Mekong River Commission
Procedures for Notification, Prior Consultation and Agreement
Form/Format for Reply to Prior Consultation

1. **Replying State(s)**: The Socialist Republic of Viet Nam
2. **Date of reply:** 19 June 2017
3. **Replying Ministry(ies)/Agency(ies)**:

   The Viet Nam National Mekong Committee

   Add.: 23 Hang Tre str., Hoan Kiem, Hanoi, Viet Nam

   Tel: (84-4) 38254785

   Fax: (84-4) 38256929

   Email: vnmc@monre.gov.vn
4. **Contact person/facilitator**:

   Dr. Le Duc Trung

   Director General

   Viet Nam National Mekong Committee

   Add.: 23 Hang Tre str., Hoan Kiem, Hanoi, Viet Nam

   Tel: (84-4) 38255596

   Fax: (84-4) 38256929

   Email: vnmc@monre.gov.vn
5. **Name of the proposed use/project**: Pak Beng Hydropower Project
6. **Location of the proposed use**:

   The Pak Beng Hydropower Project is located on the Mekong mainstream in the Pak Beng district, Oudomxay province, Lao PDR, about 174 km upstream of the Luang Prabang city.
7. **Nature of proposed use**:

   ☐ Inter-basin diversion from the mainstream during wet season

   ☒ Intra-basin use on the mainstream during dry season

   ☐ Inter-basin diversion of the surplus water from the mainstream during dry season
8. **Date of receipt of the documents**: 22 December 2016
9. **Reply to proposed use:**

First of all, Viet Nam wishes to express its appreciation to the Lao PDR Government for such a high spirit of cooperation and responsibility in performing its due diligence and commitment to the Agreement on Cooperation for Sustainable Development of the Mekong River Basin, and the Procedures for Notification, Prior Consultation and Agreement of the Mekong River Commission, in suggesting the Commission to trigger the Prior Consultation process for Pak Beng Hydropower Project planned on the Mekong River mainstream. We are pleased to acknowledge that the notifying Government has also made every effort to share data and information relevant to the Project; organize site visits; launch additional assessments; recruit international supervision consultants, and more importantly, to show the willingness and openness for consideration of any inputs and comments from relevant stakeholders in the region.

Based on recommendations by the MRC's International Experts and outcomes of regional and national consultations, it is our observation that the preparations for the project construction by the Developer was of moderate unsatisfaction, notably in the collection of data, the application of sound analytical approaches, the proven demonstration of the efficiency and effectiveness of proposed mitigation measures, and the development of a comprehensive monitoring program for both construction and operation stages. To our constant concerns, with such a below-par preparations, the Pak Beng Project together with other mainstream structures (including those in China on Mekong/Lancang River) would result in serious cumulative impacts that in turn may cause unexpected disasters and incidents to valuable environment and bio-diversity on Lao PDR's territory first, before spreading further to downstream, particularly to the Mekong Delta's parts of Viet Nam in the context of climate change, droughts, salinity intrusion that have been recently intensified in a more severe manner to this vitally important area of Viet Nam. It is also worth noting that the MRC is about to complete its "Study on Sustainable Management and Development of the Mekong River including impacts by mainstream hydropower projects" (tentatively by the end of 2017). The outcomes and findings of the Study would probably set a solid and obviously objective scientific basis to enable the MRC and its member countries not only to assess comfortably the impacts of Pak Beng Hydropower Project in the overall context of entire cascade of the mainstream hydropower dams on the Mekong River, including impacts from China dams and climate change, but also to verify the efficiency and effectiveness of the mitigation measures proposed by the Developer and the international and regional experts.

In this regard, it is our proposal that Lao PDR Government, in close collaboration with the MRC Secretariat, spend more time and resources for the collection of additional data, the assessment of comprehensive and overall impacts, including those of both transboundary and cumulative nature, the improvement of structure designs with advanced and modern technologies (as exercised for the Xayaburi Hydropower Project); develop an impact monitoring program during both construction and operation stages; and request the Project Developer to incorporate the Council study's outcomes into designs prior to the Project's ground-breaking and regularly keep MRC member countries updated of the latest developments of the project construction plan.

