	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
123	Phamouang	101	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
124	Phongnam	43	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
125	Nagnoy	56	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
225	Nathone/Phonkhoun/ Huaydieng	116	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
226	Phonsaat / Phonkeo / Pakkatan	118	Khamkeut	Nam Kata	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
202	Phontan	118	Khamkeut	Nam Kheo	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
182	Nakham	65	Khamkeut	Nam Ngoy	n/a	Y	n/a	n/a	n/a	n/a	N	Y	N	N	N	N	N	N
Subtotal		**4943**	**Est. HHs**	**37**	**villages**													

					Potential Physical / Environmental Impacts						Potential Social - Economic Impacts							
Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group C1: Riparian Villages downstream of the NT2 Power Station (82 villages)																		
3	That	156	Gnommalat	Nam Kathang	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
4	Nafaimai	89	Gnommalat	Nam Kathang	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
7	Gnommalatneua	233	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
8	Gnommalattai	168	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
9	Kenglek	110	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
10	Nongping	115	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
11	Boungbao	130	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
12	Houyyen	80	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
13	Naxok	140	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
14	Nakatang	126	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
15	Phonsead	89	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	Y	N	Y	N	Y	N	N	N	N
16	Naphong	51	Mahaxai	Upstream Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
17	Dangkang	53	Mahaxai	Upstream Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
18	Vatthat	50	Mahaxai	Upstream Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
19	Somsanouk	52	Mahaxai	Upstream Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
20	Nakio	107	Mahaxai	Upstream Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
21	Kengsavang	28	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
22	Mahaxaineua	65	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
23	Mahaxaikang	51	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
24	Mahaxaitai	185	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
25	Povaneua	88	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
26	Povatai	111	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
27	Phanang	52	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
28	Pong	40	Mahaxai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
29	Kengpe	89	Xe Bangfai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
30	Thakhor	54	Xe Bangfai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
31	Thahat	63	Xe Bangfai	Upper XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
32	Kengkhean	42	Xe Bangfai	Middle XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
33	Kasee	56	Xe Bangfai	Middle XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
34	Veunsananh	72	Xe Bangfai	Middle XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
35	Hatpek	33	Xe Bangfai	Middle XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
36	Palai	47	Xaibouli	Middle XBF	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
37	Kuase	314	Xe Bangfai	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
38	Manilad	110	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
39	Khamsavang	69	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
40	Dangsavanh	64	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
41	Souvanxai	69	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
42	Dangtha	86	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
43	Naphoktha	76	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
44	Somsaat	35	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
45	Hatkhamdee	47	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
46	Yangkham	244	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
47	Hatkhamhieng	233	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
48	Tonhaen	240	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
49	Beungxe	120	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
50	Namphou	74	Nongbok	Lower XBF 1	n/a	n/a	Y	Y	Y	Y	Y-tbv	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
51	Hatxaisoungneua	139	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
52	Hatxaisoungtai	134	Xaibouli	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
53	Sorkbor	113	Nongbok	Lower XBF 1	n/a	n/a	N	Y	Y	Y	N	Y	Y+	Y	Y-tbv	Y-tbv	Y-tbv	Y-tbv
54	Thadokkham	51	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
55	Kangpa	74	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
56	Natai	72	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv

					Potential Physical / Environmental Impacts						Potential Social - Economic Impacts							
Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group C1: Riparian Villages downstream of the NT2 Power Station (82 villages) - CONTINUED																		
57	Thabor	80	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
58	Pakeetou	69	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
59	Hatxiengdee	247	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
60	Kengphosee	95	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
61	Dongsagam	71	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
62	Sakong	107	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
63	Phakpheuaneua	65	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
64	Dongphakpheua	166	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
65	Phakpheuatai	78	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
66	Samnadee	34	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
67	Somsaat	32	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
68	Houyhe	89	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
69	Navangneua	154	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
70	Navangnoi	71	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
71	Hatxaifong	71	Nongbok	Lower XBF 2	n/a	n/a	Y	N	N	Y	Y-tbv	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
72	Naxiengkhane	73	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
73	Navangtai	83	Nongbok	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
74	Nongheuathongneua	72	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
75	Nongheuathongtai	25	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	Y	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
76	Sadeuneua	154	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
77	Sadeutai	101	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
78	Thaphoxai	109	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
79	Thakharm	102	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
80	Phonsaoea	68	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
81	Thamuang	41	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
82	Nasang	196	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
83	Bouakhai	141	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
84	Pong	88	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
85	Paksebangfai	88	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
86	Danepakse	74	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	Y+	Y	N-tbv	N-tbv	N-tbv	N-tbv
Subtotal		**8033**	**Est. HHs**	**82**	**villages**													

Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group C2: Hinterland villages downstream of the NT2 Power Station (101 villages)																		
1	Sangkeo	188	Gnommalat	Nam Kathang	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
2	Lao	130	Gnommalat	Nam Kathang	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
5	Thathod	166	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
6	Nalatkhuay	159	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
118	Phontan	63	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
126	Nakham	280	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
127	Phonsvanh	185	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
128	Muang	228	Gnommalat	Nam Gnom	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
129	Donepeuy	94	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
130	Phathoung	75	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
131	Khoksavang	81	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
132	Kouanphan	188	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
133	Phitsikhai	90	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
134	Phonsang	115	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
135	Muangkhai	63	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
136	Houytat	134	Gnommalat	Nam Phit / Houay Khama	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
137	Phachoumkhong	56	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
138	Lak 9	33	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
140	Lak 7	155	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
141	Phonsaat	296	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
142	Phonkham	52	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
143	Khamfeuang	95	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
144	Khampedong	51	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
145	Khampena	65	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
146	Khampeyai	52	Mahaxai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
147	Koktong	99	Xe Bangfai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
148	Thamlay	68	Xe Bangfai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
149	Some	92	Xe Bangfai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
150	Sokbor	66	Xe Bangfai	Upper XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
151	Beunghuanatai	128	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
152	Beunghuanakang	39	Xe Bangfai	Middle XBF	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
153	Beunghuananeua	55	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
154	Dongsavang	33	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
155	Toung	212	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
156	Dongmakba	116	Xe Bangfai	Middle XBF	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
157	Yangyai	210	Xe Bangfai	Middle XBF	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
158	Som	147	Xe Bangfai	Middle XBF	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
159	Nakhomkao	61	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
160	Nakhomthong	115	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
161	Khokkengkhene	47	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
162	Nongphang	47	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
163	Phondeetong	43	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
164	Sang	246	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
165	Nabeung	98	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
166	Houylangmeu	74	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
167	Noi	40	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
168	Xenoi	81	Xe Bangfai	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
169	Dongmakfai	100	Xaibouli	Middle XBF	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
170	Nongbone	150	Xe Bangfai	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
171	Naphoktheung	81	Xe Bangfai	Lower XBF 1	n/a	n/a	Y	N	N	N	N	Y	N	N	N	N	N	N
172	Nalak	87	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
173	Pongkiew	106	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
174	Laona	129	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
175	Nachampa	120	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
176	Nahoun	120	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
177	Phonephieng	137	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N

					Potential Physical / Environmental Impacts						Potential Social - Economic Impacts							
Ref. No	Village Name	No. HH	District	Impact Zone	Physical impact for U/S Nakai Res	Physical impact for D/S Nakai Dam	Physical / Environmental Impact for D/S of Power Station				Livelihood Losses due to increased flooding	Impacted fish catch	Dry Season Rice Crop *(reduction in pumping costs)*	Degradation of water Supply / Sanitation	Infrastructure			
					Change of aquatic habitat on Nakai Plateau	Reduced discharge below Nakai Dam in Nam Theun	Increased flows / Incremental flooding during wet season	Increased amplitude & frequency of water level fluctuations during dry season	Increased dry season water levels	Reduced water quality and / or higher turbidity	*(wet season rice, livestock, aquaculture losses)*				Structures	Riverbank Garden Losses	Dry season Access	Irrigation Pumps Pontoons
Group C2: Hinterland villages downstream of the NT2 Power Station (101 villages) - CONTINUED																		
178	Nongpham	90	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
179	Phonexai	71	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
180	Laokhung	42	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
181	Nonchick	51	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
183	Nanoi	56	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
184	Dongkhung	226	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
185	Dongkasinh	78	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
186	Dongbounyai	212	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
187	Dongbounnoi	49	Nongbok	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
188	Dongkhuang	72	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
189	Santisouk	92	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
190	Phon	160	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
191	Nongbok	146	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
192	Sibounhong	174	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
193	Nongdone	164	Nongbok	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
194	Nathong	51	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
195	Kang	310	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
196	Sikhai	135	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
197	Sixiengmai	197	Xaibouli	Lower XBF 1	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
198	Veuntai	157	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
199	Veunsivilai	162	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
200	Veunxai	122	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
201	Veunneua	159	Xaibouli	Lower XBF 1	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
203	Donggnang	49	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
204	Dongpou	107	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
205	Naoneua	130	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
206	Beungbouathong	135	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
207	Naotai	167	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
208	Dongpao	140	Xaibouli	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
209	Yangkhamneua	72	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
210	Yangkhamtai	100	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
211	Laodokmai	72	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
212	Nakhanay	133	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
213	Nongsaphangthong	106	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
214	Nongsaphangthoung	106	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
215	Mouangkhai	94	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
216	Tantheung	150	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
217	Khoksavang	68	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
218	Nonglee	149	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
220	Navangthong	82	Nongbok	Lower XBF 2	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
221	Nonenakham	81	Xaibouli	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
222	Dongpangpao	90	Nongbok	Lower XBF 3	n/a	n/a	N-tbv	N	N	N	N	Y	N	N	N	N	N	N
223	Khokkong	107	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
264	Beungsantheung	24	Nongbok	Lower XBF 3	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
265	Huaythong	152	Xaibouli	Lower XBF 2	n/a	n/a	N	N	N	N	N	Y	N	N	N	N	N	N
Subtotal		**11531**	**Est. HHs**	**101**	**villages**													

ANNEX 4

Pre-COD Village Entry Plan

Pilot Villages

Ref. No	Village Name	No. HH	District	Impact Zone	Downstream Program Commencement
Group C1: Riparian Villages downstream of the NT2 Power Station					
10	Nongping	115	Gnommalat	Nam Gnom	2006
24	Mahaxaitai	185	Mahaxai	Upper XBF	2006
25	Povaneua	88	Mahaxai	Upper XBF	2006
26	Povatai	111	Mahaxai	Upper XBF	2006
29	Kengpe	89	Xe Bangfai	Upper XBF	2006
34	Veunsananh	72	Xe Bangfai	Middle XBF	2006
35	Hatpek	33	Xe Bangfai	Middle XBF	2006
46	Yangkham	244	Xe Bangfai	Lower XBF 1	2006
47	Hatkhamhieng	233	Xe Bangfai	Lower XBF 1	2006
49	Beungxe	120	Xaibouli	Lower XBF 1	2006
69	Navangneua	154	Nongbok	Lower XBF 2	2006
71	Hatxaifong	71	Nongbok	Lower XBF 2	2006
78	Thaphoxai	109	Xaibouli	Lower XBF 3	2006
82	Nasang	196	Xaibouli	Lower XBF 3	2006
Group C2: Hinterland villages downstream of the NT2 Power Station					
130	Phathoung	75	Gnommalat	Nam Phit / Houay Khama	2006
131	Khoksavang	81	Gnommalat	Nam Phit / Houay Khama	2006
143	Khamfeuang	95	Mahaxai	Upper XBF	2006
164	Sang	246	Xe Bangfai	Middle XBF	2006
199	Veunsivilai	162	Xaibouli	Lower XBF 1	2006
206	Beungbouathong	135	Xaibouli	Lower XBF 2	2006
221	Nonenakham	81	Xaibouli	Lower XBF 3	2006
	21	**2695**			

July-August 2007

Ref. No	Village Name	No. HH	District	Impact Zone	Downstream Program Commencement
Group C1: Riparian Villages downstream of the NT2 Power Station					
21	Kengsavang	28	Mahaxai	Upper XBF	Jul-07
22	Mahaxaineua	65	Mahaxai	Upper XBF	Jul-07
23	Mahaxaikang	51	Mahaxai	Upper XBF	Jul-07
27	Phanang	52	Mahaxai	Upper XBF	Jul-07
28	Pong	40	Mahaxai	Upper XBF	Jul-07
30	Thakhor	54	Xe Bangfai	Upper XBF	Jul-07
31	Thahat	63	Xe Bangfai	Upper XBF	Jul-07
32	Kengkhean	42	Xe Bangfai	Middle XBF	Jul-07
33	Kasee	56	Xe Bangfai	Middle XBF	Jul-07
36	Palai	47	Xaibouli	Middle XBF	Jul-07
37	Kuase	314	Xe Bangfai	Lower XBF 1	Jul-07
38	Manilad	110	Xaibouli	Lower XBF 1	Aug-07
39	Khamsavang	69	Xaibouli	Lower XBF 1	Aug-07
40	Dangsavanh	64	Xaibouli	Lower XBF 1	Aug-07
41	Souvanxai	69	Xaibouli	Lower XBF 1	Aug-07
42	Dangtha	86	Xe Bangfai	Lower XBF 1	Aug-07
43	Naphoktha	76	Xe Bangfai	Lower XBF 1	Aug-07
44	Somsaat	32	Xe Bangfai	Lower XBF 1	Aug-07
45	Hatkhamdee	47	Xaibouli	Lower XBF 1	Aug-07
48	Tonhaen	240	Xaibouli	Lower XBF 1	Aug-07
50	Namphou	74	Nongbok	Lower XBF 1	Aug-07
Group C2: Hinterland villages downstream of the NT2 Power Station					
171	Naphoktheung	81	Xe Bangfai	Lower XBF 1	Aug-07
	22	**1760**			

July 2008

Ref. No	Village Name	No. HH	District	Impact Zone	Downstream Program Commencement
Group C1: Riparian Villages downstream of the NT2 Power Station					
53	Sorkbor	113	Nongbok	Lower XBF 1	Jul-08
16	Naphong	51	Mahaxai	Upstream Upper XBF	Jul-08
17	Dangkang	53	Mahaxai	Upstream Upper XBF	Jul-08
18	Vatthat	50	Mahaxai	Upstream Upper XBF	Jul-08
19	Somsanouk	52	Mahaxai	Upstream Upper XBF	Jul-08
20	Nakio	107	Mahaxai	Upstream Upper XBF	Jul-08
51	Hatxaisoungneua	139	Xaibouli	Lower XBF 1	Jul-08
52	Hatxaisoungtai	134	Xaibouli	Lower XBF 1	Jul-08
	8	**699**			

Ref. No	Village Name	No. HH	Impact Zone	Downstream Program Commencement
Group B: Villages downstream of the Nakai Dam (Khamkeut District)				
114	Khammouane	105	Nam Phouan/Phiat	Mar-08
122	Phonlom	69	Nam Ngoy	Apr-08
123	Phamouang	101	Nam Ngoy	Apr-08
124	Phongnam	43	Nam Ngoy	Apr-08
125	Nagnoy (Navaat)	56	Nam Ngoy	Apr-08
182	Nakham	65	Nam Ngoy	Apr-08
90	Phonevilai	90	Nam Kata	Apr / May 08
92	Phonsee	92	Nam Kata	Apr / May 08
93	Korhai	93	Nam Kata	Apr / May 08
119	Kouanchanh	119	Nam Kheo	Apr / May 08
120	Poung (+Boungpatao)	120	Nam Kheo	Apr / May 08
202	Phontan	202	Nam Kheo	Apr / May 08
113	Dongbang	113	Nam Phouan/Phiat	Apr / May 08
97	Nongdong	97	Lower Nam Phao	Apr / May 08
102	Oudom	102	Lower Nam Phao	Apr / May 08
103	Nongpong	103	Lower Nam Phao	Apr / May 08
107	Phonhong	107	Upper Nam Phao	Apr / May 08
99	Phonthong	99	Lower Nam Phao	To be determined (THXP host village)
121	Nongxong	121	Nam Ngoy	To be determined (THXP host village)
112	Sopphouan	112	Nam Phouan/Phiat	To be determined (THXP host village)
98	Phonxai (+Naphet)	98	Lower Nam Phao	Mid to late 2008
100	Namphao	100	Lower Nam Phao	Mid to late 2008
101	Chengsavang	101	Lower Nam Phao	Mid to late 2008
104	Namthee	104	Lower Nam Phao	Mid to late 2008
87	Vangkor / Nahang	87	Nam Kata	Mid to late 2008
88	Thongkhae / Nafouang	88	Nam Kata	Mid to late 2008
91	Vangpha	91	Nam Kata	Mid to late 2008
94	Nongmek	94	Nam Kata	Mid to late 2008
95	Namdeun	95	Nam Kata	Mid to late 2008
225	Nathone / Phonkhoun /	225	Nam Kata	Mid to late 2008
226	Phonsaat / Phonkeo / Pakkatan	226	Nam Kata	Mid to late 2008
110	Houykeo	110	Nam Phouan/Phiat	Mid to late 2008
115	Thabak	115	THPC headpond	To be verified
116	Nongkok (+Latmuang)	116	THPC headpond	To be verified
105	Phonpheng	105	Upper Nam Phao	Mid to late 2008
106	Thoungchaleun	106	Upper Nam Phao	Mid to late 2008
108	Phonmuangnoi	108	Upper Nam Phao	Mid to late 2008

ANNEX 5

General Policy and Principles for Village Funds

Note: The following will be be revised following assessment of Village Fund component of the Downstream Program – refer to Chapter 4 for additional information

Contents

1. The regulation on Income Restoration Fund management and execution

Introduction

1 Background

The Concession Agreement between NTPC and the Government of Lao PDR has specified conditions for the compensation for affected households through impacts caused by the construction of Nam Theun 2.

The CA section says:

PAPs are entitled to participate in livelihood restoration programs so as to ensure that their level of fish, protein and fisheries income lost, are at least restored to pre-Project levels.
The fisheries and livelihood restoration program may include:
a) Fish for fish aquaculture programs (such as integrated fish-rice farming, fish pond culture, and integrated livestock-fish farming);
b) Development of alternative livestock production program; and
c) Improved natural fisheries management option in rivers and wetlands.
The level of income restoration programs required will be identified on a household by household and village by village basis through the Implementation Plan to be carried out. PAPs will be entitled to receive the full benefit of the technical assistance and extension services to be provided by the Company.

The Downstream Program-Livelihood Restoration will restore livelihood activities, provide water supply systems for villagers living along and near the Xe Bang Fai and Nam Theun. The livelihood of affected households in 6 districts (Gnommalath, Mahaxai, Xe bang Fai, Xaibouli and Khamkeut) of three provinces (Khammouane, Savannakhet and Bolikhamxai) will be restored to the pre-impact level within the project period.

2 Objectives of Savings and Credit Fund Establishment

- To restore livelihoods in affected villages
- To enable affected households to access funds for increasing family incomes and reducing family difficulties
- To create solidarity among communities and perpetuate the availability of credit funds in their communities
- Allowing households in affected villages to borrow funds for income -generating activities to reach or exceed pre-impact income levels.
- Enabling villagers to identify problems and seek out solution by themselves.
- Enabling village authorities and village members to manage and execute village fund.

3 Strategy

- To provide momentum for livelihood restoration activities in the affected villages
- To promote economic growth and improve sustainable living conditions
- To enhance villagers' and local authorities' capacity to manage their resources effectively and efficiently.
- To decentralize implementation to beneficiaries at village level and local authorities for effective and accountable management.

