

## **CHAPTER 6**

# **INITIAL ENVIRONMENTAL EXAMINATION (IEE)**

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### **6.1 General**

#### **6.1.1 Environmental Regulations**

The National Environment Action Plan 1 (NEAP) was adopted in the National Assembly in 1994. The Forest Act and the Environmental Protection Law (EPL) have been enforced since 1996 and 1999 respectively. The EPL is a fundamental law in the environmental field and presents a new framework of environmental safeguards in the market economy. The EPL consolidates previous laws which were established and enforced inconsistently.

The principal authority for the environment is the Science Technology Environment Agency (STEA). The STEA was established in a reorganisation of the STENO, the first authority established in 1993 to control the environment. The STEA organises 16 STE Provincial Offices, unified by each governor of the provinces. The environment bureau of the STEA is the unifying authority of the environmental administration. The principal roles of the environment bureau are (i) drafting environment bills; (ii) drafting environment ordinances; (iii) supporting the provincial governments to enforce the environmental laws; (iv) making adjustments between the concerned authorities; (v) putting international treaties into effect; (vi) making adjustments and carrying out joint operation projects with foreign authorities. The principal environment laws charged by the environment bureau are (i) the Environmental Protection Law (EPL); (ii) Ordinances of EPL; (iii) STEA Ministerial Ordinances of Environment.

#### **6.1.2 Environment Assessment System**

In 2000, the STEA issued a ministerial ordinance for a general rule for Environment Assessment (EA), based on the Environmental Protection Law enforced in 1999. The EA is required for the designated project, regardless if the project is at the planning stage, or is an on-going project. For proposed projects, the rule requires (i) the necessity of consideration for the environment, which shall be described in the Feasibility Study (F/S); (ii) if required, the Initial Environmental Examination (IEE) shall be carried out with a means to mitigate negative impacts, and a plan for the management and monitoring of the environment or Terms of Reference (T/R). The Environmental Impact Assessment (EIA) shall be proposed if required as a result of the IEE; (iii) if the EIA is required, it shall be conducted. Regarding the preceding (i) and (ii), the Environmental Management

& Monitoring Unit of the authority of the project is required to report to STEA. For (iii) STEA is authorised to permit to implement the project. For an ongoing designated project, the authority for implementation of the project is required to submit a plan for the management and monitoring of the environment to STEA.

The detailed regulations of the EA for designated projects such as road and dam construction projects are in preparation, but no specific regulation has been issued for water supply projects. However, international agencies for development assistance such as JICA, JBIC, World Bank, and the Asian Development Bank have their own original EIA policies and detailed regulations, and apply these policies and regulations to their projects. Therefore, environmental considerations for the proposed project in this study are carried out in accordance with the guidelines for environmental consideration for study of development issued by JICA.

In accordance with the guidelines, the Initial Environmental Examination (IEE) is required in the initial stage of preparation of the Master Plan to examine possible effects caused by the project. The guideline requires that it is a fundamental principle to conduct an IEE in a short time with inexpensive cost. The guideline provides the detailed criteria for the screening and scooping as well as the reference formats.

## **6.2 Screening and Scooping**

### **6.2.1 Project Summary**

The outline of the project is summarized as follows:

- (1) Project Title:** Study of the Vientiane Water Supply Development Project
- (2) Project Background:** Due to an increase of the urban population, up graded living standards, expanding industrial and domestic areas, solutions are urgently required to deal with the rapid increase of water demand.
- (3) Purpose of the Project:** To contribute to the improvement of basic human needs through the improvement of the facilities and the institution of the water supply system. To expand the service area and increase the population served by utilising the expanded water supply capacity.
- (4) Project Location:** Vientiane Capital City, Lao PDR
- (5) Executing Authority:** Water Supply Authority (WASA)
- (6) Beneficiary of the project:** Five hundred and sixty four thousand (564,000) persons to be served by the system in the target year of the Master Plan 2020, or 85 % of population in the

service area.