On this occasion, in a spirit of good neighbouring cooperation, Viet Nam wishes to affirm once again that Viet Nam always supports the endeavour and plan of socio-economic development of all MRC member countries. Moreover, bearing in mind the special friendship amongst riparian members of Mekong family and the common mission to preserve the invaluable and essential values of Mekong River – our Mother River, it is also our profound wishes that all riparian countries, including Lao PDR, succeed in jointly managing and utilizing the Mekong's water resources in an efficient and sustainable manner. These national endeavours for growth therefore should be all directed to pursue our common development goals of the Mekong River Basin stated in Ho Chi Minh City's Declaration adopted at the Second Summit of the MRC in April 2014 as achieving efficient and sustainable use of the Mekong River water resources for the benefits of the inhabitant communities in the basin, the future of next generations, and the close solidarity and friendship amongst the riparian countries./.

Attachment to the Reply Form

DETAILED COMMENTS FROM VIET NAM CONSULTATION ON PAK BENG HYDROPOWER PROJECT

Summary

Based on the documents submitted by the Project Developer, the Technical Review Report prepared by the international expert of the MRC Secretariat, results of site surveys and national consultation activities, inpouts from other MRC Member Countries and the international community, below are the list of our key findings on documentsation and information related to Pak Beng Hydropower Project available for the prior consultation (detailed for each area of assessment will be followed):

- It is a must to supplement more data from the existing databases that would enable to establish a sound baseline conditions and firm scientific basis for assessment objectives, of which the up-to-date data available at the MRC Secretariat should be immediately considered.

- Having thoroughly studied the submitted documentations and found the seeming unconsistency and unavailability of some salient Project's specifications, it is suggested that complete and finalzed set of those specifications should be promptly provided for the sake of independent appaisals.

- It is highly recoomendaed that advanced assessment methods, which are highly internationally recognized, validated and/or widely adopted in the region (e.g, mathematical modeling tools ...) should be considered.

- It is strongly suggested that additional impact assessment of transboundary and cumulative nature would be undertaken with views of impacts from China's hydropower cascades, other mainstream hydropower dams in the Lower Mekong Basin and climate change.

- Comply with the MRC Preliminary Design Guidances for the proposed

- The mitigation measures (silt, fish migrations, ecological protection ...) should be proposed based on the scientific evidence and results of verification on their efficiency and effectiveness at the Mekong River Basin.

- There is a need to propose a suitable operation procedure to avoid any abnormal fluctuations in water quantity and quality in both upstream and

downstream areas of the project, which may cause transboundary impacts.

- Provide additional information on solutions to ensure full consideration on dam safety, especially under the circumstance that the project is located in the area with occurrence of earthquake in the past.

- Propose a comprehensive and efficient impact monitoring program during the construction and operation period.

In addition, the Viet Nam National Mekong Committee also recommends:

- Mekong River Commission needs to establish other mechanisms to strengthen information exchange and data sharing, update information for the regional community; propose solutions to ensure sustainable development, harmonization of environmental, ecological and economic benefits and livelihood of all relevant stakeholders during the construction and operation of the dam serving as a basis for the parties to negotiate on options for benefit sharing or compensation for damage.

1. Hydrology:

- Hydrological data used: The developer has used MRC hydrological data (daily discharges) from Chiang Saen and Luang Prabang stations for the period between 1960 – 2007, which are not up to date and includes no information on data QA/QC. From 2008-2014, the developer used data from direct measurements at the Pak Beng dam site, however there are concerns regarding the quality of the constructed data series and their consistency to the MRC data series. ***(Refer to Report: Engineering-Status, page 4-7)***.
- A basin scaling method was used to determine the flood peak instead of a widely used hydrological model with better solution and therefore using the hyrological models is highly recommended. ***(Refer to Report: Engineering-Status, page 4-10)***.
- The operation rule was developed based on the water inflow and did not take into account the downstream flow conditions. The operation rule indicates that there will be a drawdown/release once a year, but it does not mention clearly how to reduce the impact on downstream flow conditions. ***(Refer on Report: Engineering-Status, page 5-48).***
- The impact assessment was aimed at preventing flooding for the KengPhaDai area, focusing mainly on the upstream, thus there is a lack of impact assessment on the flow downstream. In addition, the impact assessment also did not take into account the case of hydropeaking. ***(Refer on Report: Engineering-Status, page 5-48)***.