4 Advantages of savings and credit funds

- Enabling households to access fund for livelihood restoration activities and reduce family difficulties
- Enabling households and villages to develop socially and economically
- Encouraging solidarity among communities and creating opportunity for community to decide their problems by themselves

5 Key organizations relevant to implementation at local area

- Village authorities
- Governmental organizations: Resettlement Management Unit (RMU) and District Working Group (DWG)
- NTPC-Downstream Program-Community Development/Village Fund Team

6 Implementing responsibilities

- Village authorities are responsible for implementation of village fund in their villages
- RMU and DWG are responsible for guidance, coordination, monitoring, and undertaking activities step by step.
- NTPC-Downstream Program-Community Development/Village Fund Team is responsible for capacity building, technical assistance, methodology and handing over activities to RMU and DWG step by step

7 The stages of intervention

- Stage 1: establishment of procedures/process (election of village fund committee, accounting system, monitoring etc.)
- Stage 2: Linking fund with livelihood activities step by step, in-depth and comprehensively.
- Stage 3: Handing over of activities step by step and preparation for exit

7.1 Formation of Village Development Committee

Some NT2 villages already have a VDC and where the village does not yet have a village development committee, the NT2 team will, with the district working groups, facilitate local communities to establish VDCs through the following process. The village organizational structure is strengthened through the establishment of a Village Development Committee (VDC), which consists of between 5 to 10 people depending upon the village situation in relation to extent of impact.

1. The need for and role of the VDC is explained at a village orientation meeting – this includes a description of the role and function of the VDC, the purpose and objective of establishing the VDC, typical functions and tasks performed by VDC` members. The latter is provided in order that the community may think of type of personal qualities that will be needed by VDC members. Functions required are accounting and cash safe keeping, coordination and monitoring, planning. These people must be respected within the village and seen as trustworthy, honest and reliable persons.

2. At a subsequent meeting, selection criteria for VDC membership, and community selection of VDC representatives proceeds. The actual structure of the VDC will depend upon the activities being supported and implemented in the village.

The community is advised on the role and responsibility of the VDC and what type of skills or personal attributes, are most needed.

a. The need for true representation in terms of gender and vulnerable groups is emphasized. This will provide some guidelines for the activity selection process and is the only manner in which the selection process should be manipulated.

b. Explanations are given on how The VDC fits into the existing village administrative organisation, reporting to the Village Head, and the Village Administration Committee (VAC).

c. Some of the same people may be members of both the VAC and VDC. This does not present an organisational problem as dual membership on committees is quite common.

3. The election of the VDC committee must be carried out by the village community in a transparent way. Each adult over 18 years of age in the village should have the right to participate in the election of the committee. The voting process should be supervised by the DWG to ensure that it is conducted properly and fairly.

8 Characteristics of Village Fund

- Fund value ranges from the Lao Kip equivalent of $75 to $250 per household
- NTPC-DS staff and RMU/DWG technical staff are responsible for savings and credit fund monitoring

9 Extension of target villages

The community development/village fund will cover 50 affected villages before COD.

Round 1 : 20 pilot villages, starting from 2006
Round 2 : 22 villages, starting from middle of 2007
Round 3 : 8 villages, starting from May 2008
(additional villages may be included post-COD but this will depend on finalization of strategy for Xe Bang Fai Hinterland and confirmation of lower XBF post-COD strategy, expected in mid-2009)

10 Stages of savings and loan fund implementation

10.1 Stage 1 : The consultation meeting

1. Dissemination of objectives for savings and loan funds
2. To reach agreement among village authorities and villagers on details of fund in each village
3. Selection of candidates for village fund committee

10.2 Stage 2 : Establishment of Village Fund Committee

4. Election of Village Fund Committee
5. Presenting the regulation on village funds and provision of training course on accountancy and village fund management
6. Proposal of opening village fund Accounts at BCEL at Khammouane province Branch
7. RMU/DWG keeps village fund account passbooks

10.3 Stage 3 : Arrangement of loan distribution

1. Establishment of production groups, selection of production groups' heads and deputy heads
2. Borrowers together with production groups' heads are required to make investment/business plans, then submitting to village technicians
3. RMU/DWG team then visit the village and check the household and approve or reject the plan
4. Village technical specialist will examine the business plan to ensure suitability, viability and check that the amount requested is appropriate and recommendations will be made for necessary adjustments as needed.
5. The technical specialist then refers the submitted business plans to the head of the committee. The plans are reviewed by the committee, technical specialist, DWG, with the assistance of the relevant specialists in NT2.
6. The approved loan applications are then forwarded to the District Governor for approval or rejection
7. District Governor sends loan applications back to RMU
8. RMU presents the approved loan applications to the RC for further approval or rejection
9. RC returns approved or rejected loan applications to RMU
10. RMU sends approved loan applications (if any) to Downstream office
11. DS team assists the village to open a bank account (currently with BCEL Thakhek)
12. Downstream Office follows NTPC requisition and approval processes and funds will be transferred to the village bank accounts
13. Borrowers must maintain a diary record of how they invest the borrowed money.
14. Loan distribution to be made two times per year (dry and wet seasons), except business activities and emergency cases

15. Making mutual or individual guarantees based on village fund committee's agreement. Establishment of group loans for a specific type of activity (eg fish ponds, rice cultivation) with group guarantees is encouraged for efficiency and also for enhancing the solidarity of the group.

10.4 Stage 4 : Withdrawal of money from the bank

1 Village Fund Committee (VFC) is required to inform RMU/DWG staff 3 days in advance
2 2 members of VFC with withdrawal sheet and three signatures of signatories meet RMU staff who will guide process of money withdrawal
3 NTPC will be responsible for costs of transport, accommodation, DSA based on its procedure. VFC is required to reimburse cash advance derived from village fund treasurer
4 RMU staff is required to copy papers relevant to money withdrawal , send them to DWG and NTPCŒCD
5 Each withdrawal of money shall be in accordance with investment plans, but not more than 50,000,000 Kip per time subject to the Bank regulation
6 Loan distribution is required to be completed in one day in order to avoid cash losses

10.5 Stage 5 : Deposit of money in Village Fund Accounts at the Bank

1. The cash which is allowed to be kept in the safe box in the village (provided by NTPC), is not more than 5,000,000 Kip. The balance shall be deposited in the village

fund Accounts by coordinating with DWG/RMU staff so as to collect and deposit in the village fund accounts.

2. If VFC carries out deposit of cash in the village fund accounts, information about this task is required to be made to village fund advisors and RMU/DWG staff. NTPC CD team will be responsible for cost of transport, accommodation, DSA based on its procedure and VFC is required to reimburse cash advance to village fund treasurer.
3. At the end of each month, RMU staff is required to send the bank statements derived from the bank to DWG and NTPCŒCD team so as to enter into monthly cash flow report.

ANNEX 6

UXO Support Documentation

ແບບສອບຖາມຂໍ້ມູນລະເບີດພາຍໃນບ້ານ

Unexploded Ordnance (UXO) - Village Questionnaire

ວັນທີ Date		ບ້ານ Village Name	
ເກັບຂໍ້ມູນໂດຍ Data collected by *(NTPC representatives)*		ເມືອງ District	
		ແຂວງ Province	
		ຕິວເລກອ້າງອີງ NTPC Ref #	

For each village at least two questionnaires should be completed; one must be with village authority (e.g. Village Headman). The second can be with a group, or with an individual.

ເກັບຂໍ້ມູນແບບເປັນກຸ່ມບໍ່? **ແມ່ນ** **ບໍ່**	
1.1 Was data collected through group meeting ☐ Yes ☐ No	
ຖ້າວ່າແມ່ນ, ມີຈັກຄົນ (ໂດຍປະເມີນ): If yes, how many people, total *(approx):*	
ມີຍິງຈັກຄົນ: How many women *(approx):*	
ເກັບຂໍ້ມູນແບບລາຍບຸກຄົນບໍ່? **ແມ່ນ** **ບໍ່**	
1.2 Was data collected by individual interview ☐ Yes ☐ No	
ຖ້າວ່າແມ່ນ, ຜູ້ກ່ຽວຊື່ຫຍັງ: If yes, name of interviewee:	
ຕຳແໜ່ງ, ຖ້າຫາກວ່າມີ: Position, if any:	
ເຈົ້າມີຄວາມຮູ້ເລື່ອງລະເບີດສົງຄາມໃນບ້ານເຈົ້າບໍ່? **ມີ** **ບໍ່**	
2. Do you have any knowledge of UXO in your village area: ☐ Yes ☐ No	
ຖ້າມີ, ຮູ້ມາຈາກໃສ: ເຫັນດ້ວຍຕົນເອງ ເຄີຍໄດ້ຍິນຈາກຜູ້ອື່ນ If yes, where did you learn? ☐ Observe ☐ Heard from others	
ຖ້າເຄີຍເຫັນ, ອະທິບາຍຂະໜາດ, ປະເພດ ແລະ ສະຖານທີ່ໆພົບ: If you have seen UXO, explain size, type and location of UXO found:	

ຖ້າເຄີຍຍິນຈາກຄົນອື່ນ, ໃຫ້ບອກ ຊື່/ ທີ່ຢູ່ຂອງບຸກຄົນດັ່ງກ່າວ ແລະ ສິ່ງທີ່ໄດ້ຍິນມາ:

If you have heard from others, give name and address and information on what was said

ເຈົ້າຮູ້ປະຫວັດສົງຄາມທີ່ເກີດຂຶ້ນຢູ່ບ້ານເຈົ້າບໍ່? **ຮູ້** **ບໍ່**

3. Do you know the war story of your village: ☐ Yes ☐ No

ຖ້າຮູ້, ຮູ້ໄດ້ແນວໃດ? ເຄີຍເຂົ້າຮ່ວມສົງຄາມ ຄົນອື່ນເລົ່າ

If yes, how do you know? ☐ Involved ☐ Told by others

ອະທິບາຍສິ່ງທີ່ເຈົ້າຮູ້; ສະຖານທີ່, ຊ່ວງເວລາ ແລະ ຄວາມເປັນມາ.

Explain what you know; indicate place, time period and story

ເຄີຍມີອຸປະຕິເຫດທີ່ກ່ຽວກັບລະເບີດຢູ່ບ້ານເຈົ້າບໍ່? **ມີ** **ບໍ່**

4. Have there been any UXO accidents in your village area: ☐ Yes ☐ No

ຖ້າມີ, ອະທິບາຍສິ່ງທີ່ເກີດຂຶ້ນ (ເກີດຂຶ້ນໄດ້ແນວໃດ , ຈຳນວນຄົນທີ່ກ່ຽວຂ້ອງ, ແລະ ອື່ນໆ) ແລະ ເກີດຂຶ້ນຕອນໃດ:

If yes, explain what happened (circumstances, number people involved, etc..) and when:

ເຄີຍມີ ການສຳຫຼວດ/ເກັບກູ້ລະເບີດ ຢູ່ບ້ານເຈົ້າບໍ່? **ມີ** **ບໍ່**

5. Has there been any UXO survey / clearance in your village area: ☐ Yes ☐ No

ຖ້າມີ, ໂດຍໃຜ, ສະຖານທີ່, ເວລາ, ກວມພື້ນທີ່ຫຼາຍເທົ່າໃດ:

If yes, explain by who, where, when, how much area:

ເຈົ້າຮູ້ປັນຫາລະເບີດທີ່ບໍ່ທັນແຕກຢູ່ບ້ານຂ້າງຄຽງເຈົ້າບໍ່? **ມີ** **ບໍ່**

6. Do you know of any UXO problem in nearby villages: ☐ Yes ☐ No

ຖ້າມີ, ອະທິບາຍສະຖານທີ່, ມີຫັ້ງແດ່:

If yes, explain where, what

ເຈົ້າມີຄວາມວິຕົກກັງວົນກັບລະເບີດທີ່ບໍ່ທັນແຕກຢູ່ບ້ານເຈົ້າບໍ່? **ມີ** **ບໍ່**

7. Are you concerned about UXO in your village : ☐ **Yes** ☐ **No**

ໃຫ້ອະທິບາຍ ຍ້ອນຫັ້ງຈຶ່ງມີ, ແລະ ບໍ່ມີ

Explain why, why not

NTPC
DCC VTE RECEIVED
Log No: 21859
Filing Code: D01 90 03
Date Received: 09 OCT 2007

GOL Support
Environ

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

===00000===

0345

ແຂວງຄຳມ່ວນ ເລກທີ /ຈຂ.ຄມ
ຄະນະກຳມະການຍົກຍ້າຍຈັດສັນ ຄຳມ່ວນ ວັນທີ 2 SEP 2007
ໂຄງການນ້ຳເທີນ 2

ແຈ້ງການ

ເຖິງ : ທ່ານຜູ້ອຳນວຍການບໍລິສັດໄຟຟ້ານ້ຳເທີນ 2 ຈຳກັດ.

ເລື້ອງ : ບັນຫາການເກັບກູ້ລະເບີດໃນເຂດຕອນລຸ່ມເຮືອນຈັກ.

- ເພື່ອເຮັດໃຫ້ວຽກງານການຊົດເຊີຍແລະການພັດທະນາອາຊີບສຳລັບປະຊາຊົນທີ່ຖືກກະທົບໃນເຂດຕອນລຸ່ມຂອງເຮືອນຈັກຕາມທີ່ໄດ້ລະບຸໄວ້ໃນສັນຍາສຳປະທານໄດ້ຖືກດຳເນີນໄປຕາມກຳນົດເວລາແລະຫລຸດຜ່ອນການໃຊ້ຈ່າຍທີ່ເຫັນວ່າບໍ່ຈຳເປັນ.
- ເພື່ອເປັນບ່ອນອີງໃນການເຄື່ອນໄຫວຈັດຕັ້ງປະຕິບັດວຽກງານໃນຕໍ່ໜ້າ.

ເຈົ້າແຂວງໆຄຳມ່ວນ, ປະທານຄະນະກຳມະການຍົກຍ້າຍຈັດສັນໂຄງການນ້ຳເທີນ 2 ຈຶ່ງຖືເປັນກຽດແຈ້ງມາຍັງທ່ານຜູ້ອຳນວຍການບໍລິສັດໄຟຟ້ານ້ຳເທີນ 2 ຈຳກັດຊາບວ່າ : **ບໍ່ໃຫ້ມີການກວດກາເພື່ອເກັບກູ້ລະເບີດທີ່ບໍ່ທັນແຕກນັບຕັ້ງແຕ່ບ້ານກິກຕ້ອງ-ຖ້ຳລາຍ-ສ້ອມ-ແກ້ງແປ ທີ່ຂຶ້ນກັບເມືອງເຊບັ້ງໄຟລົງຈົນເຖິງປາກນ້ຳເຊບັ້ງໄຟທີ່ຕົກໃສ່ນ້ຳຂອງຍ້ອນຍ້ຽງເຂດດັ່ງກ່າວບໍ່ໄດ້ມີການຖິ້ມລະເບີດໃນສະໄໝສົງຄາມ, ແຕ່ໃຫ້ມີການກວດກາເພື່ອເກັບກູ້ລະເບີດນັບແຕ່ເຂດບ້ານປົ່ງ ເມືອງມະຫາໄຊຂຶ້ນໄປຈົນເຖິງບໍລິເວນຕັ້ງເຮືອນຈັກຂອງໂຄງການນ້ຳເທີນ 2.**

ດັ່ງນັ້ນຈຶ່ງແຈ້ງມາຍັງທ່ານເພື່ອແຈ້ງຕໍ່ໄປໃຫ້ໜ່ວຍງານທີ່ກ່ຽວຂ້ອງສຳລັບເປັນບ່ອນອີງໃນການຈັດຕັ້ງປະຕິບັດກິດຈະກຳຕ່າງໆຕໍ່ໄປ.

ດ້ວຍຄວາມນັບຖືແລະຮັກແພງ.

ເຈົ້າແຂວງໆຄຳມ່ວນ
(ປະທານຄະນະກຳມະການຍົກຍ້າຍຈັດສັນໂຄງການນ້ຳເທີນ 2)

ຄຳໃບ ດຳລັດ

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

====== 000 ======

KMP No 0345/KMP.Gov.

NT 2 Project RC Khammouane, 2 SEP 2007

Notification

To: NTPC Director.
Subject: UXO clearance in lower stream area.

- For compensation and livelihood of affected people in lower stream area to proceed in accordance with CA provisions and to reduce unnecessary expenses.
- For reference in implementation subsequently.

KMP Governor, NT 2 Project RC Chairman has the honour to inform NTPC Director that there is no need in survey for UXO clearance in the area from Ban Koktong-Thamlai-Some-Kengpae under XBF district down to the confluence between XBF river and Mekong river as there was no bombardment in that area in the war time. However, the survey must be conducted in the area from location of Ban Pong, Mahaxai district up to NT 2 Project power house location.

Accordingly, this for your information for further communicating the units concerned for reference in the implementation subsequently.

With respect and love
KMP Governor
(**NT 2 Project RC Chairman**)

C1145

APPENDIX 1: DESCRIPTION OF THE WORKS

"**Authorised Persons**" means the Contractor's Personnel and any of the following categories of persons as notified by the Client to the Contractor from time to time:
(a) the Government of Lao (GOL) through GOL Representatives;
(b) Client's Personnel and Client's Representatives;
(c) any other personnel notified to the Contractor by (or on behalf of) the Client.

"**UXO Clearance Team**" means the Contractor's field team as defined in Clause 2.4 of this Appendix 1.

"**NCA**" (Nominated Clearance Area) means those areas for which the Contractor is required to conduct Shallow and Deep Search and Explosive Ordnance Disposal clearing. NCAs shall be nominated by the Client during execution of the Works.

"**Clearance Certificate**" means a numbered, signed, certification from the Contractor that a particular area of land has been UXO searched and cleared in accordance with the specified UXO clearance standards.

"**Deep Search**" means an EOD instrumented search task designed to locate and remove UXO and contaminants up to a depth of 4 m as specified in Clause 2.8 (UXO Deep Search and Clearance Activities).

"**Demolition**" means the controlled destruction of UXO by explosive means.

"**Demolition Ground**" means an area set aside for the demolition of UXO that is either safe to transport or has been rendered safe. This area has features that allow the maximum control of human access while demolition is in progress.

"**EOD Field Manager**" means a Lao National qualified Senior EOD Technician.

"**Explosive Ordnance Disposal**" or "**EOD**" means the detection, identification, evaluation, render safe, recovery and disposal or UXO and other items of explosive ordnance.

"**Marking**" means the identification of UXO search and clearance zones by coloured marker posts or marker posts with coloured plastic attached or joined by coloured plastic tape or fencing as specified in Clause 2.14 (Marking).

"**Downstream Area**" means the areas within Khammuane and Savanakhet Provinces that the Client will implement activities as part of the Downstream Program for which the Contractor shall undertake UXO search and clearance.

"**Shallow Search**" means an EOD instrumented search task designed to locate and remove UXO and contaminants in the first 50 cm of the soil as specified in Clause 2.7 (Shallow Search and Clearance).

"**Standard Operating Procedures**" (**SOPs**) means the Contractor's standard operating procedures for EOD, included in Appendix 5 of this Contract. The document defines the standards and procedures for the conduct of EOD operations.

"**UXO (Unexploded Ordnance**)" means items of explosive ordnance that have been primed, fused, armed or otherwise prepared for use or used. The item may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other cause.
"**Works**" means the UXO search, marking and clearance work to be undertaken by the Contractor in accordance with the Agreement.

1. BACKGROUND

The Nam Theun 2 Hydroelectric Project (NT2) is being developed by the Client as an independent power project to supply electrical energy to Lao PDR and Thailand.
The Downstream Program will operate within 183 villages1 within what is often referred to as the "Downstream Area", which is located within the following districts2:

Province	District	Approximate Number of Villages	Approximate Number of Households
Khamouane	Gnommalat	25	3,332
	Mahaxai	23	1,819
	Xe Bang Fai	37	3,742
	Nongbok	49	5,305
Savannakhet	Xaibouli	49	5,264
Total		183	19,462

The Downstream Program is a multi-faceted program aimed to compensate those villages and households located downstream of the NT2 power station which may be adversely affected by operation of the Nam Theun 2 Hydroelectric facility.