**(7) Components of the project**

- 1) **Sort of the project:** Master plan of expansion and improvement of the water supply system
- 2) **Classification of project:** Potable water, and partly industrial use
- 3) **Water Resources and quality:** River surface water, acceptable for potable water
- 4) **Water Treatment Plant:** Horizontal flow sedimentation, rapid sand filtration, and disinfection by chlorine.
  - Total capacity of the existing facilities; 101,750 m<sup>3</sup>/day
  - Additional planned production capacity (100,000 m<sup>3</sup>/day. )
- 5) **Project Background:** Development of the water supply system to deal with a rapid increase of water demand is urgently required due to urban population increases, upgraded living standards, and an expanding industrial and domestic area.
- 6) **Transmission Facilities:** New transmission mains of 13km in length
- 7) **Distribution Facilities:** New distribution mains of 98 km in length and a new reservoir with pumps (distribution centre)
- 8) **Miscellaneous:** Operation Buildings
- 9) **Others and particular:** None

**6.2.2 Condition of the project**

- 1) **Project Title:** Study on Vientiane Water Supply Development Project
- 2) **Sociology**
  - a) **Local inhabitants (inhabitants, aborigines, awareness of the project):** Present and future inhabitants of the urban area of the capital city. The inhabitants desire to have safe and reliable water supply system.
  - b) **Infrastructures (wells, reservoir, water supply/power supply):** The customers are not satisfied with the present water supply because the water supply pressure in the service area is inadequate. The inhabitants in the future service area use untreated water from rivers, ponds or wells. Many inhabitants also buy bottled water for drinking. The public power company supplies eighty (80) percent of households in Vientiane Capital City.
  - c) **Sanitation (epidemic disease, illness/hospital, habit, etc.):** Infant mortality rates in Vientiane Capital City is higher than those of the neighbouring nations. There are many cases of viral disease such as Dengue fever, diarrhoea, etc.

### 3) Nature

- a) **Topography and Geology (steep land, soft ground, damp ground, fault, etc.):** The hinterland in the centre of the capital city is swamp. Other areas are situated on alluvial soil carried downstream by the Mekong River. The area is fertile farmland compared with the national average.
- b) **Grand water, lakes and marshes, river, climate (water quality, flow rate, rainfall, etc.):** The total volume of annual river discharge flow is more than 270 billion m<sup>3</sup> and its ratio per capita is more than 54,000 m<sup>3</sup>. The ratio is the largest in Asian nations. The perviousness of the soil is small and the groundwater table is not deep from the surface. The average annual precipitation is 1,700 mm, however, rainfall in the dry season is rare.
- c) **Rare fauna and flora, habitat (natural park, inhabit of species, etc.):** There are six (6) areas for preservation of nature in Vientiane Capital City.

### 4) Pollution

- a) **Situation and pollutant (a matter of public concern, etc.):** Not significant
- b) **Antipollution measures (systematic measure/compensation, etc.):** None

### 5) Others and particular: None

## 6.2.3 Screening

The screening is defined in the JICA environmental guideline as the judgment of a development project to decide whether the investigations of negative impacts are necessary or not.

The purpose of the screening is to confirm the following policy:

- The development plan will sustain development of the area and be to peoples' benefit without negative impacts to the existence and living conditions of the peoples affected by the plan;
- The development plan will conserve precious natural resources and support a harmonious environment in the future without severe damage to the natural environment.

The items to be investigated in the screening outlined in the JICA guidelines are as follows:

#### I. Sociology

1. Resettlement
2. Economic Activities
3. Transportation & Infrastructure
4. Separation of local society
5. Ruins of ancient & Cultural property

6. Water rights & Common rights
7. Sanitary
8. Disposal
9. Disaster (risk)
- II. Nature
  10. Topography & Geology
  11. Erosion
  12. Ground water
  13. Lakes & marshes & River
  14. Coast & Area of sea
  15. Fauna & Flora
  16. Climate
  17. View
- III. Pollution
  18. Air pollution
  19. Water pollution
  20. Soil pollution
  21. Noise & Vibration
  22. Subsidence
  23. Bad smell

The detailed screening is summarized in Annex 19. Because of the screening, it has been concluded that the EIA is necessary.