2. Sediment:

- Sediment data used by the developer was collected from 1950 at 5 stations in the Lancang river (except Guanlei data from 2006) and at 4 stations in the lower Mekong river from 1960-1974. However, there is no information on regarding the locations of the stations (***Refer to Report: Engineering-Status, page 4-31***).
- In the submitted project documents, it is indicated that the sediment dataset used for calculations was taken from 1960-1970 (***Refer to Report: Engineering-Status, page 4-31***). However, the data is rather limited due to sparse sampling (only measurements were conducted in June 2008 and June 2015). Further, the most recent sediment data available at the MRC between 2008-2014 at the Chiang Saen & Luang Prabang have not been used by the developer (***Refer to report Hydrological Data and Sediment Sampling, page 54-56***).
- Data at Jinghong station have been used as reference for analyzing sediment at the Pakbeng site, while data at Chiang Saen station (much closer to the Pakbeng site) have only been used as reference data. This will increase the uncertainty in analyzing sediment conditions at the Pakbeng site. (***Refer to Report: Engineering-Status, page 4-32***).
- Monthly sediment load at the dam site was generated from data of Jinghong station by using the area proportion sediment ratio method. Due to the lack of data, the bedload sediment was assumed to be about 3% of the total suspended load sediment. This was done based on experience from the Manwan dam case. (***Refer to Report: Engineering-Status, page 4-41***)
- It is necessary to consider re-designing some sediment-related items of the project to ensure the efficiency and effectiveness of the sediment flushing (gates, flushing frequency, etc). There is also a need to investigate the combination of low-level gates and flood spillway of the project in order to increase the effiency and effectivesss of sediment flushing downstream (***Refer to Report: Engineering-Status, page 5-47***).
- It is necessary to re-consider the sediment management strategy to ensure that the sediment flushing is seasonal and annual. As reported, sediment flushing will be done when inflow is higher than 5771 m^3/s and just wash up the sediment around 100m from the dam (***Refer to Report: Engineering-Status, page 5-47; Overall Hydraulic Physical Model Investigation, pages 21-27***).

3. Water quality and Aquatic Ecology:

Data and Methodology

- The EIA of the PBHPP presented baseline water quality data collected as grab samples taken at 6 stations in the Mekong river at the location of the dam site in the dry season (November 2010) and wet season (July 2011)

with limited parameters (electrical conductivity, dissolved oxygen, Total dissolved solids, Total Phosphorus, Total Nitrogen and Total coliforms). It is shown that a very basic water quality baseline has been undertaken for the EIA. The current water quality monitoring carried out by PBHPP is considered inadequate for impact assessment of PBHPP for during both the construction and operational phases. (***Refer to EIA report, Section 4.4.8 and 4.3.9 page 100-103***)

- There is no comparison against the MRC water quality objectives and water quality guidelines for protection of Human Health and Aquatic life. (***MRC Procedure for Water quality (2011) and Technical Guideline***)
- The EIA report does not refer to the rich MRC water quality data base (at 4 stations closed to the PBHHP since 1998 up to date: Houa Khong, Chiang Saen, Luang Prabang and Vientiane). According to the MRC Annual Water Quality Assessment Report for 2014 and 2015, the river water quality reached the PBHPP's planned goal and is considered good for both aquatic life and human health (***Refer to MRC water quality database; MRC technical report on Mekong water quality assessment for the Lower Mekong main stream 2010, 2011, 2012, 2013, 2014, 2015***)
- The EIA of the PBHPP presented baseline aquatic ecological surveys both in the dry season (January 2011) and rainy season (July 2011) at 6 locations in the project area. There is no indication of how many replicate samples were taken at each site on each occasion or the duration of the sampling. The sampling design and extent of the surveys are limited and not consistent with the international or MRC standards (***Refer to MRC guideline for Ecological Health sampling and analysis***). The information provided on sampling method is inadequate for impact assesment of PBHPP for both during the construction and operational phases. (***Refer to EIA report, Section 4.4.1 page 113***)
- There is no reference to relate plankton and benthic invertebrate surveys to results from MRC Ecological Health Monitoring Programm. The MRC Ecological Health Monitoring has conducted the survey at 3 stations closed to the PBHHP *(Ban Xiengkok, Done Chor, and Ban Huayhome)* since 2008, 2009,2010, 2011, 2013 and 2015. (***Refer to MRC database 1998 -2015***)
- No modelling of the likely trans-boundary impacts on water quality and aquatic ecology downstream are provided. (***Refer to EIA report EIA report, Section 7.4.3 page 246, Section 7.5.1 and 7.5.2 page 246-287***).

