



Annex K: Head Construction Contractor's Environmental Requirements

Section 14 of Volume 1 of the Owner Requirements and Appendix A1-12 – Owner's Environmental Requirements (version 10, March 2004) are reproduced *in extenso* in this annex. These documents present the most recent draft of the relevant sections of the contract documentation detailing the arrangements, related to environmental issues, between NTPC and the Head Construction Contractor (respectively called the Owner and the Contractor

in the annexed documents). These detailed requirements have been derived from the impacts identified during the environmental assessment process presented in the EAMP. The documents mention the detailed obligations which NTPC is requiring the Head Construction Contractor to undertake, and which are of his responsibility, and show how NTPC's construction related environmental requirements will be addressed.

Section 14: Environmental & Social Requirements

14.1 General

The Contractor shall comply in all respects with the provisions this Part 14 of the Owner's Requirements.

The Contractor shall address those Project Impacts occurring within the Construction Areas arising as a direct consequence of the execution of the Works by the Contractor.

14.2 Owner's Environmental Requirements

14.2.1 General

The Contractor shall prepare the Preliminary Draft Plan of the Contractor's Environmental Monitoring and Management Plan, the Contractor's Environmental Monitoring and Management Plan and the Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities as defined in Appendix A1-12, Owner's Environmental Requirements. The Contractor's Environmental Monitoring and Management Plan, including the sub plans for implementing protection and mitigation measures, shall describe the Contractor's policy and actions it will implement to ensure, throughout the execution of the Works, compliance by the Contractor and the Subcontractors and other agents with the Environmental Requirements as set out in Appendix A1-12 and elsewhere in the Contract.

The Contractor shall, as it considers necessary, translate into the Lao Language (and other languages as necessary) parts of the final version of the Contractor's Environmental Monitoring and Management Plan and the Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities. Such translations shall be made available to the Owner for information.

14.2.2 Preliminary Draft Plan of the Contractor's Environmental Monitoring & Management Plan

The Contractor shall prepare a preliminary draft plan, of the Contractor's proposed Environmental Monitoring and Management Plan and submit it to the Owner for non objection no later than nine (9) months prior to the Commencement Date. The preliminary draft plan shall include a summary of the proposed methodology to develop and implement the Contractor's Environmental Monitoring and Management Plan and shall outline the proposed actions for all the requirements given in Part 14 and Appendix A1-12, Owner's Environmental Requirements, including the requirements for sub plans for implementing protection and mitigation measures.

14.2.3 Contractor's Environmental Monitoring & Management Plan

No later than six (6) months prior to the Commencement Date, the Contractor shall submit to the Owner a draft of the Contractor's Environmental Monitoring and Management Plan, including the sub plans for implementing protection and mitigation measures, in the then current version the development of the Environmental Monitoring and Management Plan has reached at that time. The draft of the Environmental Monitoring and Management Plan shall be in the proposed final format and shall contain sufficient detail to enable the Owner to review and comment on the Plan. The Contractor shall take into account the Owner's comments in the preparation of the final version of the Contractor's Environmental Monitoring and Management Plan.

No later than four (4) months prior to the Commencement Date, the Contractor shall submit to the Owner for non objection the final version of Contractor's Environmental Monitoring and Management Plan, including the final sub plans for implementing protection and mitigation measures.

14.2.4 Contractor's Environmental Monitoring & Management Plan for Preliminary Construction Activities

The Contractor shall prepare a Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities and shall submit it to the Owner for non-objection no later than six (6) weeks prior to the proposed commencement date of any preliminary construction work.

The Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities shall describe the Contractor's policy and actions it will implement to ensure compliance by the Contractor and the Subcontractors and other agents with the Environmental Requirements as set out in Appendix A1-12, Owner's Environmental Requirements and elsewhere in the Contract, which are relevant to the proposed Preliminary Construction Activities.

14.3 [Not Used]

14.4 Contractor's Responsibilities

14.4.1 Contractor's Compliance Monitoring & Reporting

The Contractor shall institute a program of self-monitoring and enforcement via standard international quality assurance procedures for monitoring the Project Impacts, as described in Appendix A1-12, Owner's Environmental Requirements. The self-monitoring and enforcement program shall be in accordance with the associated quality assurance procedures which shall be included in the Contractor's Environmental Monitoring and Management Plan.