There has been previous military conflict in the Downstream Area resulting in UXO contamination. Downstream Area explosive ordnance detection and disposal work is being carried out to provide a safe working environment to implement the Downstream Program activities described above.

2. SCOPE OF WORK

2.1 General

[1] Number of villages as of August 2007
[2] The Downstream Program may also operate in the Nakai and Khamkeut districts. However, these districts are not considered in this paper as at this time it is not envisioned that the types of activities which the Client will promote or undertake has generates UXO exposure risk.

The Contractor shall be responsible for all activities required to provide a team of UXO specialists and support personnel that will allow completion of the Works:

The Works shall include the conduct of Shallow Search, Deep Search, Marking and Explosive Ordnance Disposal of NCA to satisfy the specified clearance requirements and standards.

The Contractor shall be responsible for all aspects of the Works, including employment of personnel, provision of accommodation and meals, transportation, specialist personnel qualified and experienced in EOD, search instruments and equipment, safety equipment and machines, and management and reporting.
If required by the Client, the Contractor may also provide Pathfinding services, to support specific activities that the Client must undertake.

2.2 Vegetation Reduction and/or Clearing for UXO Clearance

The Contractor shall ensure that all vegetation (including trees with a trunk diameter of less than 15 cm) that would impede the effective use of search instruments is cut and removed from each NCA. Trees with a trunk diameter of greater than 15 cm shall not be cut or removed.

The cleared vegetation shall be completely removed from each NCA to be surveyed for UXO so as not to impede any subsequent EOD audits of the Contractor's UXO search and clearance work. The Contractor shall liaise with the relevant local Governmental Authorities to establish an acceptable location for placement of the vegetation cleared from the area to be surveyed for UXO.

2.3 Clearance Areas

The Contractor shall be responsible for UXO search, marking and clearance work within the each NCA identified by the Client. NCAs will vary significantly in size (potentially from 9m2 to over 500m2), depending on the intended use of the area.

Examples of intended usage for NCAs include:

- Water supply construction (boreholes, pump platforms, other water supply facilities)
- Mini-polder construction
- Repair of water gate structures
- Asset protection and relocation, including work related to

Irrigation systems for newly established for home gardens (replacement of riverbank gardens)
Irrigation pump modifications required due to fluctuations in water levels caused by operation of the NT2 Project
Access routes at risk due to increased water levels and / or increased erosion.
Assets (e.g. structures such as houses, sheds, temples) at risk due to riverbank erosion
Riverbank erosion protection

- Fish pond excavation / construction
- Establishment of new home gardens
- Sanitation infrastructure construction (e.g. household and community toilets)

- Other areas as may be nominated by the Client's Representative or Client's Field Representative.

2.4 UXO Clearance Team

The Contractor shall provide one (1) UXO Clearance Team of UXO specialists and support personnel that shall conduct UXO search, marking and clearance work in the Downstream Area.

The UXO Clearance Team shall consist of the following personnel:

- 1 EOD field manager, full time
- 2 EOD Technicians, full time – to be equipped with separate detectors
- 1 Medic, full time
- 1 Driver, full time
- An expatriate EOD technical manager, part time (however, not less than 50%)

The Contractor shall adjust the number of UXO Clearance Team members according to the work load/location as instructed by the Client. **However, it is mandatory the Contractor to request the Client's prior approval before providing any additional Works and/or any additional UXO Clearance Team members otherwise the Client won't proceed for any payment.**
Additional technicians shall be available (up to 10) shall be added to the UXO Clearance Team within 5 calendar days of the Client instructing the Contractor.

The UXO Clearance Team is a self-contained UXO demolition unit operating to the Contractor SOPs.

The Works shall include the conduct of Shallow Search, Deep Search, Marking, and EOD to satisfy the specified clearance requirements and standards.

The Contractor shall be responsible for all aspects of the Works, including employment of personnel, provision of search instruments, provision of accommodation and meals, transportation, specialist personnel qualified and experienced in EOD, search instruments and equipment, safety equipment and machines, and management and reporting.

2.5 Survey and Mapping

The Client will locate for the Contractor the areas where the Works are required. The coordinate system to be used is: Datum – Indian (Thailand and Vietnam); Spheroid: Everest (Indian 1830); Projection UTM 48.

2.6 Acceptance of Cleared Areas

Groups of NCAs, for which Clearance Certificates have been issued by the Contractor, will be accepted as complete by the Client when:

- the Clearance Certificate and related supporting documentation has been submitted by the Contractor; and
- the group of NCAs has been correctly marked by the Contractor in accordance with the specified requirements for Marking.
- if random EOD audits are performed by the Client and such audits show that the group of NCAs complies with the specified UXO clearance standards.

If random EOD audits are not performed by the Client within the timeframe of the EOD Agreement, following receipt of the related Clearance Certificates from the Contractor, such audit work shall be deemed to have been performed and the Contractor's Clearance Certificate for the related group of NCAs shall be accepted by the Client.

2.7 UXO Shallow Search and Clearance Activities

The Contractor, when performing UXO Shallow Search and Clearance Activities shall carry out vegetation reduction and/or clearing, shallow search, marking and explosive ordnance disposal according to SOPs on areas as directed by the Client in either in writing or instructed by the Client's Representative in the field.

2.8 UXO Deep Search and Clearance Activities

The Contractor, when performing UXO Deep Search and Clearance Activities, shall perform deep search, marking and explosive ordnance disposal according to SOPs on areas as directed by the Client in writing or instructed by the Client's Representative in the field.

2.9 UXO Clearance Standards

The UXO Clearance Team shall destroy all items of UXO identified within the NCAs. All Safety standards as detailed in the Contractor's SOPs for demolition shall be adhered to. As minimum standard appropriate aural warnings using loud hailers (mega-phones) shall be given prior to each and every demolition. If evacuation of villages or other areas is required the Contractor will coordinate such activities.

A group of NCAs for which a Clearance Certificate has been issued, shall be deemed to have failed the UXO clearance standard if the following items are located by a random EOD audit:

(a) Three 20 mm projectiles or metallic items of equivalent mass; or
(b) One item of UXO equal to or larger than a BLU 26 bomblet or a metallic item of equivalent mass.

If any such group of NCAs fails a random audit, that group of NCAs for which the Clearance Certificate has been issued (including all individual NCAs within that group) shall be re-searched, cleared and re-certified at the Contractor's expense.

2.10 Personnel

The Contractor shall provide all personnel needed for execution and completion of the Works.

The Contractor shall recruit and hire all necessary local workers, including those for domestic staff and EOD assistants, in accordance with Lao PDR Law and in coordination with the appropriate Provincial and District Governmental Authorities.

Personnel conducting and assisting in demolition and render-safe tasks shall be formally qualified in the procedures to be used.

All support personnel shall receive training in UXO hazards and identification. Personnel employed on search tasks shall be given more comprehensive training in the location, identification and excavation of UXO, and initial and continuation training on the operation of search equipment and techniques.

2.11 Safety

The Contractor shall provide personal safety and protection equipment to personnel conducting and assisting in UXO searching and disposal in accordance with safety standards applicable to this work in Lao PDR and as stated in the Contractor's SOPs.

Medical support for the UXO Clearance Team shall be provided by a qualified and equipped team medic who shall travel with the team every day.

2.12 Site Procedure and Rules

The Contractor shall ensure that the following site procedures and rules are complied with at all times:

(a) No person shall move or tamper with any markers or barriers identifying safe or danger zones.
(b) All personnel shall stay within the marked safe areas unless authorised by the Contractor or accompanied by a Pathfinder team.
(c) Other than as authorised for the Works, no person shall collect on site or remove from site any UXO artefacts, fragments or remnants.
(d) The Contractor shall provide instructions on site procedures and rules, to all personnel who access the site, including Authorised Persons and personnel performing EOD audits.
(e) Radio or satellite phone communications shall be maintained by the Contractor's site representative.
(f) Camp rules are presented in Appendix 6 (Camp Rules).

2.13 Search and Clearance Requirements

(a) Vegetation Reduction and/or Clearance from UXO Search Areas

The Contractor shall ensure that all vegetation (including trees with a trunk diameter of less than 15 cm) that would impede the effective use of search instruments is cut and removed from each NCA. Trees with a trunk diameter of greater than 15 cm shall not be cut or removed.

(b) Shallow Search, Deep Search and Clearance

The Contractor shall perform a 100% area shallow and deep search of each NCA with calibrated, commercial or military quality, electromagnetic metal detectors. The

electromagnetic metal detectors shall reliably locate UXO (or metallic objects of similar size) in accordance with the following criteria:

(i) objects the size of 81 mm mortars to a depth of 50 cm;

(ii) objects the size of hand grenades or cluster bomblets to a depth of 30 cm; and

(iii) object the size of 105 mm artillery projectiles to a depth of 2m.
(iv) objects the size of large aerial dropped bombs to a depth of 4 m

Searches shall be conducted as per the Contractor's Standard Operating Procedures for shallow and deep searches.

Deep searches of each NCA shall be performed immediately following and as an integrated activity with the shallow search and UXO clearance work for that NCA.

All electromagnetic metal detector readings, including those thought to be geological, shall be investigated and identified.

Searches of rock formations within each NCA shall be by a combination of visual search of cracks and crevasses and instrument search of soil aggregation areas.

The Contractor shall clearly mark any areas within a particular NCA of land which, for any reason, have not been able to be properly shallow or deep searched and cleared of UXO, e.g. areas under water, tree root-balls, etc. Areas so marked shall be clearly identified on the associated Clearance Certificates and supporting documentation for that NCA.

UXO and explosive ordnance items found during the search phase shall be destroyed by explosive demolition or render-safe procedures.

Clearance of each NCA shall mean that the area is 100% cleared of UXO and contaminant to a depth of 2m.

Deep search and clearance of a NCA shall mean that the area is 100 % cleared of UXO and contaminants to such a depth as stated on the Contractors Clearance Certificate.

(c) Explosives and UXO Render-safe Equipment

The Contractor shall be responsible for the supply, transportation, storage and security of all explosives and render-safe equipment that is required to support Contractor's EOD activities.

(d) Removal or Destruction of Assets

The Contractor shall seek approval from the Client before taking any action that may cause damage to agriculture resources, fences or structures here such damage may result in compensation litigation by the owners of such assets.

The Client will be responsible for all compensation procedures in relation to damage to assets within the each NCA, and the Contractor shall cooperate with and assist the Client as

required during any compensation negotiations with asset owners affected by any of the Contractor's Works within each NCA.

The Contractor shall not continue to work in such areas subject to compensation dispute with local asset owners, but shall immediately notify the Client of the location and nature of any such dispute. The Contractor shall only resume work in the disputed area when so directed by the Client.

(e) UXO Disposal

The Contractor shall be responsible for the disposal of all UXO recovered. The Contractor shall maintain a UXO disposal log that records:

(i) The type and number of UXO items destroyed; and
(ii) The 'as found' location of items; and
(iii) The date items were destroyed.
(iv) When conducting demolition of UXO the Contractor shall ensure that:

- Only qualified and experienced personnel are involved.
- Demolition procedures for the handling of explosives are in accordance with the Contractor's SOPs;
- Adequate sentries and warning procedures are in place prior to each UXO demolition, in accordance with the Contractor's SOPs;
- In consultation with the Client the Contractor shall locate a remote demolition ground for the disposal of UXO.

2.14 Marking of Cleared Areas

The Contractor shall accurately record the boundaries/coordinates of all searched areas by means of GPS equipment or other agreed means.

The Contractor shall maintain comprehensive and accurate records defining the location and boundaries of each search area.

Markers shall be installed, and location recorded on the site map.

The proposed final marker design will be approved by the Client upon presentation by the Contractor.

2.15 Quality Assurance and Quality Control

The EOD Contractor shall prepare a quality assurance plan to cover all activities for the Works, including management, safety, training and Quality Control requirements.

The Contractor shall implement a formal quality control (QC) programme under the supervision of a nominated QC supervisor.

The QC programme shall include quality control sampling of not less than 20 % of each cleared area, including both shallow search and deep search sampling.

Quality control sampling shall be conducted with instruments of the same sensitivity as those used to conduct the initial UXO search.

A formal quality control log shall be maintained by the QC supervisor that records the site location and QC sampling details.

2.16 Random EOD Audit

After the Contractor has issued Clearance Certificates for a group of NCAs the Client may conduct random EOD audits of such certified NCAs.

The Contractor shall advise the Client of any changes to the program and shall cooperate with the Client to enable the EOD audits to be conducted in a timely and efficient manner, and without interference with the Contractor's ongoing UXO search, marking and clearance work.

Acceptance by the Client of the Contractor's UXO search, marking and clearance work in each area will be withheld if the Client's random EOD audits show that the Contractor has not achieved the specified UXO clearance standards.

3. REPORTS

3.1 Clearance Certificates

The Contractor shall issue a Clearance Certificate and supporting documents for each group of NCAs, in the opinion of the Contractor, has been cleared of UXO in accordance with the Agreement. Each such Clearance Certificate shall include as a minimum:

(i) Clearance Certificate identifying number;
(ii) List of areas covered by the Clearance Certificate;
(iii) Signed certification statement by the Contractor, certifying that the declared areas have been searched and cleared to the specified UXO clearance standards and that the area is safe for its intended purpose; and
(iv) Signed certification statement by the Contractor, certifying that quality control sampling of not less than 20 % of each area (including both shallow and deep search sampling) has been undertaken and that the areas sampled meet the specified UXO clearance standards.

3.2 Supporting Documents

The Contractor's Clearance Certificate supporting documents shall include the following information:

(i) Plans of each group of NCAs listed in the Clearance Certificate, with coordinates of boundary points (or coordinates for a single point and a specific distance from such point that the UXO clearance standards have been achieved);
(ii) Records of all UXO and metallic items located within each NCA;
(iii) Records of UXO disposal undertaken, in the same format as the UXO disposal log; and
(iv) Copies of quality control reports.

3.3 Incidents/Accidents

The Contractor shall contact the Client field representative at the completion of a work day to report any incidents, including accidents, safety issues, and any problems with local people.

4. INSURANCE

4.1 General

In all cases under this Agreement, the Contractor shall be the Insuring Party. Each insurance, as shown below, shall be affected and maintained by the Contractor for the duration of the Agreement.

The Contractor shall hold the Client harmless against any claims arising as a result of the Contractor's activities.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage. The Contractor shall, as a condition precedent to the Effective Date of the Agreement, submit to the Client evidence that all necessary insurances have been affected.

Once affected, the Contractor shall not make any material alteration to the terms of any of the policies without the prior approval of the Client. If an insurer makes (or attempts to make) any alteration, the Contractor shall promptly give notice to the Client.

If the Contractor fails to effect and keep in force any of the insurances it is required to effect and maintain under the Agreement, or fails to provide satisfactory evidence and copies of policies in accordance with this Clause, the Client has the option to suspend the Agreement.

Nothing in this Clause limits the obligations, liabilities, or responsibilities of the Contractor, under the other terms of the Agreement or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor in accordance with these obligations, liabilities, or responsibilities.

The Contractor shall provide and maintain all insurances as required by Applicable Laws or as required by good industry practice. The Contractor shall ensure that the Client personnel, whether directly hired or subcontract hired, are included as an insured party in each of the insurance policies.

The Client's employees, whether directly hired or subcontract hired, shall, for the purposes of this Agreement and these insurance requirements, be deemed to be employees of the Contractor and such insurances as appropriate shall include them in coverage as employees of the Contractor.

Without limitation to the Contractor's liabilities and obligations under this Agreement, the Contractor shall, at all times during the period in which this Agreement is in force, effect and maintain and evidence to the Client and shall require all Sub-Contractors to effect and maintain and evidence to the Employer, the types and amounts of insurance as given below.

4.2 Worker's Compensation and Employer's Liability Insurances

Worker's Compensation and Employer's Liability (including Occupational Diseases) Insurances as required by the country of hire or origin for all employees employed by the Contractor and Sub-Contractors, and the Client's employees. Coverage shall be in a form as prescribed by the Applicable Laws with acceptable limits of liability for the duration of the Agreement.

4.3 Third Party Liability Insurance

Third Party Liability Insurance (including Excess Automobile Liability) effective for the duration of this Agreement against Common Law liability to third parties for death or bodily injury and/or loss of or damage to property arising from activities in relation to this Agreement.

The limit of liability shall be internationally acceptable and shall be unlimited in the aggregate for the duration of the Agreement.

4.4 Automobile Liability

Automobile Liability Insurance for all automotive equipment owned, non-owned, hired and/or leased and used in the performance of this Agreement, with minimum limits equal to the statutory limits in compliance with Applicable Laws and effective for the duration of this Agreement.

4.5 Professional Indemnity Insurance

Professional Indemnity (PI) Insurance against damages caused by failure of the Contractor to clear the required areas of UXO to the extent and standard required by this Agreement.

The Contractor shall have global and Project specific PI policy with internationally acceptable limits and shall remain in force and effect for two (2) years from the Effective Date of the Agreement.

4.6 Emergency Evacuation

For emergency situations the Contractor shall have a 24-hour Emergency Assistance insurance policy that allows for the helicopter evacuation of seriously injured personnel, both expatriate and Lao.

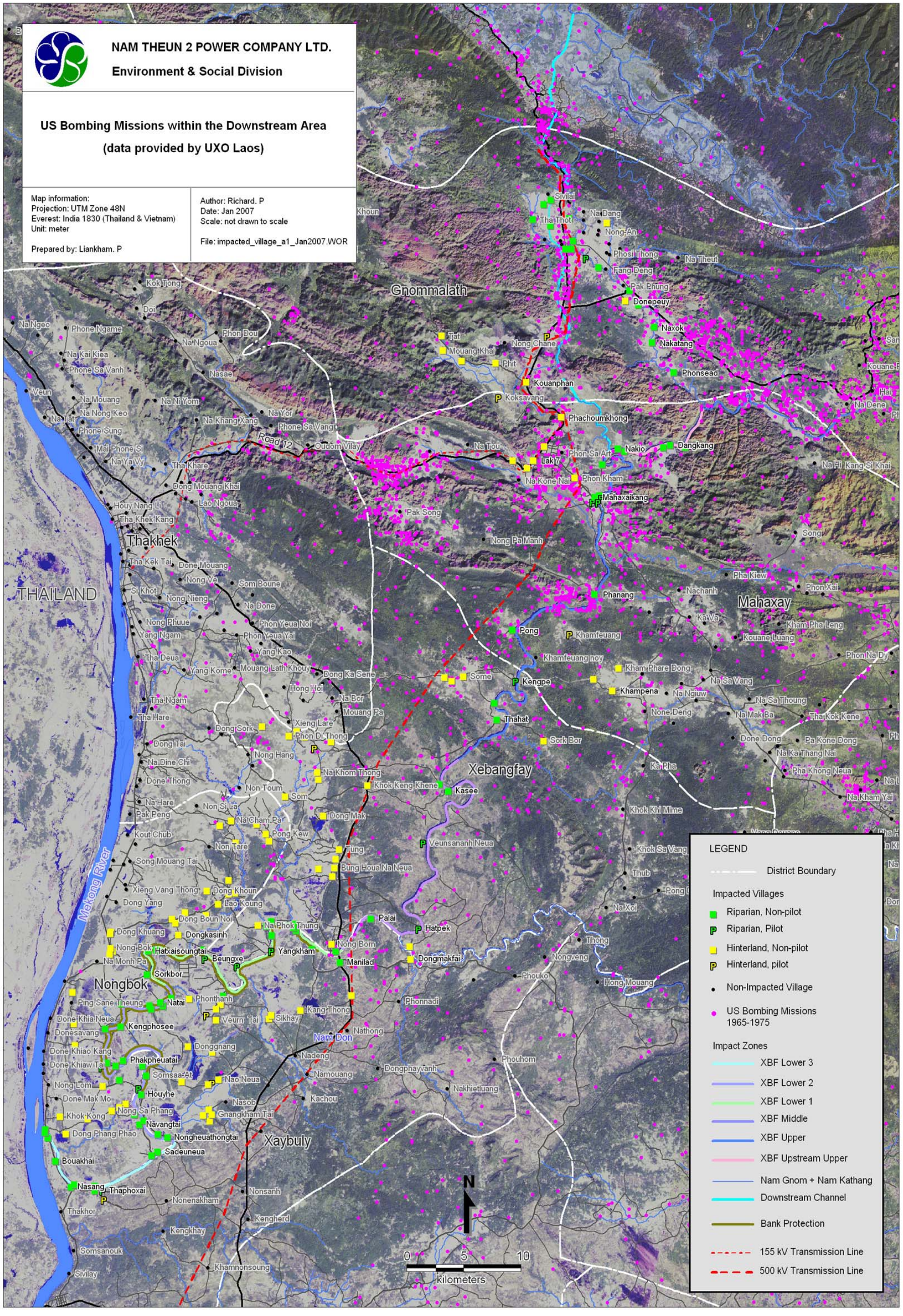
4.7 Additional requirements

The terms of all insurances provided by the Contractor shall be in a form and effected with insurers approved by the Client, where such approval by the Client will not to be unreasonably withheld or delayed.