Mitigation and Monitoring

- Within the EMMP, there are no detailed descriptions on measures to mitigate the negative impacts on water quality and aquatic ecology. (***Refer to the EMMP report, Section 4.2.1 page 4.8 and Section 4.2.2 page 4.10***)

- PBHPP does not assess the adverse impacts on the biodiversity values of the critical habitats and reduction in the populations of critically endangered or endangered species. An appropriate design of long-term biodiversity monitoring and evaluation programme should be undertaken and later be integrated into the EMMP. There is very little information on wider biodiversity management or monitoring. (***Refer to the EMMP report, Section 4.2.1 page 4.8 and 4.10***)
- The monitoring progamme for water quality and aquatic ecology suggested in the EMMP report is the same during construction and operation with the same parameters, methods and frequency. No long-term monitoring programme for water quality and aquatic ecology is formulated. (***Refer to the EMMP report, Section 6.2 – Page 6.2***)

4. Fisheries:

Data

- 6 sampling sites with only 2 times of sampling in 2011 are not representative of baseline conditions and about 54 species found in sampling are much less than about 200 species that have been found in zone 1.
- There was no baseline data on fish productivity and species-specific biomass or migratory and biological habits of main species/guilds and their living environment conditions and food. Therefore, the data used to support a sound, scientific-based impact assessment and fish passway design are insufficient.

Impact assessment

- Impacts of sediment/nutrient loss on the primary productivity of downstream ecosystems and impacts of 97 km-long reservoir on the larva drift to downstream were not mentioned in the impact assessments.
- Impacts of the dam on fish habitats (deep pools, downstream habitats...) caused by upstream impoundment and water fluctuation downstream also need to be addressed.
- Trans-boundary impacts on downstream fisheries' resources and aquatic ecological systems (in Cambodia and Mekong Delta) have not been described.
- Relationship between impacts of PBHPP and other existing and planned mainstream hydropower projects have not been considered and assessed.

Mitigation measures

Fish passage design

- The design of fish passage should be based on the migratory habits, swimming capacity, biomass and biological characteristics of fish populations in the area.
- Design of fish passage does not link to the design of the whole project; there was no supporting data to prove that the design of inlets and flow discharge through the fish passage could attract fish and support fish moving.

Other mitigation measures

- The fish stocking proposed in the reservoir may not compensate for the loss/reduction of important migrating fishes and the groups who benefit from reservoir aquaculture are not the same as the groups who are experiencing the fish loss.
- More information on fish friendly turbines, and fish passing through navigation locks and spill ways should be provided.
- Measures for larvae drift through the impoundment to downstream should be proposed.

Recommendations

- Collect additional data on fisheries (species, migration, habitat, life cycle, and biomass).
- Conduct a comprehensive impact assessment of PBHPP on fisheries, including transboudary and cumulative impacts.
- Change the design of fish passage based on the MRC PDG and the recommendations made by the international experts in the MRC TRR and conduct more studies on the effectiveness of other mitigation measures.
- Conduct mathematical and physical modeling to prove the effectiveness of fish friendly turbines, fish passage and other mitigation measures for fisheries.
- Provide details on the operation of fish passage and other measures in relation to the operation of the whole project.
- Set up an effective monitoring programme for fisheries before and during construction and operation periods.

5. Socio-Economics:

- Socio-economic data and information were collected since 2007; the methodology and dates of social survey for baseline data are only partially reported. The socio-economic data rely on only a 5 km distance from the mainstream for 100 km from the PBHPP site to the downstream, which are in contrast to standard MRC SIMVA with 15 km distance. (***Refer to the SIA, Section 5,1, page 5-1***).

- The social impact assessment lacks details on specific livelihood activities at the household level. The assessments rely also on a 5km distance from the mainstream for 100 km from the PBHPP site to the downstream. (***Refer to the SIA, Section 5.2. page 5-9***)
- Transboundary impacts of the PBHPP in the upstream area were assessed, focusing mainly on navigation (tourist, passenger and navigation), and only partial fish survey at Chiang Saen was carried out. No villages were surveyed to assess the current and future livelihood consequences due to reduced fish catch. The comparison of transboundary impacts in the downstream area between two scenarios (with and without PBHPP) is not reported. The assessment of the transboundary impact on the livelihoods of people in the downstream area is most critical. However, it has not yet been completed. As a critical change in sediment source, fish catch and the efficacy of proposed mitigation efforts are especially crucial for downstream food security. (***Refer to the SIA, Section 7.3 page 7-3 and Section 7.4 page 7-17***)

6. Navigation:

- Ship lock was designed with only one way and one step under a maximum working head of navigation lock of 32.38 m (***Refer to Report: Engineering-Status, page 6-5***). This clearly does not comply with the article 23 of the MRC PDG: "Locations that require the ability to traverse a height greater than 30 metres should use two locks in a series (tandem) arrangement".

