

To: Robert Allen
General Manager
Theun Hinboun Power Company Ltd.
Vientiane, Lao PDR
Email: gmthpc@thpclaos.com

Bounma Molaknasouk
THPC Environmental Management Division
Ban Nahin, Khammouane Province, Lao PDR
Email: emd@thpclaos.com

Cc: Aviva Imhof
International Rivers Network
Berkeley, California, USA
aviva@irn.org

From Keith D. Barney
Department of Geography, York University
Toronto, Ontario, Canada
kbarney@yorku.ca

October 22, 2006
Toronto, Canada

Greetings Mr. Allen and Mr. Bounma:

You may recall that some months ago we met at the Theun-Hinboun Power Co. office in Vientiane. I am a Canadian doctoral student researching commercial forestry, resource tenure and rural change in Laos. During my fieldwork in Laos from 2004-2006, I was based with the Faculty of Forestry at the National University of Laos.

As you may also recall, one of my primary field sites was a village located along the lower Hinboun river—Ban Pak Veng—and as such my village case study also relates to the Theun Hinboun Power Company project.

On August 5th 2006, as I was departing from my second last village field trip from Pak Veng, I alerted Mr. Bounma at the Environmental Management Division by mobile phone that there was a livestock epidemic underway in Ban Pak Veng.

I was then pleased to hear on my last trip to Hinboun District in late August, that Mr. Bounma had taken up my suggestion to direct THPC EMD field staff to the Ban Pak Veng, to encourage and facilitate the villagers in vaccinating their livestock. While THPC had, in the months prior to this disease outbreak, previously provided a medical kit and training for supporting vaccinations, the majority of the villagers in fact did not take the opportunity to vaccinate their animals. This relates largely to traditional belief systems,

whereby illness, for both humans and animals, is viewed to be governed by the *phi* or village guardian spirits, as opposed to causes such as bacterial or viral infection.

I contacted Mr. Bounma in the morning of August 5th, and the THPC staff arrived that same evening. It is hard of course to pinpoint the actual effect of the booster antibiotics and vaccinations on slowing the course of the epidemic; I understand another 6 animals still died after receiving inoculations. But I am indeed appreciative that THPC actively followed up on this issue, and directed EMD field staff to the village. I understand the EMD staff stayed for nearly two weeks, and were able to vaccinate almost all the larger animals in the village. This action by the THPC EMD likely helped halt a further spread of the disease, and may have spared the village from experiencing a complete loss of all their larger livestock. It goes without saying that it is a heavy loss indeed for villagers to lose buffalos and cows to disease. At approximately US\$400 per head for an adult buffalo, and US\$150 for an adult cow, they truly represent “savings on the hoof” for many villagers in rural Laos.

The total losses for the village between July 7th to August 22nd 2006 were recorded at 15 adult buffalos and 3 adult cows. The peak mortality period however occurred between July 28th to August 8th, during which 13 adult buffalos and 2 adult cows expired. This peak mortality period coincided with my observations of the presence of standing floodwater in the village. At the above valuation rates, the epidemic resulted in a total economic loss to Ban Pak Veng in the range of US\$6,500. For the villagers, this was a crushing blow, representing years of accumulated savings.

A colleague who works in animal diagnostics in Vientiane suggested that a probable cause of the outbreak was an infection called *haemorrhagic septicemia* (HS). HS is a livestock disease that is endemic in Laos, a bacterial infection of *Pasteurella multocida*. Among its notable features include: a pronounced seasonality (wet and moist conditions prolong the survival of the bacteria); buffalos are more affected than cattle; and decaying carcasses are an important source of infection.

“Infection occurs by inhalation or ingestion of P. multocida bacteria. Higher incidence of HS is associated with moist, humid conditions, high buffalo population density, and extensive free grazing system of management, where large herds graze freely in common pastures and are paddocked together at night. In situations where occasional sporadic outbreaks occur in some regions within endemic countries, mortality may be very high unlike endemic areas where regular, seasonal outbreaks occur, where losses in each outbreak are low and confined to young animals...losses in endemic areas may be of an insidious nature which may escape the notice of the animal health authorities but may be of considerable economic significance (De Alwis, 1981). Once clinical signs appear, case fatality is nearly 100%.”¹