All insurance policies affected pursuant to this clause shall include a waiver of any rights of subrogation by the insurers thereunder against all additional insured parties.

The Contractor shall release, assign and waive any and all rights of recovery against the Client, the GOL, and any of its sub-Contractors, and all their affiliates, subsidiaries, employees, successors, permitted assigns, insurers, and against other Sub-Contractors which the Contractor may otherwise have.

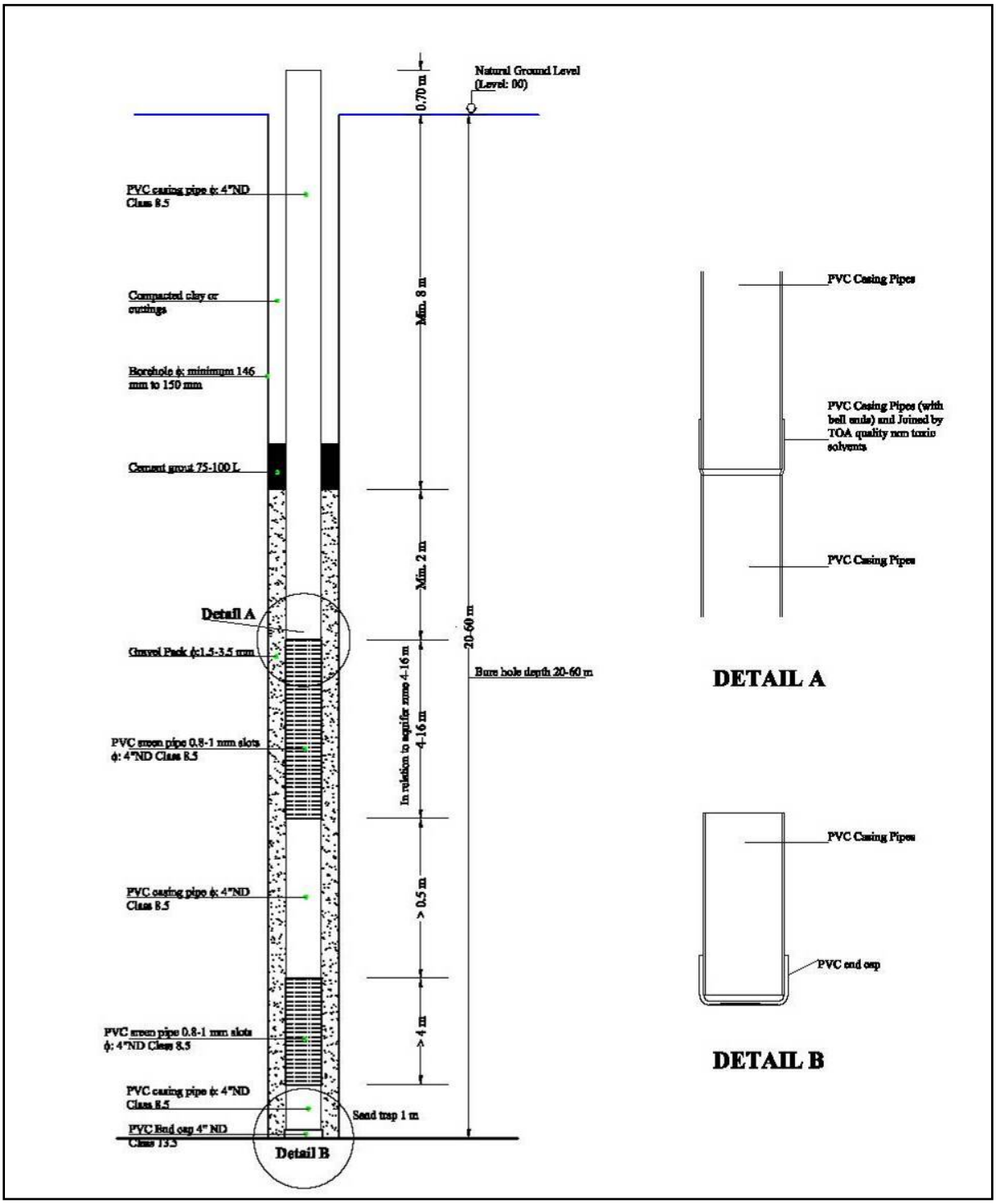
As a condition precedent to the Effective Date of this Agreement, the Contractor shall furnish to the Client and any other parties as reasonably requested by the Client, certificates of insurance (or if the Client so directs, copies of the actual insurance policies signed by an authorized representative of the insurer) from each insurance carrier showing that the insurances required pursuant to this clause are in force, the amount of the insurer's liability thereunder, and further providing that the insurance shall not be cancelled, changed or not renewed until the expiration of at least 45 days after written notice of such cancellation, change or non-renewal has been received by the Client and any other parties as reasonably requested by the Client.


NAM THEUN 2 POWER COMPANY LTD.
Environment & Social Division
US Bombing Missions within the Downstream Area
(data provided by UXO Laos)
Map information:
Projection: UTM Zone 48N
Everest: India 1830 (Thailand & Vietnam)
Unit: meter
Prepared by: Liankham. P
Author: Richard. P
Date: Jan 2007
Scale: not drawn to scale
File: impacted_village_a1_Jan2007.WOR
THAILAND
Mekong River
Gnommalath
Thakhek
Nongbok
Xaybuly
Xebangfay
Mahaxay
Sivilai
Thai Thot
Na Dang
Nong An
Phosi Thong
Na Theut
Fang Deng
Pak Phung
Donepeuy
Naxok
Nakatang
Phonsead
Kouanphan
Koksavang
Phachoumkhong
Lak 7
Nakio
Dangkang
Phon Kham
Mahaxaikang
Phanang
Pong
Khamfeuang
Kengpe
Thahat
Sork Bor
Some
Khamfeuang noy
Khamphare Dong
Khampena
Na Ngiuw
Na Sa Vang
Na Sa Thoung
None Deng
Na Maki Ba
Tha Kok Kene
Done Dong
Pa Kone Dong
Na Ka Thang Nai
Ka Pha
Pha Khong Neua
Na Kham Yai
Khok Khi Mime
Khok Sa Vang
Thub
Na Xoi
Tong
Nongveng
Phouko
Hong Mouang
Phouhom
Nakhietluang
Dongphayvanh
Namouang
Nadeng
Nam Don
Nathong
Kang Thong
Sikhay
Veurn Tai
Phonnadi
Palai
Hatpek
Dongmakfai
Manilad
Nong Born
Yangkham
Hatxaisoungtai
Beungxe
Sorkbor
Dongkasinh
Dong Khuang
Nong Bok
Na Monh Pa
Dong Boun Noi
Na Phok Thung
Dong Khoun
Lao Koung
Dong Yang
Xieng Vang Thong
Song Mouang Tai
Kout Chub
Pak Peng
Na Hare
Non Si La
Na Cham Pa
Pong Kew
Non Tare
Tung
Bung Houa Na Neua
Veunsananh Neua
Dong Mak
Kasee
Khok Keng Khene
Na Khom Thong
Dong Sork
Xieng Lare
Phon Di Thong
Dong Tai
Nong Hang
Na Dine Chi
Done Thong
Non Toum
Som
Mouang Pa
Na Bor
Hong Hoi
Dong Ka Sene
Mouang Lath Khouy
Yang Kome
Tha Deua
Yang Kao
Phon Yeua Yai
Phon Yeua Noi
Yang Ngam
Nong Phuue
Na Done
Nong Nieng
Si Khot
Som Boune
Nong Ve
Done Mouang
Tha Kek Tai
Tha Khek Kang
Houy Nang Li
Lao Ngoua
Dong Mouang Khai
Tha Khare
Na Ya Vy
Mai Phone Si
Phone Sung
Na Tiat
Na Nong Keo
Na Mouang
Veun
Na Ni Yom
Nasae
Phone Sa Vanh
Na Kai Kiea
Na Ngoua
Phon Dou
Phone Ngame
Na Ngeo
Doi
Kok Tong
Road 12
Oudom Vilay
Na Khang Xang
Na Yor
Phone Sa Vang
Na Trou
Pak Song
Nong Pa Manh
Na Kone Nai
Phon Sa Art
Na Hi
Kang Si Khai
Song
Pha Kiew
Nachanh
Phon Xai
Ka Va
Kham Pha Leng
Kouane Luang
Phon Na Dy
Hai
Na Dene
Kouane P
Pl
Tha Ngam
Tha Hare
Dong Sork
Dong Tai
Na Dine Chi
Done Thong
Non Toum
Na Hare
Pak Peng
Kout Chub
Song Mouang Tai
Xieng Vang Thong
Dong Yang
Dong Boun Noi
Dong Khuang
Nong Bok
Na Monh Pa
Sorkbor
Ping Sane Theung
Natai
Done Khia Neua
Donesavang
Done Khiao Kang
Done Khiaw Tai
Nong Lom
Done Mak Mo
Khok Kong
Dong Phang Phao
Bouakhai
Nasang
Thaphoxai
Thakhor
Somsanouk
Sivilay
Phonthanh
Kengphosee
Donggnang
Phakpheuatai
Somsaa-At
Houyhe
Nong Sa Phang
Navangtai
Nongheuathongtai
Sadeuneua
Nao Neua
Nasob
Gnangkham Tai
Kengkhay
Kengherd
Nonsanh
Nonenakham
Khamnonsoung
Kachou
Nong Pha Phuang
Nong Ya Long
Nong Ya Kham
Nong Ya Lat
Nong Ya Plong
Nong Ya Khao
Nong Ya Kham
Nong Ya Lat
Nong Ya Plong
Nong Ya Khao
0
5
10
kilometers
N
LEGEND
District Boundary
Impacted Villages
Riparian, Non-pilot
Riparian, Pilot
Hinterland, Non-pilot
Hinterland, pilot
Non-Impacted Village
US Bombing Missions 1965-1975
Impact Zones
XBF Lower 3
XBF Lower 2
XBF Lower 1
XBF Middle
XBF Upper
XBF Upstream Upper
Nam Gnom + Nam Kathang
Downstream Channel
Bank Protection
155 kV Transmission Line
500 kV Transmission Line

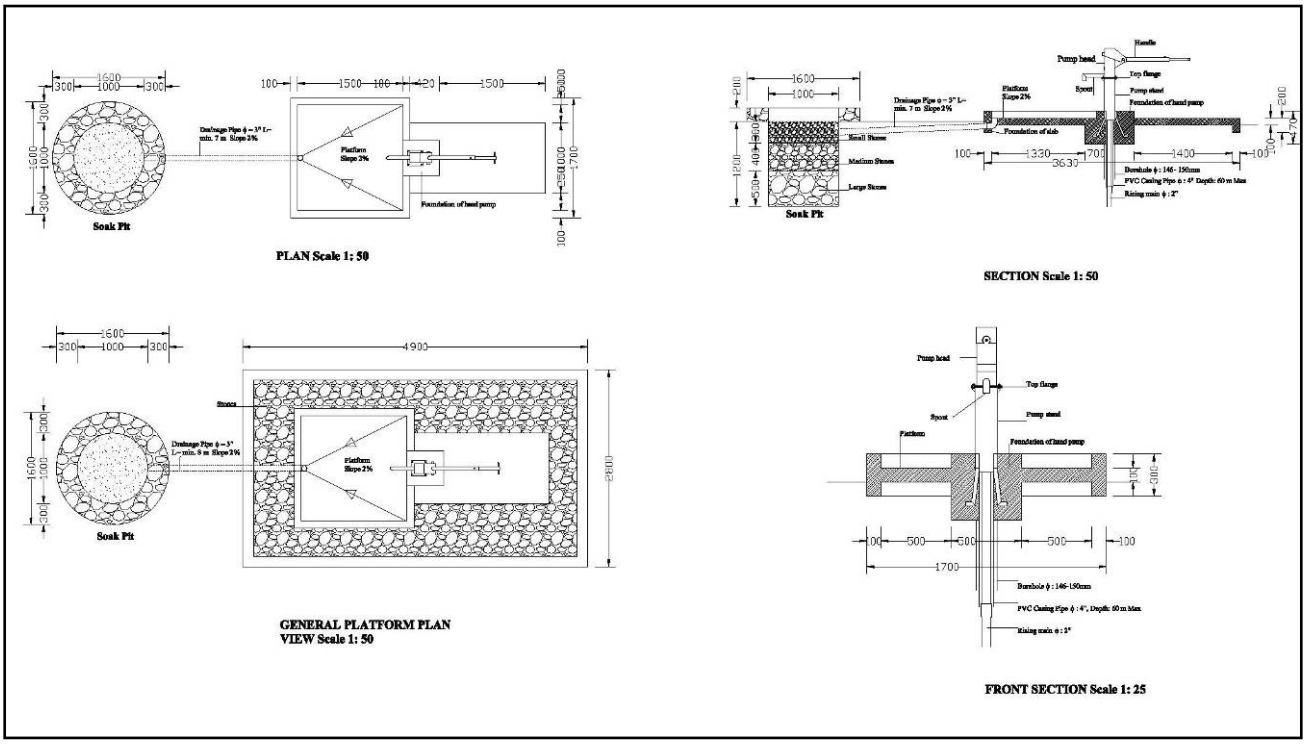
ANNEX 7

Borehole and Hand pump Designs

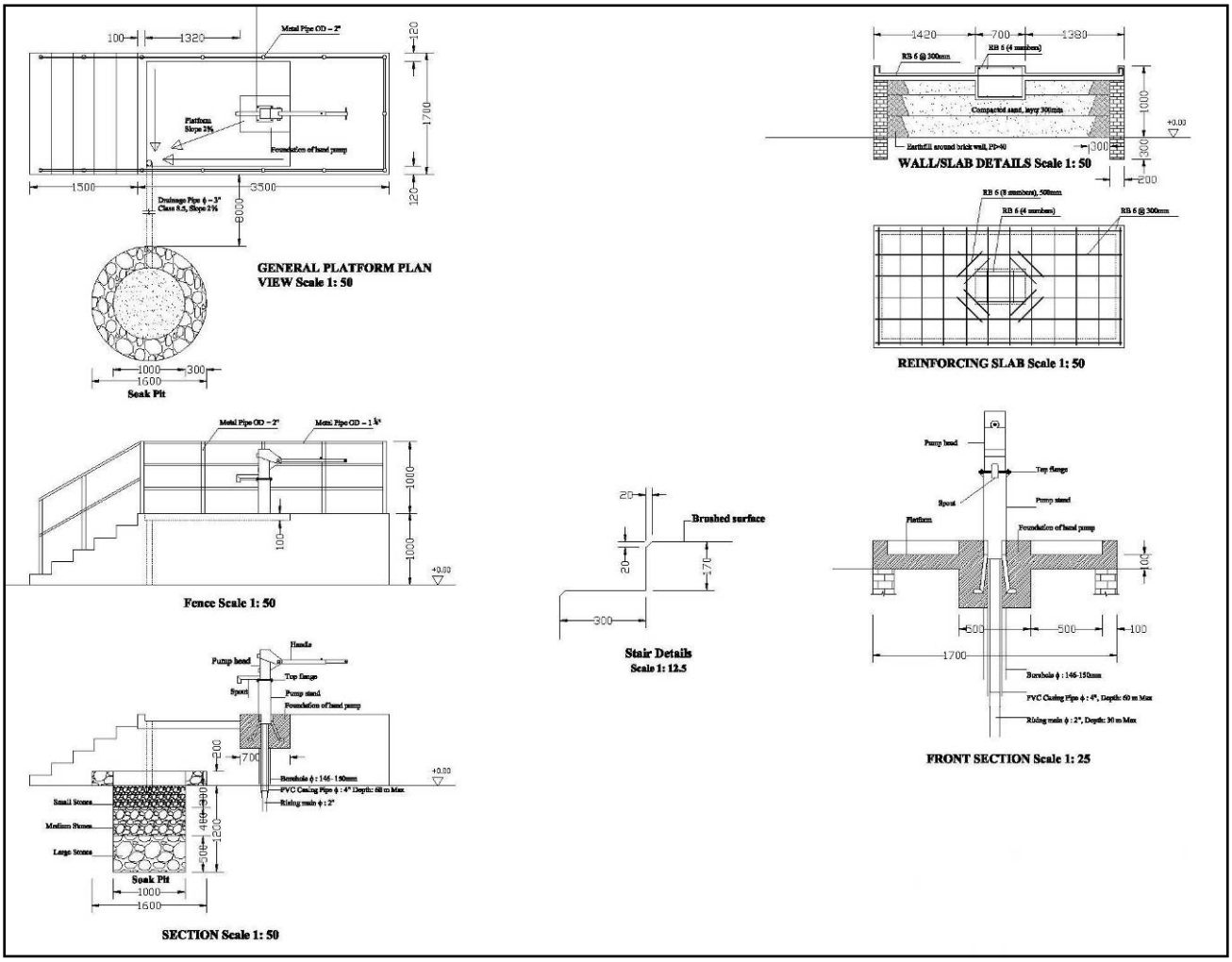
Standard Borehole Design



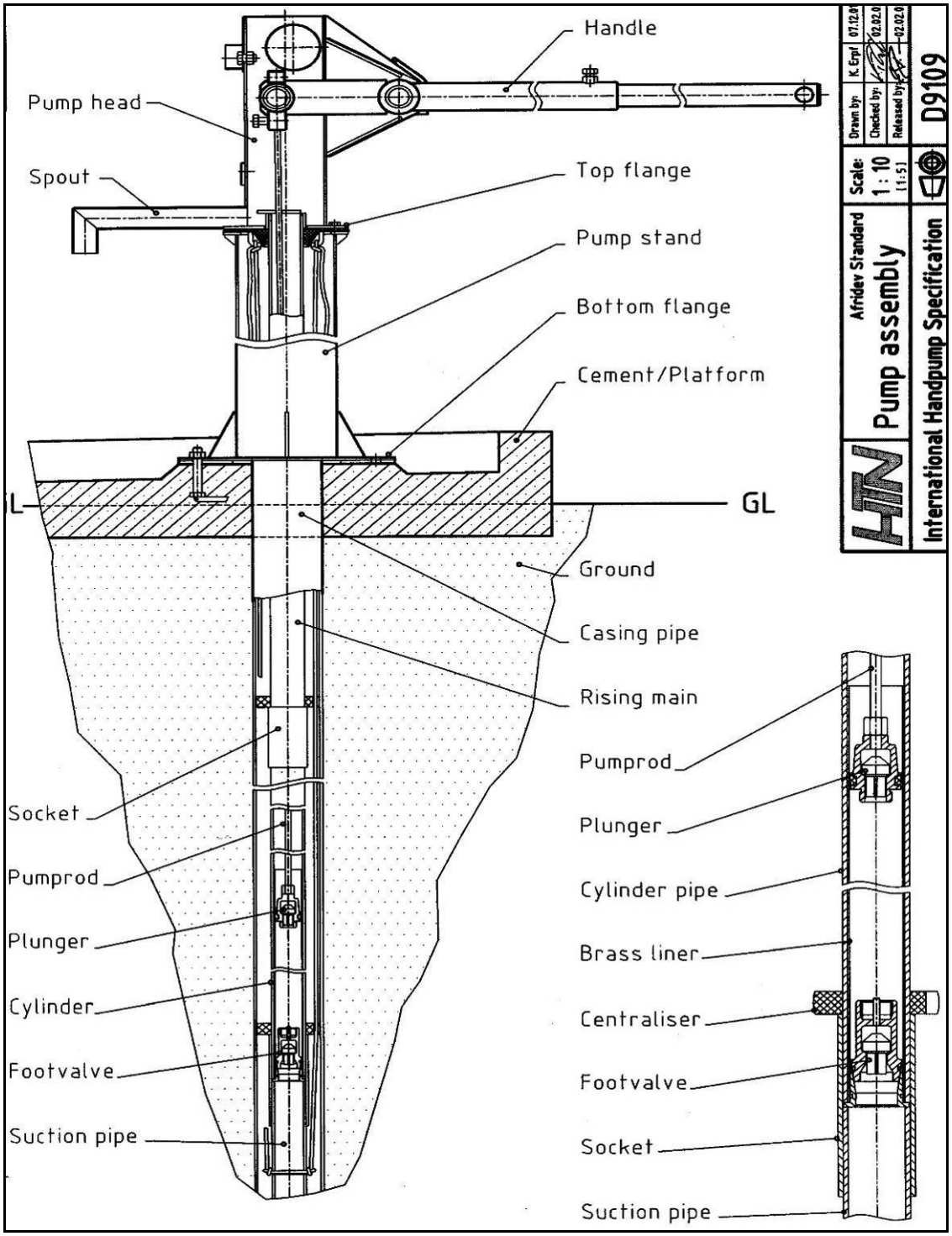
Hand pump platform design – "Type A" (not elevated)