7. Dam Safety:

- In-depth research on geology, earthquakes and cumulative impacts of hydropower dams is needed. There are no predictions, causes and solutions as well as safety options, especially in cases when chain incidents could happen with 11 cascade dams. (***Refer to Report: Engineering-Status, page 1-3***)
- The impact of upstream development and design floods in combination with climate change scenarios have not been assessed. (***Refer to Report: Engineering-Status, page 1-3 and 12-4***)
- No dam break studies including upstream and downstream dams of Pak Beng project have been conducted. There is no information indicating the extent of impacted areas in case a disaster occurs. (***Refer to Report: Engineering-Status, Section 12.2, page 12-8***)
- The solution for dam safety to prevent flood release is not clear. (How overtoping release is operated in case the bottom discharge sluices malfunction?) (***Refer to Report: Engineering-Status, Section 12.2, page 12-8***)

8. Recommendations:

- Collect additional hydrological and sediment data available at the MRC Secretariat, namely:
  - Hydrological data:
    - ✓ Historical data: 1985-2008
    - ✓ Near real-time data: 1985-2017
  - Sediment data:
    - ✓ Historical data (DSMP Data): 2009-2013
- Provide all design data (including reservoir volumes) of Pak Beng HP as a basis for an independent assessment. There are some inconsistences regarding the characteristics of the project that need to be corrected. These are:
  - Maximum Height of Dam (64/69m) – *Refer to Report: Engineering-Status, page 1-1; Two-dimensional Sediment, page 1; Enviromental Impact Assessment, page 26; Social Impact Assessment, page 2-2, 2-3.*
  - Total volume of reservoir (599/701/780 mil. m3) - *Refer to Report: Engineering-Status, page 5-51; Reservoir Sedimentation and Backwater, page 12; Numberial Simulation of Sediment, page 4; Enviromental Impact Assessment, page 19; Social Impact Assessment, page 2-5.*
  - Check Flood level (P=0.05%, Up/Down) - *Refer to Report: Two-dimensional Sediment, page 72-73; Enviromental Impact Assessment, page 19 and 27.*
  - Hydropower Station (Hydraulic head, design discharge, number of turbines, annual average energy) – *Refer to Report: Engineering-Status, page 5-51; Enviromental Impact Assessment, page 4 and 18-20; Social Impact Assessment, page 2-3.*
  - Ship Lock (Downstream water level (max/min), max navigation head) – *Refer to Report: Numberial Simulation of Sediment Movement in the Ship Channel of Pak Beng HPP downstream, page 4; Hydrodynamic Charaterisics Research on Valve and Culvert at Valve Section for Pak Beng Ship Lock, page 1; Matrix 2.1, Enviromental Impact Assessment, page 20.*
  - Fishway (Length, width, slope: 1.6x10x1.85/1.8x5x2.5) - *Refer to Report: Engineering-Status, page 6-5; Enviromental Impact Assessment, page 20.*
- Apply assessment methods (e.g. mathematical models on hydrology, sedimentation transportation, etc.), which are widely admitted both internationally and regionally.
  - Refer to DSF system, which has been approved for wide use in Mekong Member Countries or other advanced models such as Mike Group.

- Supplement the transboundary and cumulative impact assessments (taking into account the scale of whole basin and in short-term, medium-term and long-term); consider the combined effects of the Chinese HP cascades and climate changes.
  - Consider the climate change scenario (*refer to MRC Climate Change Scenarios Report*) and the exiting, under-construction and proposed dams in Lancang river.
- Align with Preliminary Design Guidelines of MRC for the proposed mainstream hydropower projects on LMB (design of ship-lock; sediment flushing etc.) and propose appropriate measures to mitigate the sediment trapping and fish migration).
- Propose a suitable operation rule for the HPP to avoid abnormal fluctuations and minimize impacts on trans-boundary water quality and quantity (Hydro-picking, fill-up, flushing operation…) in both upstream and downstream areas and to harmonize the economic, social and environmental benefits; and inform the rule to other member countries.
- Particular attention should be paid to the safety aspects of the HP, especially when it is located in the North of Lao PDR with a history of earthquakes (the project document lack of information on seismic assessment, earthquakes, design standards, etc.)
- Propose a comprehensive and effective impact monitoring program on hydrology, sediments, ecological health and fish migration…during construction and operation periods.