¹ Benkirane, A. and M. De Alwis (2002). *Haemorrhagic septicemia, its significance, prevention and control in Asia*. *Vet. Med. – Czech*, 47, 2002 (8): 234–240. pp. 236.

http://www.cazy.cz/2003/2002/vet8_02/Benkirane.pdf

See also: http://www.fao.org/AG/AGAINFO/programmes/en/haemosept/haemo_about.html

The onset was indeed remarkable. It would start with foaming around the mouth of the animal, and within 24 hours a fully healthy adult buffalo would be dead. Villagers noted that the animals' body temperature increased rapidly with onset, to the extent that buffalo would run into nearby water sources to cool down. In one instance, an adult buffalo did so and subsequently expired in a stream located nearby the village. The smell of a decomposing buffalo wafting through the village added to the general unpleasantness and discomfort of the flooding situation, and it certainly did not help in terms of the water quality of the standing water in the village at the time. The large decaying buffalo carcass in the nearby stream may also have acted as a source of onward infections in Ban Pak Veng.

Benkirane and De Alwis (2002) also write that:

“The onset of the monsoon in Asian countries also set into motion other activities such as rice cultivation which bring about movements of animals, work stress in work animals, etc. all of which favour the precipitation of outbreaks (De Alwis, 1990a).”

It is notable that in Ban Pak Veng, water buffalo are not used as draught animals. This is because the villagers no longer cultivate lowland wet-rice paddy. The shift from wet rice paddy cultivation to upland swidden rice cultivation is a result of the downstream flooding effects of the THPC project on the lower Hinboun River. The available wet-rice paddy land in Ban Pak Veng is now unpredictably flooded in the wet season, making cultivation a highly risky endeavor, and often impossible. The humid, moist conditions which present a favourable environment for outbreaks of this disease in village livestock was more likely associated with the presence of standing water in the village itself, rather than via the a more usual mode, of the employment of livestock as draught animals in wet rice paddy preparation.

It is also notable that in Ban Pak Veng, the livestock herd can be separated into two main groups, depending on their owner's practices. That is, the animals that return to the village compound each evening, versus the animals that remain grazing in the forest, even at night. Villagers noted that the animals trained to return to the village compound each night (or whose owners went and fetched them) were more likely to become infected and die, than the animals who tended to stay on higher ground in the forest. This supports the notion that it was the presence of standing flood water in the village itself which was an important factor in the disease outbreak.

It would seem plausible that the infectious disease that raced through Ban Pak Veng in early August was causally associated with the presence of dirty standing water in the village. It is also the case that an increase in the extent and duration of wet season flooding events are among the downstream effects of the THPC's hydropower operations, which diverts 110 cubic meters of water per second from the Nam Theun into the Nam

Hinboun via the Nam Hai. As you are aware, this diversion of water increases volume flows in the lower Nam Hinboun considerably.²

When one connects these observations, it is a logically consistent hypothesis that the operations of the Theun-Hinboun Power Company may represent a contributing factor in causing, or exacerbating the extent of, livestock disease and mortality losses via infections such as *haemorrhagic septicemia* in villages located along the lower Hinboun River, especially when such an outbreak coincides with a wet season flooding event.

Clearly, it is not possible to provide a statistically valid scientific correlation between THPC's hydropower operations, post 1998 flooding effects on the lower Hinboun river, and this specific incident of livestock disease in Ban Pak Veng in August 2006. Without established baseline data, the specific effects of THPC's operations upon a range of ecological variables are not possible to isolate. However, if it is accepted as logically consistent that THPC's operations may play a role in causing or exacerbating the incidence of livestock disease via the mechanism of an increased *extent* and/or *duration* of downstream flooding events, then: A) THPC has a responsibility to investigate further the causes of such significant disease outbreaks and B) in the absence of clear data, THPC also holds an obligation to provide financial compensation to downstream villages experiencing significant livestock losses, especially when the incidence of disease and mortality coincides with wet season flooding events. That is, the weight of responsibility for addressing the economic losses that impoverished Lao villagers in the project area experience, which are associated with ecosystem changes resulting in part from THPC's operations, lies with the Company.