Hand pump platform design – "Type B" (elevated)

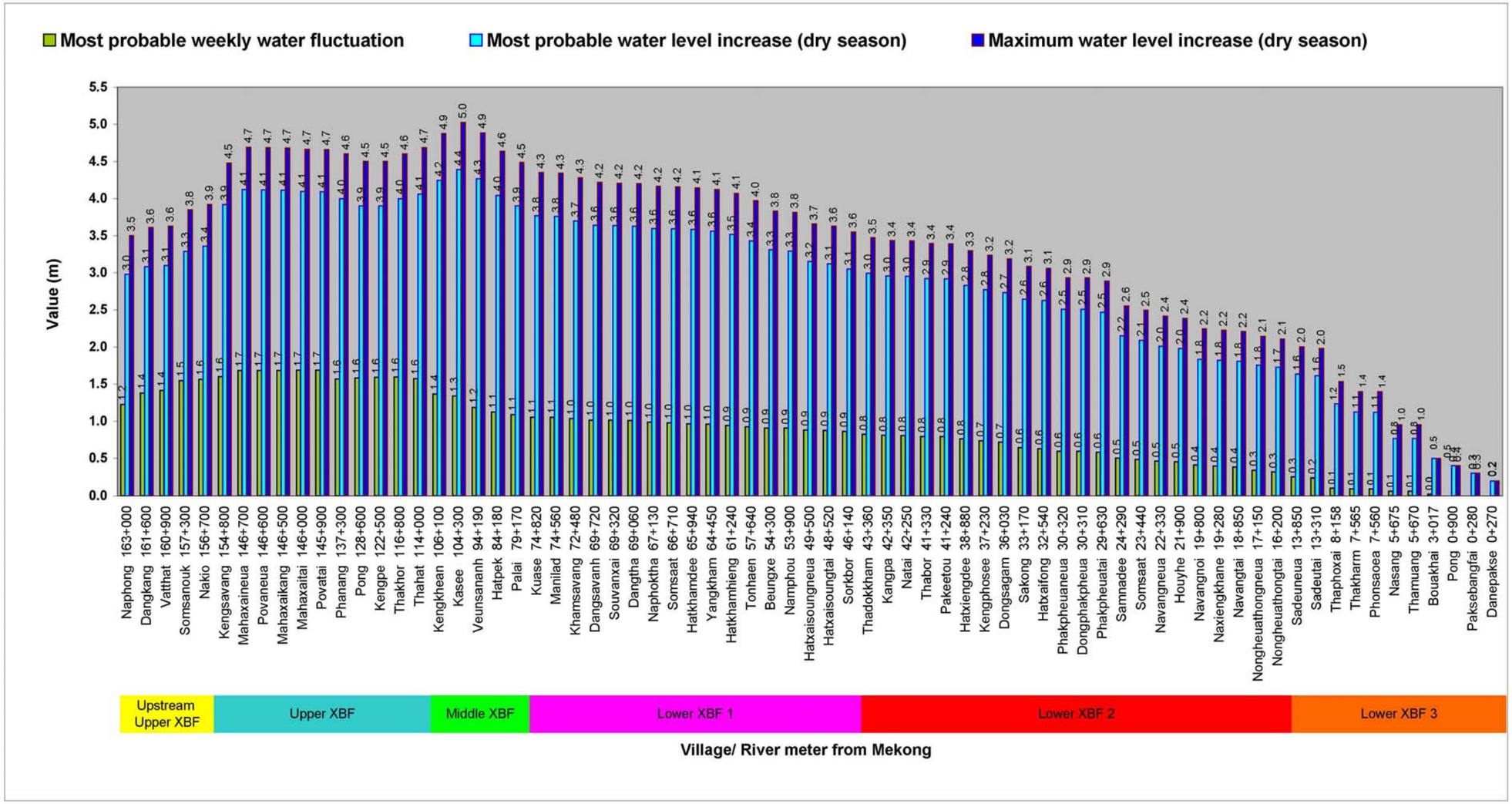


AfriDev Hand pump



ANNEX 8

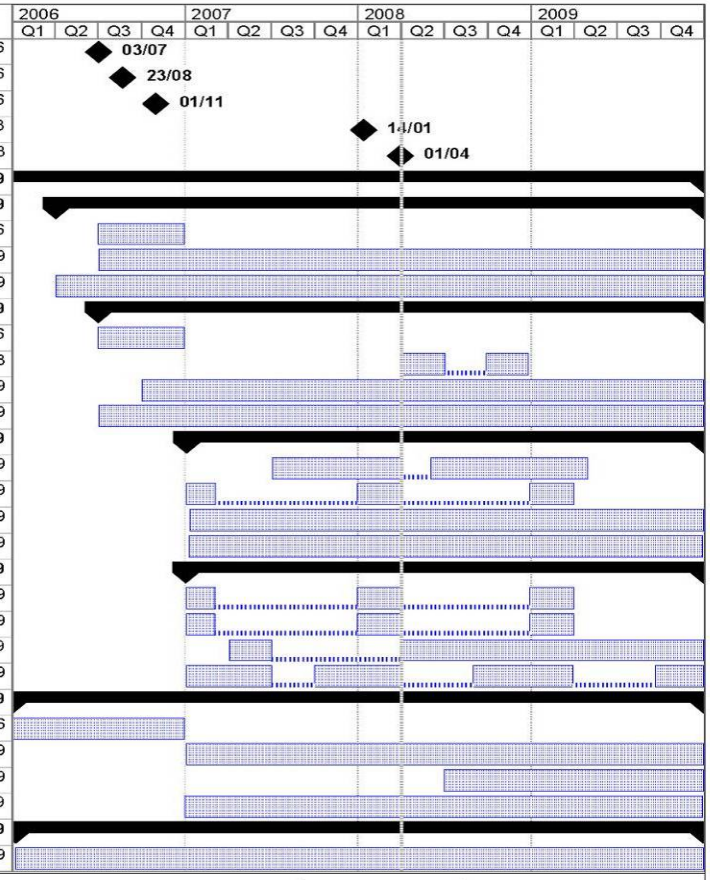
Predicted dry season water level increases and fluctuations



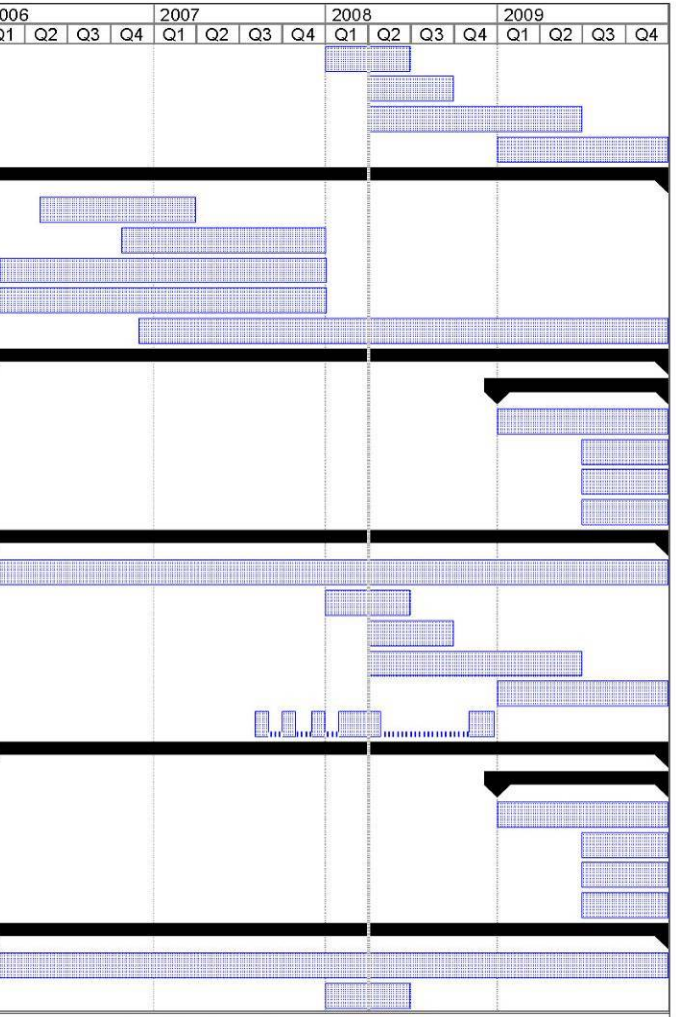
a. "Most probable weekly water fluctuation" represents the weekend variation in water surface level experienced 1) during the dry season when natural flows are the lowest and 2) discharge of water from the regulating dam is consistent with the most probably operating scenario.
b. "Maximum water increase / level fluctuation" represents the change in water surface level experienced 1) during the dry season when natural flows are the lowest and 2) discharge of water from the regulating dam is at the highest possible value (330m3/s) and then regulating dam discharge stops for an extended period of time
c."Most probable water level increase" represents the change in water surface level experienced 1) during the dry season when natural flows are the lowest and 2) discharge of water from the regulating dam is consistent with the most probable scenario (e.g. ~200 m3/s).
d. "Most probable weekly water fluctuation" and "Most probable water level increase" are based on Case 1.2 included in NTPC document "Simulation of Flow Releases from Regulating Dam, Results #1, Preliminary Analysis along Xe Bang Fai river and tributaries (draft)" (Reference number: NTPCNO030201000002-A0)"
e. Hydraulic model values for "Most probably water level increase" and "Maximum water increase / level fluctuation" have been adjusted (increased) for the villags of Phanang, Phong, Kengpe and Thakhor.

Annex 9 - Downstream Program Schedule of Activities

ID	Task Name	Duration	Start	Finish
1	DSIP Draft 1	0 days	Mon 03/07/06	Mon 03/07/06
2	DSIP Draft 2	0 days	Wed 23/08/06	Wed 23/08/06
3	DSIP Draft 3	0 days	Wed 01/11/06	Wed 01/11/06
4	DSIP Draft 4	0 days	Mon 14/01/08	Mon 14/01/08
5	DSIP Draft 5	0 days	Tue 01/04/08	Tue 01/04/08
6	**Pilot Villages (20 XBF) villages**	**1573 days**	**Wed 07/01/04**	**Thu 31/12/09**
7	**Community Development**	**989 days**	**Tue 04/04/06**	**Thu 31/12/09**
8	Establishment of VDC	131 days	Mon 03/07/06	Sat 30/12/06
9	Capacity Building of Village Groups	923 days	Tue 04/07/06	Thu 31/12/09
10	Coordination	989 days	Tue 04/04/06	Thu 31/12/09
11	**Village Fund**	**924 days**	**Mon 03/07/06**	**Thu 31/12/09**
12	Establishment of Village Fund	131 days	Mon 03/07/06	Sat 30/12/06
13	Evaluation of village fund system	131 days	Thu 03/04/08	Fri 26/12/08
14	Capacity building of village Groups	858 days	Tue 03/10/06	Thu 31/12/09
15	Village Fund activities	923 days	Tue 04/07/06	Thu 31/12/09
16	**Agriculture**	**789 days**	**Fri 05/01/07**	**Thu 31/12/09**
17	Demonstration of field crops	437 days	Thu 05/07/07	Thu 30/04/09
18	Demonstration of home gardens	176 days	Fri 05/01/07	Tue 31/03/09
19	Post-harvest/processing/harvesting	785 days	Thu 11/01/07	Thu 31/12/09
20	Extension	785 days	Tue 09/01/07	Tue 29/12/09
21	**Livestock**	**790 days**	**Thu 04/01/07**	**Thu 31/12/09**
22	Training of Village Volunteer Workers	175 days	Fri 05/01/07	Tue 31/03/09
23	Equipment & Vaccines	175 days	Fri 05/01/07	Tue 31/03/09
24	Demonstration feed production Units	526 days	Thu 05/04/07	Wed 30/12/09
25	Extension	486 days	Thu 04/01/07	Thu 31/12/09
26	**Aquaculture**	**1054 days**	**Tue 03/01/06**	**Thu 31/12/09**
27	Demonstration aquaculture	260 days	Tue 03/01/06	Fri 29/12/06
28	Setup of hatcheries network	789 days	Fri 05/01/07	Thu 31/12/09
29	Demonstration feed production	395 days	Wed 02/07/08	Thu 31/12/09
30	Extension	789 days	Tue 02/01/07	Mon 28/12/09
31	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
32	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09



ID	Task Name	Duration	Start	Finish
33	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
34	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
35	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
36	Extension	262 days	Fri 02/01/09	Thu 31/12/09
37	**Handicraft**	**1573 days**	**Wed 07/01/04**	**Thu 31/12/09**
38	Groups selection	239 days	Thu 04/05/06	Fri 30/03/07
39	Demonstration	316 days	Thu 26/10/06	Wed 02/01/08
40	Set up budget plan	505 days	Wed 08/02/06	Fri 04/01/08
41	Implementation	1050 days	Wed 07/01/04	Fri 04/01/08
42	Marketing	815 days	Fri 01/12/06	Thu 31/12/09
43	**Nam Kathang & Nam Gnom**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
44	**Aquaculture**	**262 days**	**Fri 02/01/09**	**Thu 31/12/09**
45	Demonstration aquaculture	262 days	Fri 02/01/09	Thu 31/12/09
46	setup of hatcheries network	132 days	Wed 01/07/09	Thu 31/12/09
47	Demonstration feed production	132 days	Wed 01/07/09	Thu 31/12/09
48	Extension	132 days	Wed 01/07/09	Thu 31/12/09
49	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
50	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
51	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
52	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
53	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
54	Extension	262 days	Fri 02/01/09	Thu 31/12/09
55	Drilling Water Supply/Sanitation	165 days	Mon 06/08/07	Fri 26/12/08
56	**Nam Phit**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
57	**Aquaculture**	**262 days**	**Fri 02/01/09**	**Thu 31/12/09**
58	Demonstration aquaculture	262 days	Fri 02/01/09	Thu 31/12/09
59	setup of hatcheries network	132 days	Wed 01/07/09	Thu 31/12/09
60	Demonstration feed production	132 days	Wed 01/07/09	Thu 31/12/09
61	Extension	132 days	Wed 01/07/09	Thu 31/12/09
62	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
63	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
64	Program Design	130 days	Wed 02/01/08	Mon 30/06/08

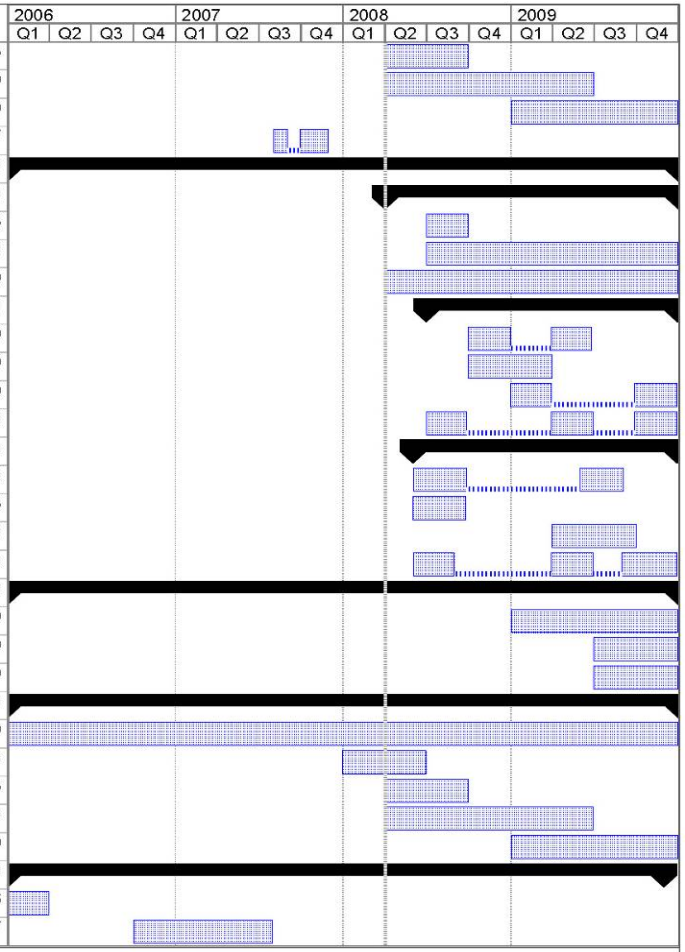


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 2

ID	Task Name	Duration	Start	Finish
65	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
66	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
67	Extension	262 days	Fri 02/01/09	Thu 31/12/09
68	Drilling Water Supply/Sanitation	67 days	Fri 03/08/07	Fri 30/11/07
69	**XBF Upstream Confluence**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
70	**Community Development**	**461 days**	**Wed 02/04/08**	**Thu 31/12/09**
71	Establishment of VDC	66 days	Wed 02/07/08	Tue 30/09/08
72	Capacity Building of Village Groups	394 days	Wed 02/07/08	Wed 30/12/09
73	Coordination	461 days	Wed 02/04/08	Thu 31/12/09
74	**Agriculture**	**393 days**	**Wed 02/07/08**	**Tue 29/12/09**
75	Demonstration of field crops	132 days	Tue 30/09/08	Thu 25/06/09
76	Demonstration of home gardens	132 days	Tue 30/09/08	Tue 31/03/09
77	Post-harvest/processing/harvesting	131 days	Thu 01/01/09	Tue 29/12/09
78	Extension	197 days	Wed 02/07/08	Mon 28/12/09
79	**Livestock**	**414 days**	**Mon 02/06/08**	**Mon 28/12/09**
80	Training of Village Volunteer Workers	153 days	Tue 03/06/08	Wed 02/09/09
81	Equipment & Vaccines	85 days	Mon 02/06/08	Thu 25/09/08
82	Demonstration feed production Units	132 days	Wed 01/04/09	Wed 30/09/09
83	Extension	218 days	Tue 03/06/08	Mon 28/12/09
84	**Aquaculture**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
85	Demonstration aquaculture	262 days	Fri 02/01/09	Thu 31/12/09
86	setup of hatcheries network	132 days	Wed 01/07/09	Thu 31/12/09
87	Demonstration feed production	132 days	Wed 01/07/09	Thu 31/12/09
88	**Fisheries Co-Management**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
89	Baseline data collection (FCM)	1055 days	Mon 02/01/06	Thu 31/12/09
90	Program Design	131 days	Tue 01/01/08	Mon 30/06/08
91	Setup Fisheries Co-management	132 days	Wed 02/04/08	Tue 30/09/08
92	Demonstration aquatic resources	329 days	Tue 01/04/08	Mon 29/06/09
93	Extension	262 days	Fri 02/01/09	Thu 31/12/09
94	**Handicraft**	**1032 days**	**Mon 02/01/06**	**Mon 30/11/09**
95	Groups selection	65 days	Mon 02/01/06	Fri 31/03/06
96	Demonstration	219 days	Tue 03/10/06	Tue 31/07/07

