1.782 Environmental Engineering Masters of Engineering Project

Fall 2007 - Spring 2008

REQUEST FOR PROPOSALS

Water-Supply Analysis for Mae La Refugee Camp, Thailand

Aide Médicale Internationale Thailand

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September 2007

NOTICE TO PROSPECTIVE BIDDERS

Aide Médicale Internationale is seeking technical assistance in order to assess an existing water supply system in the Mae La refugee camp in Thailand. According to their website (AMI, undated1), "AMI is a humanitarian and non-political public French association created in 1979. It works to restore the access to the care of the population excluded from any system of health. AMI trains staff of local health and rehabilitates many health centers." AMI is active in nine countries, including Thailand.

AMI's activities in Thailand have focused on refugee camps along the Thailand-Burmese border since 1995 (and in Maela in particular since mid-2005 after a hand-over with MSF). Civilians have been fleeing Myanmar (formerly named Burma) since 1984 to avoid conflict between Burmese ethnic minorities and the Burmese army (AMI, undated2). The camps house more than 150,000 refugees of the Karen, Karenni, Mon and other ethnic minorities. Although they departed many years ago, the Thai government discourages their settlement in Thailand and as Thailand is not a signer to the UN refugee acts, has allowed the Burmese no official status. The refugees must rely entirely on international aid to supply their fundamental needs. AMI works at three camps—Nupoe, Umpiem and Mae La—mainly populated by Karen people.

Recently, personnel from the U.S. Centers for Disease Control and Prevention visited the Mae La camp to evaluate a persistent but low-level cholera incidence. They made a number of recommendations for engineering evaluation of the camp's water-supply system. The system

consists of a variety of sources that provide intermittent supply to a rudimentary distribution system consisting of a network of pipes feeding stand pipes for resident access to water. Needed are an evaluation of the distribution system, tracing of water from sources to supply points, evaluation of potential additional sources, and design of drinking-water treatment facilities. Mapping of the system using GIS is a first step to detailed analysis of the distribution system. Completing a water-quality assessment (analysis of available data and further analysis if necessary) is also a first step to propose improvements.

The anticipated effort will require 1200 to 1600 hours of technical effort (three or four MEng students) leading to a draft final report on Friday, April 11, 2008. Assuming a one-week review by sponsors, a final report is due on Friday, May 9, 2008. In addition, the successful team will be expected to make one or more oral presentations to the client.

To be considered, prospective bidders are asked to forward a letter of intent (LOI) with team qualifications to the above address by COB, Friday, October 5, 2007. The LOI should be no longer than 2 pages, exclusive of resumes, and should outline the team's preliminary plans for the project. Bidders will be notified by October 12, 2007 if they have made the short list, and successful bidders will be asked to submit a full technical plus cost proposal by December 7, 2007. Details of the proposal follow.

BACKGROUND

For more than twenty years, ethnic minority populations from Myanmar have fled their homeland to seek protection in Thailand. In 1984, the Thai government started setting up camps to respond to the influx (Mae La camp was the first with around 10,000 persons). The main population flows occurred in 1995 (around 60,000 persons). Today, there are nine camps along the border in which an estimated 150,000 persons are living. New arrivals are still arriving at the camps. Other refugees are living outside of the camps along the border without official registration. They are called "migrants" and their number is estimated between 200,000 and 400,000 people.

The current political situation in Myanmar does not leave much hope for return of the refugees in the forthcoming years. Since May 2006, new mass persecutions have been committed against the Karen ethnic group in Myanmar that led to new massive flights to Thailand. Thailand is not a party to the 1951 Refugee Convention or its 1967 Protocol which give rights and status to the refugees. Refugees are thus considered as "illegal migrants". However their stay in the country is allowed under strict regulations inside camps called "Temporary Shelters." The Ministry of Interior is responsible for refugee issues.

Resettlement is the only long-term solution for the time being. An ambitious program has been set-up in Tham-Hin camp (2006) and in Mae La, Umpiem and Nupoe camps (2007 and 2008) for massive resettlement to the United States. In 2007 an approximate 16,000 departures are planned to be organized for those three camps. AMI camp staff began to depart the Mae La camp in summer 2007. To date, approximately 45% of the population applied for resettlement and 8,000 have already left.

The United States plans to continue its massive resettlement program in the three camps mentioned above, so far with no limit to the number of applications. Resettlement to other countries are also organized in all the nine camps of the border but on a smaller scale and will also continue in 2008.

Since 1984, NGOs have been providing assistance to these refugees, covering their primary needs: food, shelter, education, water, health services. There are now 19 NGOs working for the refugee camp population under the coordination body known as Committee for Coordination Services to Displaced Persons in Thailand (CCSDPT). The United Nations High Commissioner for Refugees (UNHCR) takes care of protection issues, among others. In 2007, following an assessment organized by AMI/UNHCR/CCSDPT in 2006 and on demand of Thai authorities, the NGO Solidarités started to work in Thailand in the Mae La camp on sanitation aspects. A close coordination system with AMI has been organized. Some people have been living in the camps for more than 20 years, others were born there, and a number of NGOs have been assisting them since then. However, interventions must keep evolving and adapting to the new context.

AMI provides health services and drinking water to a population of approximately 48,000 Karen refugees in the Mae La refugee camp. Mae La is the largest of the nine refugee camps along Thailand's border with Burma (UNHCR, 2006). There are a total of 140,000 refugees in the camps, some displaced for as long as 20 years.