It should be noted that this past August in Ban Pak Veng, the Hinboun River did not significantly overflow its banks, although it came very close. Rather, the very dirty standing water under many of the houses in Pak Veng village was the result of nearby feeder streams backing up into the village. The resulting standing water quickly became a health issue: cows and buffalos were urinating and defecating into the water, children were playing in it, and everyone was forced to wade through it. Many villagers, especially children, developed resulting foot rashes. For adults, the foot rashes could keep them away from working in their swidden agricultural fields for some days. Village flooding events can still therefore occur even though the Hinboun has not technically overflowed its banks in a specific location.

Observers might point out that THPC had attempted to establish a livestock vaccination program in the village prior to this outbreak of livestock disease, yet most of the villagers chose not to take advantage of this option. In response, I would argue that if the spiritual beliefs of rural villagers in Laos may at times work against the timely, 'rational'

² Although the lower Hinboun floodplain is prone to seasonal flooding events, villagers stated that historically flooding events usually did not result in complete crop failure. Since 2002 however, villagers in Ban Pak Veng have abandoned any further efforts to cultivate productive wet rice paddy in locations along the Hinboun. Villagers in Ban Pak Veng are unanimous in their view that after the Theun-Hinboun Power project came on-line in 1998, the *extent* and *duration* of wet season flooding events increased considerably. (Five Pak Veng households maintain small plots of wet rice paddy in low-lying areas located a distance away from the main river).

implementation of health and livelihood programs, this is simply an issue which calls for more imagination, innovation and resources on the part of THPC to address, in a responsible manner. After all, it is THPC that has been the primary source of the destabilizing ecosystem changes along the Hinboun, and the associated hardships for villagers. Secondly, the reluctance of Pak Veng villagers to vaccinate their herd is exactly the type of initial response that one would *expect* in many areas of rural Laos, where religious tradition represents the prism through which villagers interpret and explain the world, and where a belief in *phi* spirits forms part of the cosmological foundation for village life.

The power of religious spiritual beliefs should not be underestimated in these situations; and the role of the *phi* spirits certainly outweighs the explanatory power of scientific vaccinations for animal health issues in the minds of many villagers. For instance, in a communal meeting on July 31st, as the epidemic was developing, village elders agreed that if any livestock owner refused to join the proposed spirit ceremony, and that person's cow or buffalo subsequently become ill with the disease, either the owner would be required to keep the animal away from the village housing area, or the offending owner would be requested to leave the village. To my knowledge, no such collective sanction was proposed with respect to a refusal or failure to inject one's animals with THPC's scientific vaccine.

One could even imagine various innovations which could integrate village spiritual belief systems with a scientific vaccination program. For instance, THPC staff could time an advance vaccination program with the periods of the agricultural calendar when villagers in Ban Pak Veng make alcohol and chicken offerings to the village guardian spirits. The goal would not be to dismiss customary beliefs as 'irrational', but rather to seek options to integrate a scientific vaccination program with religious belief and village culture.

THPC may also want to consider looking further into sending rapid mobile health units into villages at critical flooding event weeks. Alternatively, THPC could consider mechanisms whereby if villagers are experiencing livestock disease outbreaks, there is an efficient communication mechanism in place for the village headman to quickly alert the THPC EMD for required assistance. I also refer you to the recommendations listed in the Benkirane and De Alwis publication, for improving your prevention and vaccination program and to minimize the economic losses from this type of disease in your project area.

Again, while village religious beliefs may not exactly facilitate a timely vaccination program, the cost of dismissing villager's perspectives and beliefs may lead to a general failure of the THPC livestock health program in many villages. On the positive side, more flexibility by THPC, combined with a respectful and detailed understanding of the local situation, attitudes and belief systems of Lao villagers, may identify innovative and exciting ways forward.

I will be writing up a fuller field report on my research Ban Pak Veng shortly, which I will be sure to direct your way.

I would look forward to hearing back from you on these matters.

Sincerely,

Keith D. Barney

Doctoral Candidate, Department of Geography
York University
4700 Keele Street, Toronto, Ontario
Canada
M3J 1P3
Tel: (416) 736-2100
Email: kbarney@yorku.ca



Flooding conditions in Ban Pak Veng, Hinboun District. August 1, 2006. Photo: K. Barney



Transporting a dead buffalo across the Hinboun River for burial, Ban Pak Veng, Hinboun District, Laos. July 30, 2006. Photo: K. Barney.