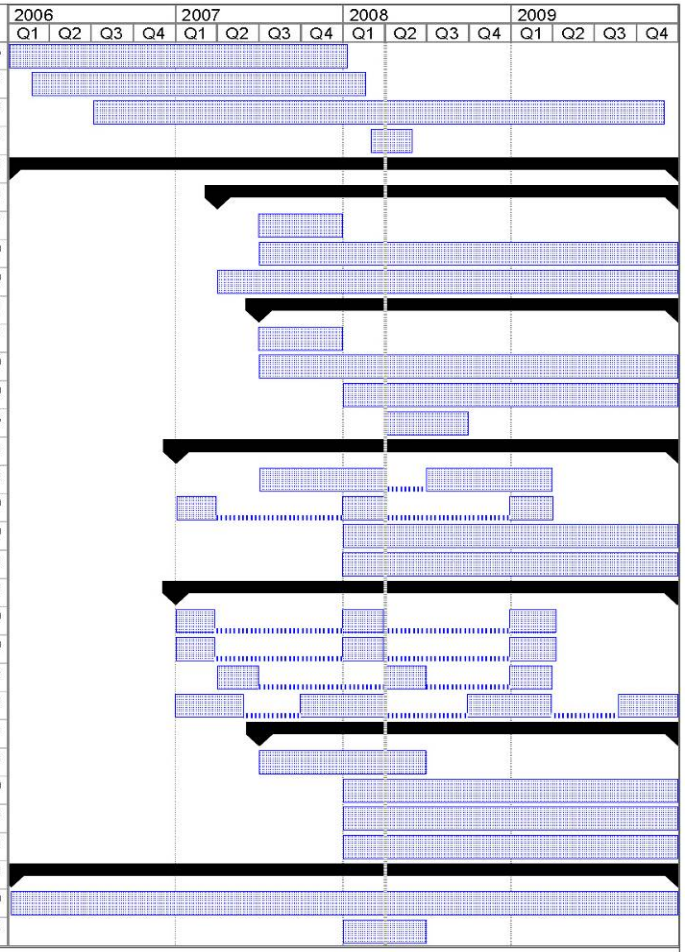


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 3

ID	Task Name	Duration	Start	Finish
97	Set up budget plan	532 days	Fri 06/01/06	Thu 10/01/08
98	Implementation	526 days	Fri 24/02/06	Wed 20/02/08
99	Marketing	897 days	Fri 07/07/06	Mon 30/11/09
100	Drilling Water Supply/Sanitation	66 days	Mon 03/03/08	Sat 31/05/08
101	**Upper XBF**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
102	**Community Development**	**726 days**	**Tue 03/04/07**	**Thu 31/12/09**
103	Establishment of VDC	134 days	Mon 02/07/07	Mon 31/12/07
104	Capacity Building of Village Groups	660 days	Tue 03/07/07	Thu 31/12/09
105	Coordination	726 days	Tue 03/04/07	Thu 31/12/09
106	**Village Fund**	**661 days**	**Mon 02/07/07**	**Thu 31/12/09**
107	Establishment of Village Fund	134 days	Mon 02/07/07	Mon 31/12/07
108	Capacity building of village Groups	660 days	Tue 03/07/07	Thu 31/12/09
109	Village Fund & savings activities	526 days	Wed 02/01/08	Thu 31/12/09
110	Trabsfer of remaining fund (50%) to V	132 days	Wed 02/04/08	Tue 30/09/08
111	**Agriculture**	**790 days**	**Thu 04/01/07**	**Thu 31/12/09**
112	Demonstration of field crops	395 days	Thu 05/07/07	Wed 01/04/09
113	Demonstration of home gardens	198 days	Thu 04/01/07	Fri 03/04/09
114	Post-harvest/processing/harvesting	526 days	Wed 02/01/08	Thu 31/12/09
115	Extension	526 days	Tue 01/01/08	Wed 30/12/09
116	**Livestock**	**791 days**	**Tue 02/01/07**	**Wed 30/12/09**
117	Training of Village Volunteer Workers	199 days	Wed 03/01/07	Thu 09/04/09
118	Equipment & Vaccines	199 days	Wed 03/01/07	Thu 09/04/09
119	Demonstration feed production Units	200 days	Tue 03/04/07	Wed 01/04/09
120	Extension	463 days	Tue 02/01/07	Wed 30/12/09
121	**Aquaculture**	**659 days**	**Wed 04/07/07**	**Thu 31/12/09**
122	Demonstration aquaculture	263 days	Wed 04/07/07	Mon 30/06/08
123	setup of hatcheries network	525 days	Thu 03/01/08	Thu 31/12/09
124	Demonstration feed production	525 days	Wed 02/01/08	Wed 30/12/09
125	Extension	525 days	Wed 02/01/08	Wed 30/12/09
126	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
127	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
128	Program Design	130 days	Wed 02/01/08	Mon 30/06/08

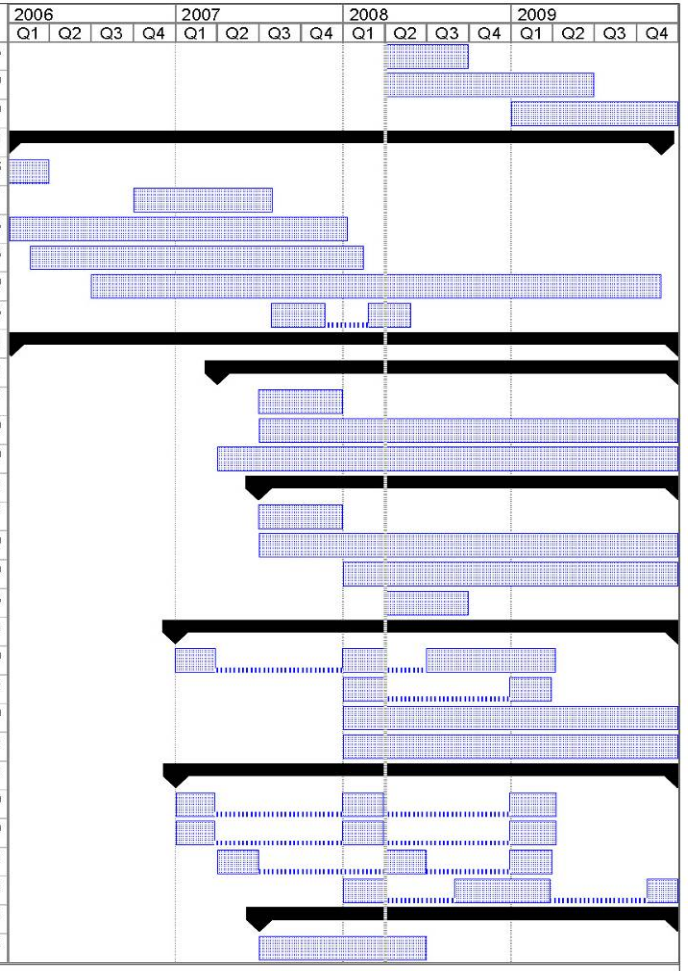


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 4

ID	Task Name	Duration	Start	Finish
129	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
130	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
131	Extension	262 days	Fri 02/01/09	Thu 31/12/09
132	**Handicraft**	**1028 days**	**Mon 02/01/06**	**Tue 24/11/09**
133	Groups selection	65 days	Mon 02/01/06	Fri 31/03/06
134	Demonstration	219 days	Mon 02/10/06	Mon 30/07/07
135	Set up budget plan	532 days	Fri 06/01/06	Thu 10/01/08
136	Implementation	526 days	Mon 20/02/06	Thu 14/02/08
137	Marketing	897 days	Mon 03/07/06	Tue 24/11/09
138	Drilling Water Supply/Sanitation	153 days	Mon 30/07/07	Tue 27/05/08
139	**Middle XBF**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
140	**Community Development**	**726 days**	**Tue 03/04/07**	**Thu 31/12/09**
141	Establishment of VDC	134 days	Mon 02/07/07	Mon 31/12/07
142	Capacity Building of Village Groups	660 days	Tue 03/07/07	Thu 31/12/09
143	Coordination	726 days	Tue 03/04/07	Thu 31/12/09
144	**Village Fund**	**661 days**	**Mon 02/07/07**	**Thu 31/12/09**
145	Establishment of Village Fund	134 days	Mon 02/07/07	Mon 31/12/07
146	Capacity building of village Groups	660 days	Tue 03/07/07	Thu 31/12/09
147	Village Fund & savings activities	526 days	Wed 02/01/08	Thu 31/12/09
148	Trabsfer of remaining fund (50%) to V	132 days	Wed 02/04/08	Tue 30/09/08
149	**Agriculture**	**792 days**	**Tue 02/01/07**	**Thu 31/12/09**
150	Demonstration of field crops	331 days	Tue 02/01/07	Tue 07/04/09
151	Demonstration of home gardens	131 days	Wed 02/01/08	Mon 30/03/09
152	Post-harvest/processing/harvesting	525 days	Thu 03/01/08	Thu 31/12/09
153	Extension	525 days	Wed 02/01/08	Wed 30/12/09
154	**Livestock**	**790 days**	**Wed 03/01/07**	**Wed 30/12/09**
155	Training of Village Volunteer Workers	199 days	Wed 03/01/07	Thu 09/04/09
156	Equipment & Vaccines	199 days	Wed 03/01/07	Thu 09/04/09
157	Demonstration feed production Units	200 days	Tue 03/04/07	Wed 01/04/09
158	Extension	263 days	Wed 02/01/08	Wed 30/12/09
159	**Aquaculture**	**659 days**	**Wed 04/07/07**	**Thu 31/12/09**
160	Demonstration aquaculture	263 days	Wed 04/07/07	Mon 30/06/08

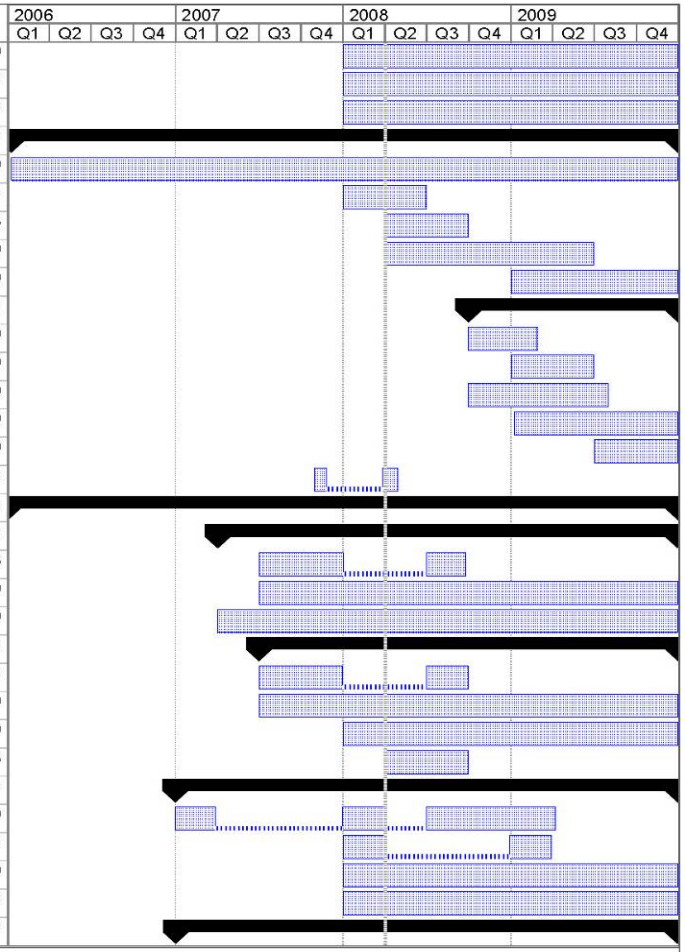


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 5

ID	Task Name	Duration	Start	Finish
161	setup of hatcheries network	525 days	Thu 03/01/08	Thu 31/12/09
162	Demonstration feed production	525 days	Wed 02/01/08	Wed 30/12/09
163	Extension	525 days	Wed 02/01/08	Wed 30/12/09
164	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
165	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
166	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
167	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
168	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
169	Extension	262 days	Fri 02/01/09	Thu 31/12/09
170	**Handicraft**	**329 days**	**Wed 01/10/08**	**Thu 31/12/09**
171	Groups selection	109 days	Wed 01/10/08	Fri 27/02/09
172	Demonstration	130 days	Fri 02/01/09	Tue 30/06/09
173	Set up budget plan	220 days	Wed 01/10/08	Fri 31/07/09
174	Implementation	257 days	Fri 09/01/09	Thu 31/12/09
175	Marketing	131 days	Thu 02/07/09	Thu 31/12/09
176	Drilling Water Supply/Sanitation	44 days	Wed 31/10/07	Wed 30/04/08
177	**Lower XBF1**	**1055 days?**	**Mon 02/01/06**	**Thu 31/12/09**
178	**Community Development**	**726 days**	**Tue 03/04/07**	**Thu 31/12/09**
179	Establishment of VDC	199 days	Tue 03/07/07	Thu 25/09/08
180	Capacity Building of Village Groups	660 days	Tue 03/07/07	Thu 31/12/09
181	Coordination	726 days	Tue 03/04/07	Thu 31/12/09
182	**Village fund**	**660 days**	**Tue 03/07/07**	**Thu 31/12/09**
183	Establishment of Village Fund	199 days	Tue 03/07/07	Mon 29/09/08
184	Capacity building of village Groups	660 days	Tue 03/07/07	Thu 31/12/09
185	Village fund & savings activities	526 days	Wed 02/01/08	Thu 31/12/09
186	Trabsfer of remaining fund (50%) to V	132 days	Wed 02/04/08	Tue 30/09/08
187	**Agriculture**	**792 days**	**Tue 02/01/07**	**Thu 31/12/09**
188	Demonstration of field crops	331 days	Tue 02/01/07	Tue 07/04/09
189	Demonstration of home gardens	131 days	Wed 02/01/08	Mon 30/03/09
190	Post-harvest/processing/harvesting	525 days	Thu 03/01/08	Thu 31/12/09
191	Extension	525 days	Wed 02/01/08	Wed 30/12/09
192	**Livestock**	**790 days**	**Wed 03/01/07**	**Wed 30/12/09**

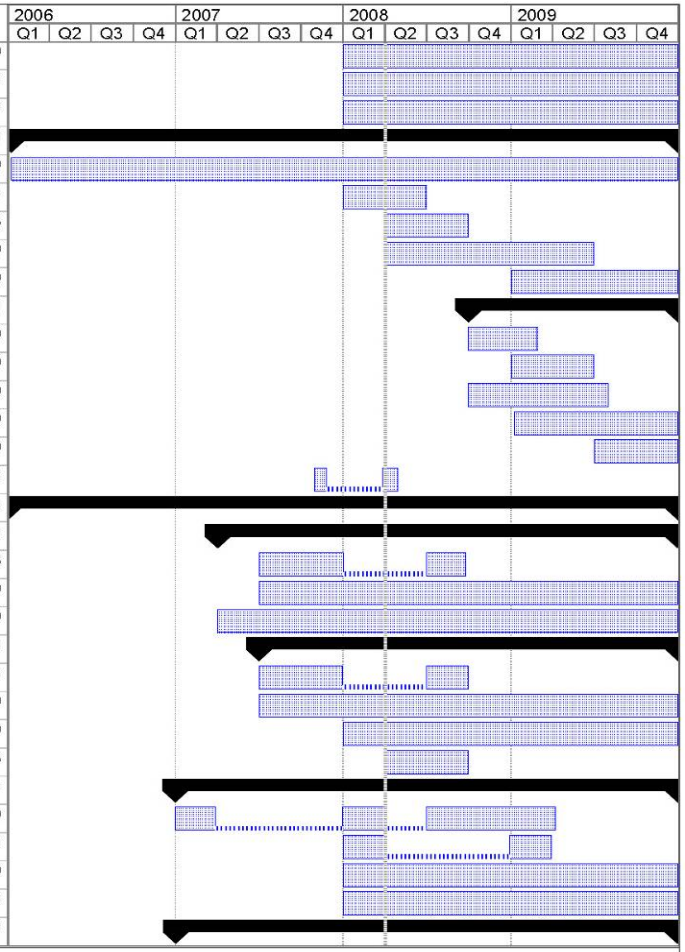


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 6

ID	Task Name	Duration	Start	Finish
161	setup of hatcheries network	525 days	Thu 03/01/08	Thu 31/12/09
162	Demonstration feed production	525 days	Wed 02/01/08	Wed 30/12/09
163	Extension	525 days	Wed 02/01/08	Wed 30/12/09
164	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
165	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
166	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
167	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
168	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
169	Extension	262 days	Fri 02/01/09	Thu 31/12/09
170	**Handicraft**	**329 days**	**Wed 01/10/08**	**Thu 31/12/09**
171	Groups selection	109 days	Wed 01/10/08	Fri 27/02/09
172	Demonstration	130 days	Fri 02/01/09	Tue 30/06/09
173	Set up budget plan	220 days	Wed 01/10/08	Fri 31/07/09
174	Implementation	257 days	Fri 09/01/09	Thu 31/12/09
175	Marketing	131 days	Thu 02/07/09	Thu 31/12/09
176	Drilling Water Supply/Sanitation	44 days	Wed 31/10/07	Wed 30/04/08
177	**Lower XBF1**	**1055 days?**	**Mon 02/01/06**	**Thu 31/12/09**
178	**Community Development**	**726 days**	**Tue 03/04/07**	**Thu 31/12/09**
179	Establishment of VDC	199 days	Tue 03/07/07	Thu 25/09/08
180	Capacity Building of Village Groups	660 days	Tue 03/07/07	Thu 31/12/09
181	Coordination	726 days	Tue 03/04/07	Thu 31/12/09
182	**Village fund**	**660 days**	**Tue 03/07/07**	**Thu 31/12/09**
183	Establishment of Village Fund	199 days	Tue 03/07/07	Mon 29/09/08
184	Capacity building of village Groups	660 days	Tue 03/07/07	Thu 31/12/09
185	Village fund & savings activities	526 days	Wed 02/01/08	Thu 31/12/09
186	Trabsfer of remaining fund (50%) to V	132 days	Wed 02/04/08	Tue 30/09/08
187	**Agriculture**	**792 days**	**Tue 02/01/07**	**Thu 31/12/09**
188	Demonstration of field crops	331 days	Tue 02/01/07	Tue 07/04/09
189	Demonstration of home gardens	131 days	Wed 02/01/08	Mon 30/03/09
190	Post-harvest/processing/harvesting	525 days	Thu 03/01/08	Thu 31/12/09
191	Extension	525 days	Wed 02/01/08	Wed 30/12/09
192	**Livestock**	**790 days**	**Wed 03/01/07**	**Wed 30/12/09**