Lantagne (2007), AMI (2007) and Bowyer (2002) describe the water-supply system of the camp. In order to provide drinking water, MSF has constructed and then AMI has developed a water-distribution system of plastic pipe to supply water within the camp. Numerous water sources feed into the distribution system. The primary supply is the nearby river, from which water is withdrawn at two locations and pumped to storage tanks. In addition, thirteen natural springs are tapped at higher ground above the camp and that water is fed by gravity into the distribution system. Almost all of both the spring and river water is chlorinated prior to distribution. Roughly 1000 cubic meters of water is distributed per day during two three-hour time blocks. Camp residents can obtain water at 152 tap stands situated throughout the camp and they generally store water in their homes in a variety of storage containers.

There are also seventeen boreholes equipped with hand pumps and 63 rope-pump wells distributed throughout the camp for non-drinking water use (due to the presence of heavy metals). These sources are shock-treated with chlorine on a periodic basis. Finally, there are non-AMI sources including illegal connections to the AMI system, springs utilized on a private basis, and shallow dug wells created on a private basis. These latter two sources can be presumed to be untreated.

Water quality within the camp was found by Lantagne (2007) to be uneven. Water from most tap stands had low turbidity (below 5 NTU, the desired maximum for chlorination) and had proper residual chlorine levels. However, water stored in households generally showed inadequate residual chlorine levels and bacteria were too numerous to count. Boreholes tended to have higher turbidity levels and tended to have widely ranging residual chlorine depending upon the time since the borehole was last shock chlorinated. Lantagne's data were obtained at a

single time of the year marked by the absence of heavy rains. Water quality varies during the year as weather varies.

PROPOSED STUDY

Lantagne (2007) identified several aspects of the water supply system that required engineering analysis. A particular need is analysis of the distribution system so that water can be traced from particular sources to particular distribution points. A water-distribution system model is requested for this purpose; however special attention will need to be devoted to the intermittent nature of system operation as well as to the geographical repartition of the population. Mapping of the piping network and conducting field tracer studies are preliminary tasks to system analysis. The feasibility of new water sources and how those could be integrated into the system need to be assessed. In addition, methods to effectively chlorinate the rope wells are requested. Finally, a design for a water treatment system for the water supplied from the river is desired.

Proper spatial data are necessary for most of this work. Lantagne developed a preliminary GIS using GoogleEarth, recording the locations of water sources, storage tanks, boreholes, rope pumps, and tap stands, however an ArcView-based GIS is still needed.
AMI has arranged with the Faculty of Engineering of Mahidol University in Bangkok to make an aerial photographic survey of the camp and prepare a GIS by the end of December. Securing the permission of authorities to fly so near the international border is problematic and may delay or even cancel the GIS project however. Thus, the project team should assume that spatial information will need to be collected and organized into a GIS. Some spatial data may be available from the Thai government. Discussions to improve the water safety plan as a function of the situation observed and of the changes proposed should also take place. The project team is expected to travel to Thailand in January 2008 to collect field data.

MANAGEMENT, PERSONNEL, SCHEDULE, AND BUDGET

The full proposal should include a breakdown of responsibilities by staff member, including the name of a project manager; a schedule for completion including project milestones and progress reports; and details regarding cost, expressed in terms of hours of effort by job classification (staff engineer, project manager).

BASIS FOR SELECTION

Proposals will be evaluated on a competitive basis using the following criteria:

- Does the proposal address the client's needs?
- Originality
- Likelihood of success
- Cost (expressed in terms of staff hours).

CITED REFERENCES AND SOURCES OF ADDITIONAL INFORMATION

AMI, 2007. Humanitarian assistance for Burmese refugee population living in the camps on the Thai Burmese border (PowerPoint file). Aide Médicale Internationale, Thailand.

AMI, undated1. Discover AMI. Aide Médicale Internationale. http://www.amifrance.org/-Discover-AMI-.html. Accessed September 12, 2007.

AMI, undated2. AMI in Thailand. Aide Médicale Internationale. http://www.amifrance.org/-Thailand-.html. Accessed September 12, 2007.

Bowyer, Thomas, 2002. Evaluation Report: Evaluation of the ECHO Actions in favour of the Burmese refugees in Thailand, Sector: Water and Sanitation. Report by GFE, Aachen, Germany for the European Commission. March 2002. [http://ec.europa.eu/echo/pdf_files/evaluation/2002/thail_watsan.pdf].

Lantagne, Daniele, 2007. Water and Sanitation Assessment to Inform Case-Control Study of Cholera Outbreak in Mae La Refugee Camp, Thailand (PowerPoint file). Foodborne and Diarrheal Diseases Branch, Centers for Disease Control and Prevention, Atlanta, Georgia. August 26, 2007.

UNHCR, 2006. Myanmar refugees in Thailand. United Nations High Commissioner for Refugees, Geneva, Switzerland. May 23, 2006. http://www.unhcr.org/news/NEWS/4472ded14.html. Accessed September 12, 2007.

UNHCR, 2007. Resettlement of Myanmar refugees under way from northern Thai camp. United Nations High Commissioner for Refugees, Geneva, Switzerland. May 23, 2007. http://www.unhcr.org/news/NEWS/465430f04.html. Accessed September 12, 2007.