#### **6.2.4 Scooping**

Scooping is defined in the guidelines as a process to determine the precise items or fields for the EIA after due consideration of the various impacts to the environment by a development project. Furthermore, to clarify the impact to the environment, the guideline presents a checklist for scooping. The items are the same as those for the screening, as shown in the preceding section 6.2.3. Details of the scooping are shown in Annex 19.

As a result of the scooping, the items to be examined by the EIA are concluded and summarized in Table 62-1 below.

**Table 62-1      Scooping**

Items	Evaluation Result	Further study to be required	Remarks
Transportation & Infrastructure	B	Construction of pipelines and increase of vehicles used for transportation of construction material will cause traffic congestion. The selection of the pipeline route and / or alignment and construction method will reduce this impact.	
Water right & Common right	C	Confirmation of water rights in the Nam Ngum River for the Thangone WTP has not been completed.	
Sanitary	B	Water supply condition will be improved. However, an increase of discharge water from the water supply will deteriorate the drainage system. To prevent this impact consultation with the concerned authorities will be required.	
Disposal	B	Sludge from the existing WTP is disposed into Mekong river. Sludge from the Thangone WTP will be treated and disposed due to raw water quality and water use in the vicinity of the plant. Further study on the disposal of sludge from the sludge treatment facility will be required.	
Lakes & marshes & River	B	Raw water intake structures at Kaolieo from the Mekong River and at Thangone from Nam Ngum river will be constructed. Further study on protection against erosion to the bank or revetment of the rivers probably caused by the intake structures will be required.	
Water pollution	B	Sludge treatment facilities at the Thangone WTP will be required. Further study on the treatment process and structure in order to prevent pollution will be necessary. Waste and drain water from the construction site will deteriorate the drainage water system. Means to prevent pollution will be provided.	
Noise & Vibration	B	Noise and vibration from construction will be managed by employing heavy equipment and construction methods which generate less noise and vibration. The operation, selection of equipment and location and structure for the equipment will be considered in the design of the WTP and pumping facilities.	

A: Serious impact expected

B: Some impact expected

C: Unknown (Consideration of the impact is required. It is considered that the impact will be clearer as more investigations are made)

D: EIA is not required due to none or the least impact expected

## **6.3 TOR for the EIA**

### **6.3.1 Data Collection**

In order to determine the magnitude of any environmental impact resulting from the construction or implementation of a project it is necessary to describe the environmental conditions which exist within and adjacent to the project area. The key information required to define the existing environmental conditions in the project area is as follows:

#### **(1) Physical Environment**

##### **1) Meteorology**

- |               |               |                            |
|---------------|---------------|----------------------------|
| - Temperature | - Rainfall    | - Wind speed and direction |
| - Humidity    | - Evaporation | - Solar radiation          |

##### **2) Topography and Geology**

- |                      |                           |              |
|----------------------|---------------------------|--------------|
| - Topography         | - Solid and drift geology | - Seismicity |
| - Landslip potential |                           |              |

##### **3) Hydrology and Water Quality**

- |                                      |                         |                       |
|--------------------------------------|-------------------------|-----------------------|
| - River discharge                    | - Surface water courses | - River water quality |
| - Discharge points                   | - Irrigation areas      | - Groundwater quality |
| - Lake (dam reservoir) water quality |                         |                       |

##### **4) Noise**

- |                        |                         |
|------------------------|-------------------------|
| - Ambient noise levels | - Noise Sensitive Zones |
|------------------------|-------------------------|

##### **5) Ecosystem – Terrestrial and Aquatic (T&A)**

- |                  |               |           |
|------------------|---------------|-----------|
| - National Parks | - Wetlands    | - Forests |
| - Flora (T&A)    | - Fauna (T&A) |           |



6) Socio-Economic Conditions

- |                  |                  |             |
|------------------|------------------|-------------|
| - Population     | - Employment     | - Land Use  |
| - Public health  | - Transportation | - Utilities |
| - Waste disposal |                  |             |

### **6.3.2 Key Environmental Issues**

The possible effects of the 1<sup>st</sup> Stage Project on the environment are confirmed as a result of examination through the screening and the scooping in accordance with the checklist provided by the JICA as described in the preceding section.