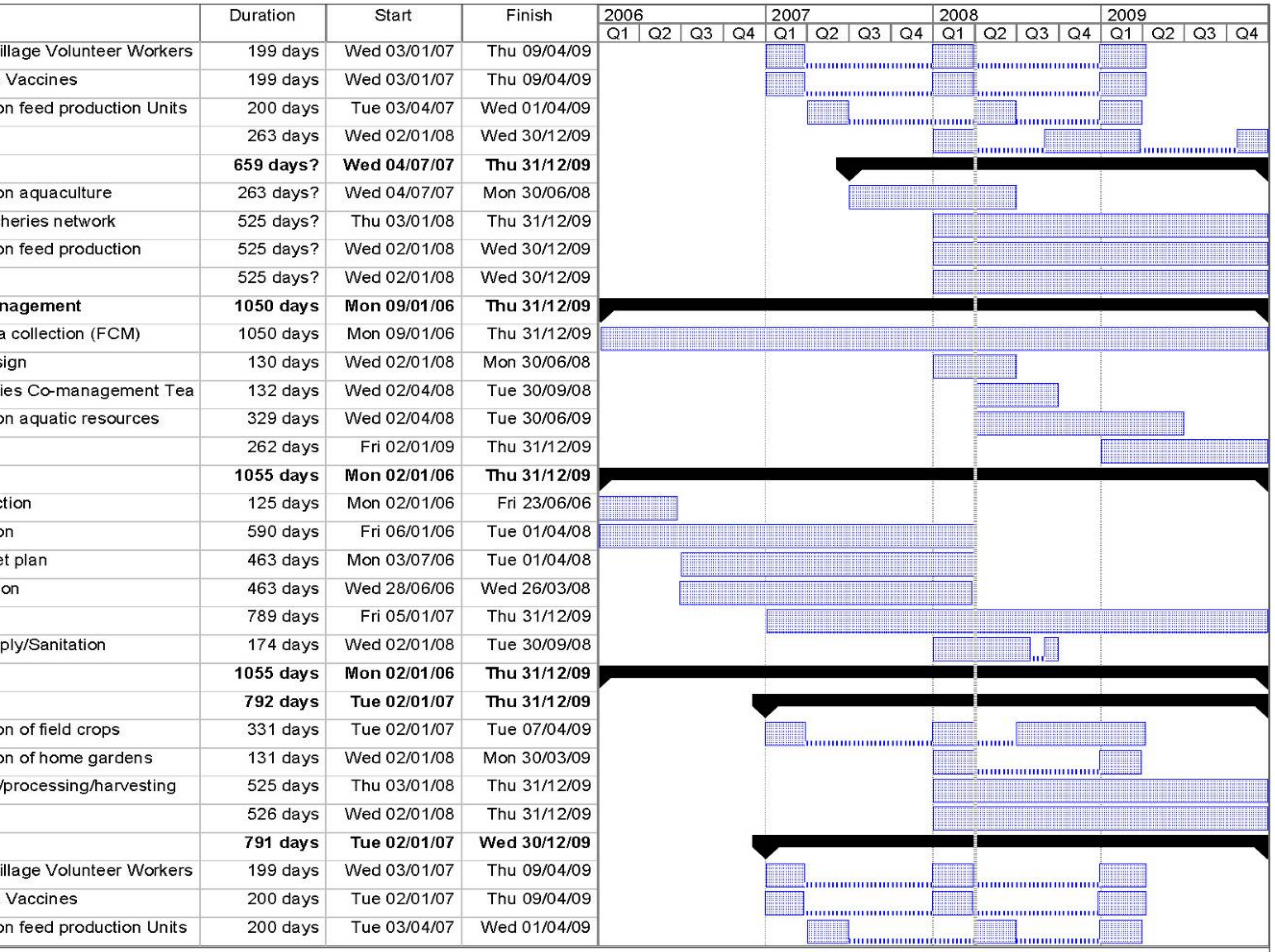


Project: Overall DSIP Schedule
Date: Tue 01/04/08

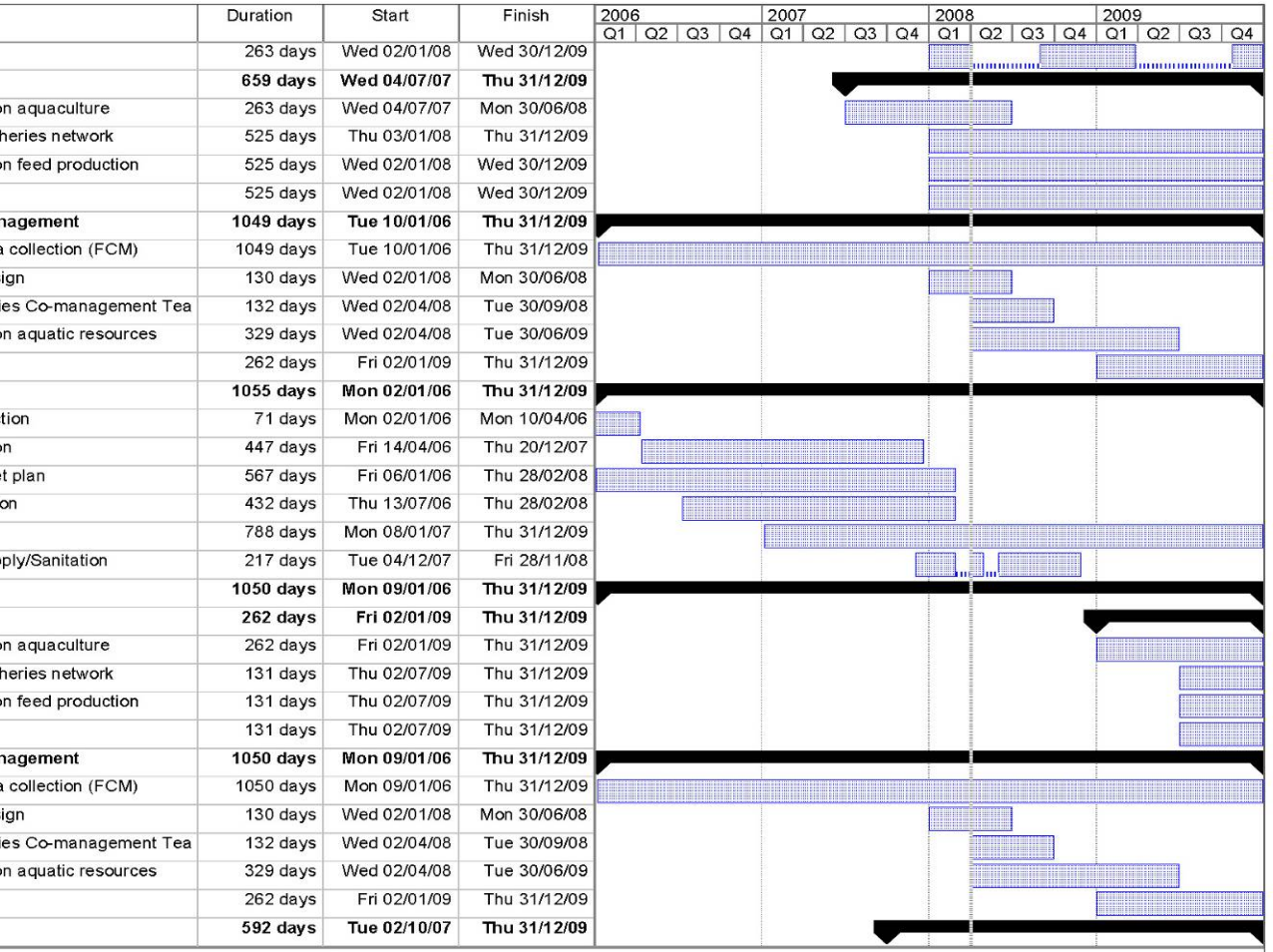
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 6

ID	Task Name	Duration	Start	Finish
193	Training of Village Volunteer Workers	199 days	Wed 03/01/07	Thu 09/04/09
194	Equipment & Vaccines	199 days	Wed 03/01/07	Thu 09/04/09
195	Demonstration feed production Units	200 days	Tue 03/04/07	Wed 01/04/09
196	Extension	263 days	Wed 02/01/08	Wed 30/12/09
197	**Aquaculture**	**659 days?**	**Wed 04/07/07**	**Thu 31/12/09**
198	Demonstration aquaculture	263 days?	Wed 04/07/07	Mon 30/06/08
199	setup of hatcheries network	525 days?	Thu 03/01/08	Thu 31/12/09
200	Demonstration feed production	525 days?	Wed 02/01/08	Wed 30/12/09
201	Extension	525 days?	Wed 02/01/08	Wed 30/12/09
202	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
203	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
204	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
205	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
206	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
207	Extension	262 days	Fri 02/01/09	Thu 31/12/09
208	**Handicraft**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
209	Groups selection	125 days	Mon 02/01/06	Fri 23/06/06
210	Demonstration	590 days	Fri 06/01/06	Tue 01/04/08
211	Set up budget plan	463 days	Mon 03/07/06	Tue 01/04/08
212	Implementation	463 days	Wed 28/06/06	Wed 26/03/08
213	Marketing	789 days	Fri 05/01/07	Thu 31/12/09
214	Drilling water Supply/Sanitation	174 days	Wed 02/01/08	Tue 30/09/08
215	**Lower XBF2**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
216	**Agriculture**	**792 days**	**Tue 02/01/07**	**Thu 31/12/09**
217	Demonstration of field crops	331 days	Tue 02/01/07	Tue 07/04/09
218	Demonstration of home gardens	131 days	Wed 02/01/08	Mon 30/03/09
219	Post-harvest/processing/harvesting	525 days	Thu 03/01/08	Thu 31/12/09
220	Extension	526 days	Wed 02/01/08	Thu 31/12/09
221	**Livestock**	**791 days**	**Tue 02/01/07**	**Wed 30/12/09**
222	Training of Village Volunteer Workers	199 days	Wed 03/01/07	Thu 09/04/09
223	Equipment & Vaccines	200 days	Tue 02/01/07	Thu 09/04/09
224	Demonstration feed production Units	200 days	Tue 03/04/07	Wed 01/04/09

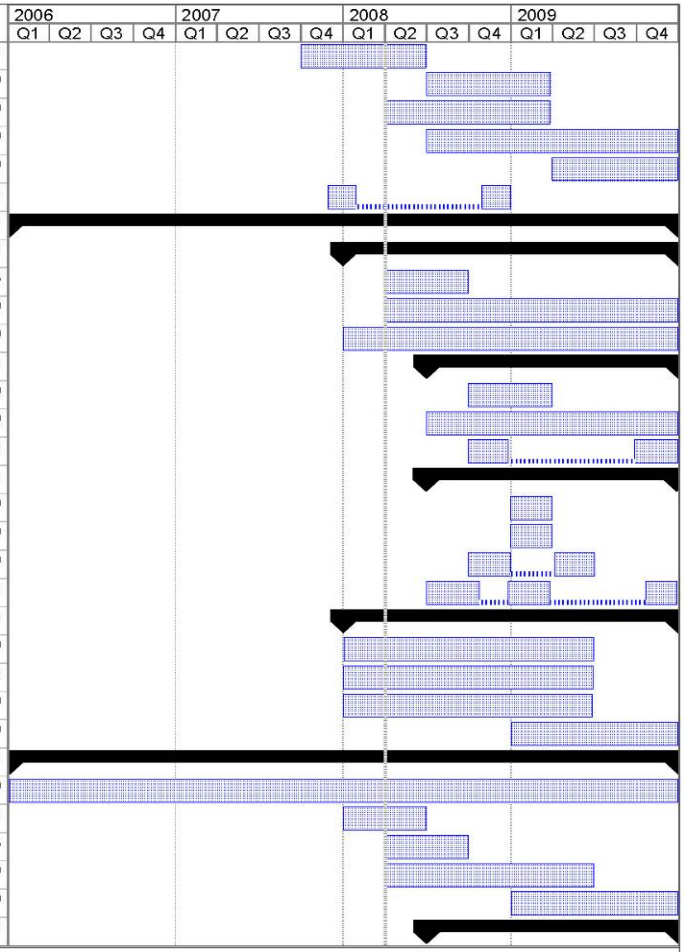


ID	Task Name	Duration	Start	Finish
225	Extension	263 days	Wed 02/01/08	Wed 30/12/09
226	**Aquaculture**	**659 days**	**Wed 04/07/07**	**Thu 31/12/09**
227	Demonstration aquaculture	263 days	Wed 04/07/07	Mon 30/06/08
228	setup of hatcheries network	525 days	Thu 03/01/08	Thu 31/12/09
229	Demonstration feed production	525 days	Wed 02/01/08	Wed 30/12/09
230	Extension	525 days	Wed 02/01/08	Wed 30/12/09
231	**Fisheries Co-Management**	**1049 days**	**Tue 10/01/06**	**Thu 31/12/09**
232	Baseline data collection (FCM)	1049 days	Tue 10/01/06	Thu 31/12/09
233	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
234	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
235	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
236	Extension	262 days	Fri 02/01/09	Thu 31/12/09
237	**Handicraft**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
238	Groups selection	71 days	Mon 02/01/06	Mon 10/04/06
239	Demonstration	447 days	Fri 14/04/06	Thu 20/12/07
240	Set up budget plan	567 days	Fri 06/01/06	Thu 28/02/08
241	Implementation	432 days	Thu 13/07/06	Thu 28/02/08
242	Marketing	788 days	Mon 08/01/07	Thu 31/12/09
243	Drilling Water Supply/Sanitation	217 days	Tue 04/12/07	Fri 28/11/08
244	**Lower XBF3**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
245	**Aquaculture**	**262 days**	**Fri 02/01/09**	**Thu 31/12/09**
246	Demonstration aquaculture	262 days	Fri 02/01/09	Thu 31/12/09
247	setup of hatcheries network	131 days	Thu 02/07/09	Thu 31/12/09
248	Demonstration feed production	131 days	Thu 02/07/09	Thu 31/12/09
249	Extension	131 days	Thu 02/07/09	Thu 31/12/09
250	**Fisheries Co-Management**	**1050 days**	**Mon 09/01/06**	**Thu 31/12/09**
251	Baseline data collection (FCM)	1050 days	Mon 09/01/06	Thu 31/12/09
252	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
253	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
254	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
255	Extension	262 days	Fri 02/01/09	Thu 31/12/09
256	**Handicraft**	**592 days**	**Tue 02/10/07**	**Thu 31/12/09**



Page 8

ID	Task Name	Duration	Start	Finish
257	Groups selection	196 days	Tue 02/10/07	Mon 30/06/08
258	Demonstration	196 days	Tue 01/07/08	Fri 27/03/09
259	Set up budget plan	261 days	Wed 02/04/08	Fri 27/03/09
260	Implementation	395 days	Wed 02/07/08	Thu 31/12/09
261	Marketing	198 days	Wed 01/04/09	Thu 31/12/09
262	Drilling Water Supply/Sanitation	89 days	Fri 30/11/07	Wed 31/12/08
263	**DS Nakai Dam**	**1051 days**	**Fri 06/01/06**	**Thu 31/12/09**
264	**Community Development**	**526 days**	**Wed 02/01/08**	**Thu 31/12/09**
265	Establishment of VDC	132 days	Wed 02/04/08	Tue 30/09/08
266	Capacity Building of Village Groups	461 days	Wed 02/04/08	Thu 31/12/09
267	Coordination	526 days	Wed 02/01/08	Thu 31/12/09
268	**Agriculture**	**395 days**	**Wed 02/07/08**	**Thu 31/12/09**
269	Demonstration of field crops	131 days	Wed 01/10/08	Tue 31/03/09
270	Post-harvest/processing/harvesting	395 days	Wed 02/07/08	Thu 31/12/09
271	Extension	131 days	Wed 01/10/08	Wed 30/12/09
272	**Livestock**	**393 days**	**Tue 01/07/08**	**Mon 28/12/09**
273	Training of Village Volunteer Workers	65 days	Thu 01/01/09	Tue 31/03/09
274	Equipment & Vaccines	65 days	Thu 01/01/09	Tue 31/03/09
275	Demonstration feed production Units	131 days	Wed 01/10/08	Thu 02/07/09
276	Extension	197 days	Tue 01/07/08	Mon 28/12/09
277	**Aquaculture**	**526 days**	**Wed 02/01/08**	**Thu 31/12/09**
278	Demonstration aquaculture	392 days	Fri 04/01/08	Tue 30/06/09
279	setup of hatcheries network	393 days	Wed 02/01/08	Mon 29/06/09
280	Demonstration feed production	392 days	Wed 02/01/08	Fri 26/06/09
281	Extension	262 days	Fri 02/01/09	Thu 31/12/09
282	**Fisheries Co-Management**	**1051 days**	**Fri 06/01/06**	**Thu 31/12/09**
283	Baseline data collection (FCM)	1051 days	Fri 06/01/06	Thu 31/12/09
284	Program Design	130 days	Wed 02/01/08	Mon 30/06/08
285	Setup Fisheries Co-management Tea	132 days	Wed 02/04/08	Tue 30/09/08
286	Demonstration aquatic resources	329 days	Wed 02/04/08	Tue 30/06/09
287	Extension	262 days	Fri 02/01/09	Thu 31/12/09
288	**Handicraft**	**395 days**	**Wed 02/07/08**	**Thu 31/12/09**

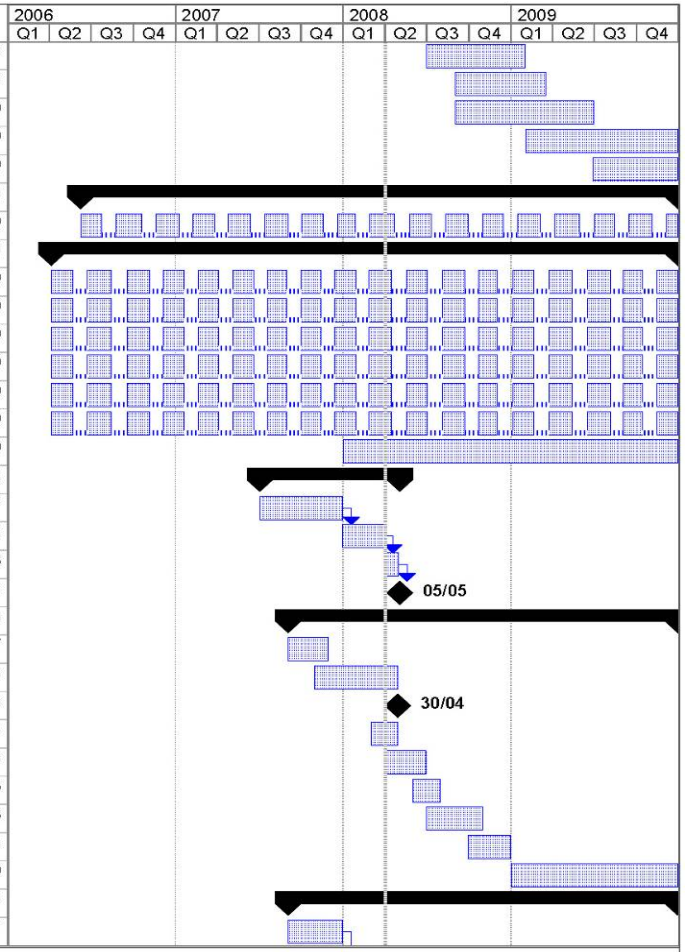


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 9

ID	Task Name	Duration	Start	Finish
289	Groups selection	155 days	Wed 02/07/08	Sat 31/01/09
290	Demonstration	143 days	Tue 02/09/08	Wed 18/03/09
291	Set up budget plan	218 days	Tue 02/09/08	Tue 30/06/09
292	Implementation	240 days	Mon 02/02/09	Thu 31/12/09
293	Marketing	133 days	Tue 30/06/09	Thu 31/12/09
294	**US Nakai Reservoir**	**941 days**	**Fri 09/06/06**	**Thu 31/12/09**
295	Fish Catch Monitoring Survey	584 days	Fri 09/06/06	Thu 31/12/09
296	**Capacity Building (District GOL)**	**987 days**	**Thu 06/04/06**	**Thu 31/12/09**
297	Livestock	610 days	Thu 06/04/06	Thu 31/12/09
298	Community Developmen t	610 days	Thu 06/04/06	Thu 31/12/09
299	Micro Credit (Village Fund)	610 days	Thu 06/04/06	Thu 31/12/09
300	Aquaculture	610 days	Thu 06/04/06	Thu 31/12/09
301	Agriculture	610 days	Thu 06/04/06	Thu 31/12/09
302	Livestock	610 days	Thu 06/04/06	Thu 31/12/09
303	Building Links with Agro Industries	526 days	Wed 02/01/08	Thu 31/12/09
304	**Inventory of assets**	**220 days**	**Thu 05/07/07**	**Mon 05/05/08**
305	Preparation of inventory	131 days	Thu 05/07/07	Mon 31/12/07
306	Inventory of infrastructure	65 days	Tue 01/01/08	Mon 31/03/08
307	Preparation of report	23 days	Tue 01/04/08	Thu 01/05/08
308	Report issued	0 days	Mon 05/05/08	Mon 05/05/08
309	**Irrigation Pumps**	**614 days**	**Tue 04/09/07**	**Thu 31/12/09**
310	Preparation for inventory and assessment	66 days	Tue 04/09/07	Fri 30/11/07
311	inventory and assessment of pumps	130 days	Thu 01/11/07	Wed 30/04/08
312	Inventory Report	0 days	Wed 30/04/08	Wed 30/04/08
313	Identification of pumps needing modificatic	43 days	Mon 03/03/08	Wed 30/04/08
314	Develop detailed plan	66 days	Tue 01/04/08	Mon 30/06/08
315	consultations and agreements	44 days	Mon 02/06/08	Thu 31/07/08
316	Procurement of materials	89 days	Wed 02/07/08	Fri 31/10/08
317	Field modification activities	66 days	Wed 01/10/08	Wed 31/12/08
318	Monitoring	262 days	Fri 02/01/09	Thu 31/12/09
319	**Access Restoration**	**614 days**	**Tue 04/09/07**	**Thu 31/12/09**
320	Preparation of inventory and assessment	87 days	Tue 04/09/07	Mon 31/12/07

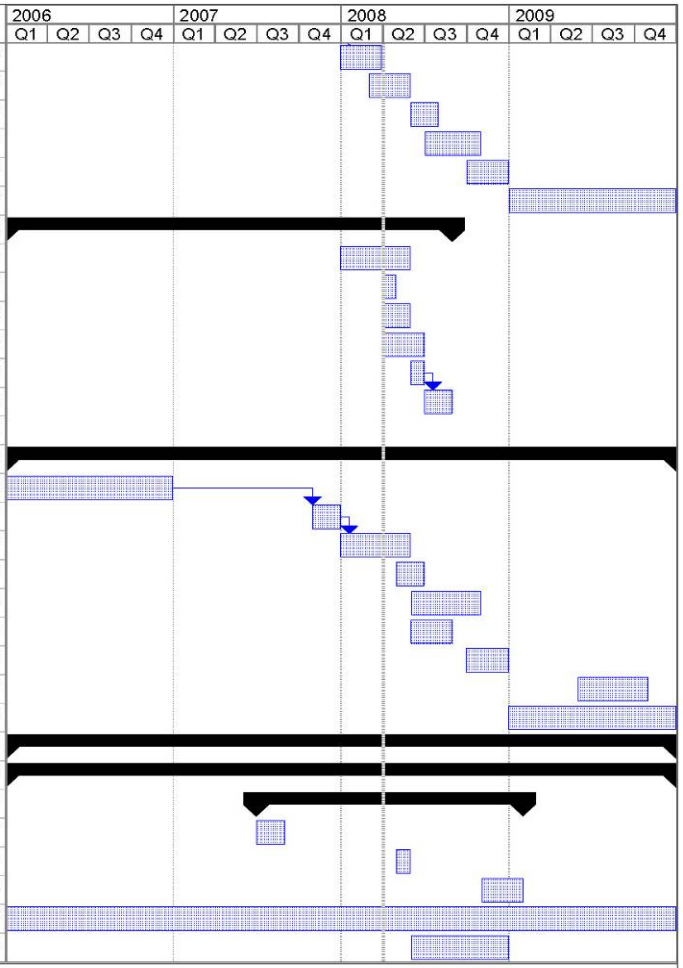


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 10

ID	Task Name	Duration	Start	Finish
321	Field inventory	64 days	Tue 01/01/08	Fri 28/03/08
322	Detailed plan for modification	65 days	Mon 03/03/08	Fri 30/05/08
323	Consultation and agreement	44 days	Mon 02/06/08	Thu 31/07/08
324	Procurement of materials & services	88 days	Thu 03/07/08	Fri 31/10/08
325	Field modification	65 days	Thu 02/10/08	Wed 31/12/08
326	Monitoring of success	262 days	Fri 02/01/09	Thu 31/12/09
327	**River Bank Gardens Relocation**	**704 days**	**Mon 02/01/06**	**Sat 30/08/08**
328	Survey and Registration of Gardens	110 days	Tue 01/01/08	Sat 31/05/08
329	Identification of demonstration villages	22 days	Tue 01/04/08	Wed 30/04/08
330	Develop detailed plans	45 days	Tue 01/04/08	Sat 31/05/08
331	Final consultations	66 days	Tue 01/04/08	Mon 30/06/08
332	Procurement of materials	21 days	Mon 02/06/08	Mon 30/06/08
333	Implementation of relocation	44 days	Wed 02/07/08	Sat 30/08/08
334	Expansion to additional villages	1 day	Mon 02/01/06	Mon 02/01/06
335	**Water Gate Rehabilitation**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
336	Pre Feasibility Studies	262 days	Mon 02/01/06	Sat 30/12/06
337	Update basic flood gate data	43 days	Thu 01/11/07	Mon 31/12/07
338	Detailed rehabilitation plan	110 days	Tue 01/01/08	Sat 31/05/08
339	Consultation and workshop	44 days	Thu 01/05/08	Mon 30/06/08
340	Wet season monitoring	110 days	Tue 03/06/08	Fri 31/10/08
341	Bidding and procurement	66 days	Mon 02/06/08	Sat 30/08/08
342	Rehabilitation	66 days	Wed 01/10/08	Wed 31/12/08
343	Wet season monitoring of gates	110 days	Mon 01/06/09	Fri 30/10/09
344	Operational strengthening	263 days	Thu 01/01/09	Thu 31/12/09
345	**DS Monitoring pre COD**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
346	**Physical Monitoring XBF**	**1055 days**	**Mon 02/01/06**	**Thu 31/12/09**
347	**Cross Sectional Surveys**	**422 days**	**Sun 01/07/07**	**Sat 31/01/09**
348	2007 Survey	46 days	Sun 01/07/07	Fri 31/08/07
349	Review	22 days	Fri 02/05/08	Sat 31/05/08
350	2008 Survey	65 days	Tue 04/11/08	Sat 31/01/09
351	Suspended Solids Measurements	1055 days	Mon 02/01/06	Thu 31/12/09
352	Photographic/Video evidence	152 days	Wed 04/06/08	Wed 31/12/08

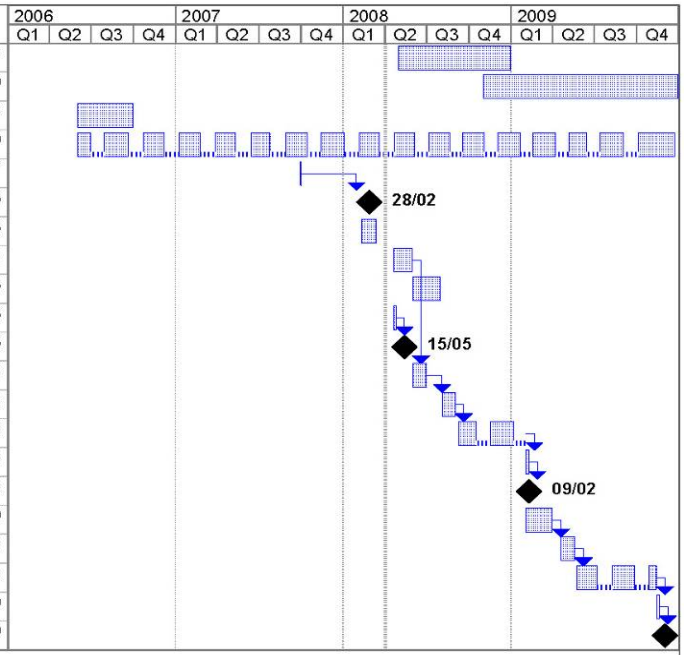


Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 11

ID	Task Name	Duration	Start	Finish
353	Aerial Photograph/Satelite Imagery	177 days	Thu 01/05/08	Wed 31/12/08
354	Critical Infrastructure Monitoring	306 days	Mon 03/11/08	Thu 31/12/09
355	S/E Baseline Survey 1	87 days	Fri 02/06/06	Sat 30/09/06
356	Fish Catch Monitoring Survey	586 days	Fri 02/06/06	Thu 24/12/09
357	IMA 1st field visit inception/work plan deve	2 days	Sun 30/09/07	Mon 01/10/07
358	First 2008 Summary Mission Report	0 days	Thu 28/02/08	Thu 28/02/08
359	KamKerd Food Consumption survey	24 days	Tue 12/02/08	Fri 14/03/08
360	S/E Baseline Survey 2 Design + Contractir	31 days	Mon 21/04/08	Sat 31/05/08
361	S/E Baseline Survey 2 Data Collection	44 days	Mon 02/06/08	Thu 31/07/08
362	IMA 2nd Site Visit	5 days	Mon 21/04/08	Fri 25/04/08
363	Second Summary Mission Report	0 days	Thu 15/05/08	Thu 15/05/08
364	S/E Baseline Survey d/base module desigi	21 days	Mon 02/06/08	Mon 30/06/08
365	S/E Baseline Survey 2 Data Entry	21 days	Tue 05/08/08	Mon 01/09/08
366	S/E Baseline Survey 2 Data analysis	65 days	Tue 09/09/08	Mon 02/02/09
367	IMA 3rd Site Visit	5 days	Tue 03/02/09	Mon 09/02/09
368	Full Intermediate Summary Report	0 days	Mon 09/02/09	Mon 09/02/09
369	S/E Baseline Survey 3 Data Collection	42 days	Mon 02/02/09	Tue 31/03/09
370	S/E Baseline Survey 3 Data Entry	23 days	Tue 21/04/09	Wed 20/05/09
371	S/E Baseline Survey 3 Data analysis	79 days	Mon 25/05/09	Sat 14/11/09
372	IMA 4th Site Visit	5 days	Mon 16/11/09	Fri 20/11/09
373	Full Intermediate Summary Report	0 days	Fri 04/12/09	Fri 04/12/09



Project: Overall DSIP Schedule
Date: Tue 01/04/08

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 12

ANNEX 10

Case study of Ban Khammouan (Khamkeut district)

Village consultation meeting held on 27 March 2008

Objectives of village consultation

- Provide community with information on NT2 project and its impacts
- Collect necessary village information including identification of poor households (wealth ranking)
- Identify village priorities for livelihood activities

Steps

No.	Activities	Participants	Tools	Responsibility		
				NTPC	RMU	DWG
1	Opening meeting	All villagers (1 pers of each hh)				District Chief Cabinet
2	Objectives of the meeting	All villagers (1 pers of each hh)		Francois Demoulin		
3	Progress of NT2 construction	All villagers (1 pers of each hh)	LCD / Posters / Maps	Khamkhing		
4	Village data collection	Village authority	Interview form	Bounhom	Chanthapanya	Maymanh
5	Wealth ranking	Men and female group	Flip charts, markers	Nilandon, Khamkhing	Keoula	Sivone, Phimthong, Phoukhong, Thongvilay
6	Village mapping	Village guards amd 6 villagers	Flip charts, markers, sticker	Phairat	Vanthawee	Dammoen
Lunch				All		
7	Identify livelihood activities by group	3 groups:(rich, middle, poor)	Flip charts, markers	Nilandon, Phairat, Khamkhing, Bounhom	Keoula, Vanthawee, Chanthapanya	All DWGs
8	Prioritise village livelihood activities	All villagers (1 pers of each hh)	Flip charts, markers, sticker	Nilandon, Bounhom	Keoula, Vanthawee, Chanthapanya	All DWGs
9	Presentation of VDC concept	All villagers (1 pers of each hh)			Keoula	
10	Closing meeting	All villagers (1 pers of each hh)				District Chief Cabinet

Results

The information collected by the use of the different participatory tools are presented below.

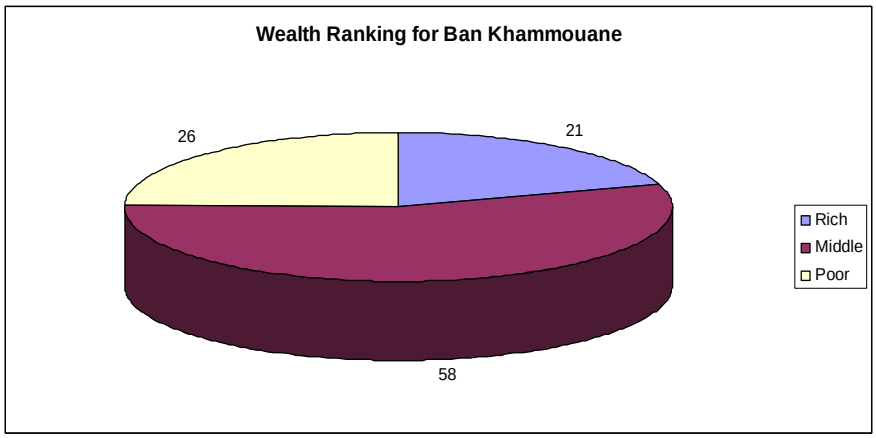
Data collection

Data collected from village authorities are as follows:

Kind of information	Amount
Total of families (according to family book)	105
Total number of HH	132
Total population	646 persons , 320 women
Total land holding of the village (ha)	750
Total rainy season rice cultivation area (ha)	121.10
Number of HH who have rainy season rice cultivation	127
Average rice cultivation per HH (ha)	0.95
Total rice cultivation area (ha)	12
Cash crop area (ha)	
Average rice production (t/ha)	2.5
Number of HH without rice shortage	54
Number of open wells	20
Number of HH who have latrine	35
Buffalo	83
Number of HH who have buffalo	15
Average number of buffalo per HH	6
Cattle	176
Number of HH who have native cows	47
Average number of cattle per HH	4
Goat	6
Pig	129
Number of HH who have pig:s	56
Average number of pigs per HH	2
Poultry	NA
Main product	rice
Minor product	NA

Wealth ranking

From 105 families 21 were ranked as rich, 58 as middle and 26 as poor.



Livelihood activity identification

The results of the 3 discussion groups (rich, middle, poor) are summarized in the table below.

No	Rich			Middle			Poor		
	Activities	HH. involved	Ranking	Activities	HH. involved	Ranking	Activities	HH. involved	Ranking
1	Fish pond improvement	10	1	School improvement		1	Fish raising	14	1
2	School improvement		1	Dry rice planting / rehabilitation of irrigation system		2	Pig raising	5	2
3	Land clearing for paddy field	13	2	Fish pond digging	19	3	Cattle raising	5	3
4	Water supply construction		2	Water supply construction		4			
5	Intensive rice production	16	3	Clearing land for paddy field	15	5			
6	Village office construction		3	Buffalo raising	9	6			
7	Agar wood planting	3	4						
8	Improving local pig raising techniques	2	5						

Village walk

Time and staff available for village walk was very (too much) limited. Some important observations are noted below:

- The school is a permanent building but needs important repairs
- The weir and other structures for irrigation need repairs but materials are already available on site, as recorded during the meeting
- With exception of poultry, not a single animal was seen free grazing or scavenging. It appears that tough livestock regulations apply and are respected
- A great number of pigs is reporte but only a very few could be observed in the village behind the rice mills
- Some corn plantation were observed close to the village but none of them is the result of contract farming (that the district is promoting)

Village mapping

The results of the village map (see map at the end of the section) are summarized in the table below.

No.	Kind of information	Amount
1	Total households:	132
2	Total families	105
3	Number of HH who have buffalo	15
4	Number of HH who have native cows	47
5	Number of HH who have native fighting cows	0
6	Number of HH who have pigs	56
7	Number of HH who have goats	3
8	Number of HH who have fish pond	23
9	Number of HH who used to stock fish fry	3
10	Number of HH who do rainy season rice cultivation	127
11	Number of HH who have no rice cultivation area	5
12	Number of HH who do dry season rice cultivation	23
13	Number of HH growing agarwood (more than 50 trees)	19
14	Number of HH cultivating cassava	30
15	Number of HH who have rice mill	13
16	Number of HH who have small retail shop	9
17	Number of water taps	0
18	Is there a primary school? (Y/N)	Y
19	Does the village have a secondary school? (Y/N)	Y
20	Does the village have a temple? (Y/N)	Y
21	Total number of ethnic minority families	0

One will notice that data collected with the different tools are sometimes very contradictory. The shot time available did not enable to crosscheck the data in the field. That is the reason why the process will be modified in the future with

village data collection being organized the day before village meeting (see modification of process further in the text).

General discussion on activities

The results of the 3 livelihood activity groups were presented in the general assembly and the villagers agreed, after discussion, on the following list of activities ranked per priority:

1. *Improvement and increase of rice cultivation, including land clearing for paddy field, better rice cultivation techniques and rehabilitation of irrigation system*
2. *Improvement and increase of fish culture, including pond improvement and digging and improved techniques*
3. *Improving local pig raising techniques*
4. *School improvement*
5. *Water supply construction*

It must be noted that with such a selection the activities of interest for the poor families are included in the final village proposals. It will be up to NTPC/RMU/DWGs to ensure during the implementation that poor families do effectively participate and benefit from the process.

Presentation of VDC concept
Before closure of the meeting RMU presented the VDC concept as a tool likely to be establish hed in the village for the further development of activities.

Next steps for Ban Khammouan

- Analyse village information, decide on the principle which activities are acceptable by NTPC/GoL for support,
- Define additional information needed for planning, go back to village to collect more precise data in order to assess the administrative, technical and financial feasibility of the proposed activities
- Develop draft village action plan taking into account the interests of different wealth groups and district plans
- Review / approval of plan by NTPC / RMU / Khamkeut District / village
- Implementation of activities
- Review / evaluation / revision

Modifications of the process

The analysis of Ban Khammouan process has led to the following changes in the process for the next villages:

- Village data collection and presentation of VDC concept will be done the afternoon before the day of village meeting
- Wealth ranking will be done in a single group
- Identification of livelihood activities will be done per wealth group, with a further sub-division by gender if applicable
- More importance will be given to village walks for collecting additional precise technical information (to be used for effective planning)
- Prior writing of the village action plan, a technical village visit is likely to be organized for collecting further technical data enabling to assess administrative, technical and financial feasibility of the proposed activities.

Village map of Ban Khammouan