The key environmental issues and terms to be addressed in the EIA are:

(1) Transportation

The assessment should compile traffic statistics for the major road crossing locations to determine the distribution and numbers of vehicles involved. A traffic management plan should be developed to minimise the impact on traffic.

The numbers and frequency of vehicles accessing the treatment works site should be assessed based on the quantities of materials to be delivered and removed, for a comparison with the present traffic pattern to determine the extent of any impact.

The assessment should confirm the numbers of vehicles involved in the construction and operation to demonstrate the absence of any impact.

(2) Sanitary

The assessment should confirm the capacity of sewage or drainage systems in the service area which will receive more flow. The total volume of waste water and drainage will increase.

(3) River

The assessment will require the confirmation that there are no significant erosional sites where the intake facility will be located. The assessment should include an evaluation of conditions of the existing bank or revetment in the vicinity of the intake facilities.

The assessment should ensure that suitable means have been established to prevent river bank or revetment erosion caused by stream change after the construction of the intake structure.

(4) Water pollution

Review the existing and any future proposed discharge standards to surface water from construction sites. Identify the locations along pipelines which are close to, or cross water courses, which will be sensitive to local increases in suspended solids. For these sites and for the treatment works construction site, preparation of a set of construction site drainage guidelines is required. These should include measures to control; suspended solids in surface run-off, rainstorm, management of pumped groundwater, wastewater from concrete batching and casting, actions to be taken in the event of the need to re-align sewers or remove septic tanks/cess pits, identification of suitable discharge points for mains disinfection water, disposal of grey and black wastewater from site offices and management of fuel storage and plant maintenance areas on long term construction sites at the water treatment plant.

It is necessary to review the existing and any future proposed discharge standards for discharges to surface waters from industrial sites or other standards appropriate to discharges from water treatment plants. The assessment should confirm the ability of wastewater treatment process to meet the discharge standards.

The assessment should review the design of the surface and foul water drainage plans for the site. Where possible surface water drains should be incorporated.

(5) Noise & Vibration

The construction methodology should be examined for the likely types and numbers of powered plants which would be used in the vicinity of noise sensitive receivers such as hospitals, schools, etc. Comparison of the predicted noise levels and vibration with the appropriate noise and vibration standards will indicate whether any mitigation measures are required.

Where the construction is being carried out at along highways or road crossings, a comparison of, and combination of the noise due to construction and the existing traffic noise will determine whether mitigation is required to bring the noise levels to within accepted standards.

Following the assessment, a noise performance specification for powered plants should be prepared for inclusion in the construction tender documents. This should include maximum permitted sound power levels (SPL) for powered plants and where shown to be necessary, a recommendation for the

phasing of noisy activities, the use of acoustic barriers or enclosures, or the use of alternative plants.

The noise levels associated with the different types of plant should be sought from a number of manufacturers to determine the range of the SPL. Noise levels at the adjacent sensitive receivers should be calculated taking into account enclosure of the sources in buildings, and the attenuation due to the distance between source and receiver. In the event that the noise standards are exceeded, consideration of different mitigation measures should be investigated. These should include selection of quieter equipment, reduction of noise from the buildings, use of external noise absorbent surfaces, and the use of vegetation to reduce reflections.

### **6.3.3 Preparation of the Environmental Impact Assessment Report**

The EIA report should be prepared in accordance with the guideline issued by JICA and should be based on the discussion of issues contained in this chapter. The magnitude of the potential will also be examined in preparation of the EIA report. The content of the report should be such that the environmental criteria for assessment meet JICA requirements, and if appropriate the JBIC Environment Checklist for Infrastructure Project should be completed.