The Contractor shall be responsible for preparing monthly reports, as a section within the monthly report required in accordance with Part 16.11.1, Monthly and Quarterly Reports, for submission to the Owner, setting out:

- Implementation of the Contractor's Environmental Monitoring and Management Plan against the agreed program;
- Any difficulties encountered in the implementation of the Contractor's Environmental Monitoring and Management Plan and recommendations for remedying them for the future;
- The number and type of non-conformances and proposed corrective actions;

- Reports from the Sub-Contractors involved in the implementation of the Contractor’s Environmental Monitoring and Management Plan, including minutes of meetings and discussions held by the Contractor;
- Minutes of meeting from discussions held with the Owner regarding the Contractor’s Environmental Monitoring and Management Plan.

14.4.2 Compliance Monitoring by the Owner, GOL & Others

The Owner will have an environmental unit called the “Environmental Management Office” (EMO) which will be responsible for monitoring the Contractor’s compliance with the Contractor’s Environmental Monitoring and Management Plan.

The GOL will have an environmental unit called the “Environmental Management Unit” (EMU), which will monitor the Owner’s compliance with the Environmental Requirements. The EMU will be responsible for:

- Coordinating with the EMO and the GOL in relation to the Environmental Requirements;
- Liaising with organizations in relation to environmental issues relating to the Project;
- Working with the Panel of Experts and International Advisory Group in periodic assessment of the Environmental Requirements;
- Responding to any public comments, complaints and inquiries in relation to the Environmental Requirements.

The Owner and the GOL will appoint an independent monitoring agency to review implementation of the management of environmental issues by the Project.

The Contractor shall provide the Owner full cooperation to respond to queries and provide it with access to all relevant data, documentation, program activities and Construction Areas to facilitate the effective monitoring and evaluation of the Environmental Requirements and the status of the Project Impacts.

The EMO will identify to the Contractor any detected non-conformances to the Environmental Requirements and/or the Contractor’s Environmental Monitoring and Management Plan. The Contractor shall implement the appropriate corrective action for the non-conformances to the Contractor’s Environmental Monitoring and Management Plan so identified to the Contractor.

Monthly meetings will be held between representatives of the EMO, EMU and any other associated parties to facilitate the administration, coordination and monitoring of the Environmental Requirements and/or the Contractor’s Environmental Monitoring and Management Plan, which may also include consideration of contractual and legal obligations. The Contractor shall attend such meetings when requested by the Owner.

14.4.3 Explosive Ordnance Disposal (EOD)

The responsibilities of the Owner and the Contractor with regard to Explosive Ordnance Disposal (EOD) are specified in Appendix A1-12, Owner’s Environmental Requirements, and Appendix A1-25, Explosive Ordnance Disposal (EOD).

Appendix A1-12: Owner’s Environmental Requirements

1. Preamble

The Owner’s obligations on environmental and social issues are given in the Owner’s Requirements, Volume 1, Part 14, Environmental and Social Requirements.

Those obligations that apply to the Contractor comprise:

- the Contractor’s Environmental Monitoring and Management Plan;
- Sub Plans for Implementing Protection and Mitigation Measures;
- Contractor’s Environmental Monitoring and Management Plan for Preliminary Construction Activities; and
- Preliminary Draft Plan of the Contractor’s Environmental Monitoring and Management Plan,

as specified in this Appendix and elsewhere in the Contract.

These obligations, and the mitigations and constraints they impose on the Contractor, apply as the Owner’s Environmental Requirements.

2. [Not Used]

3. Details of Owner’s Environmental Requirements

- Attachment A: 1. Contractor’s Environmental Monitoring and Management Plan
 2. Contractor’s Environmental Monitoring and Management Plan for Preliminary Construction Activities
 3. Preliminary Draft Plan of the Contractor’s Environmental Monitoring and Management Plan

- Attachment B: Sub Plans for Implementing Protection and Mitigation Measures

ATTACHMENT A

1. Contractor's Environmental Monitoring & Management Plan

The Contractor's Environmental Monitoring and Management Plan shall establish an environmental management system that specifies how the Contractor proposes to meet the Owner's Environmental Requirements. The Contractor's Environmental Monitoring and Management Plan shall comply with ISO 14001:1996 (Environmental Management Systems) and shall include the following as a minimum:

- (i) A statement of policy, providing a definition of the Contractor's environmental policy and an indication of commitment to the execution of its Environmental Monitoring and Management Plan.
- (ii) The environmental planning process, setting out the principal steps in the Contractor's Environmental Monitoring and Management Plan, including:
 - Identify environmental aspects of the Contractor's work and evaluation of associated environmental impacts;
 - Specify other environmental mitigations for which the Contractor is responsible under the Contract;
 - Identify Applicable Laws associated with the requirements of these Owner's Environmental Requirements and the Contractor's Environmental Monitoring and Management Plan, and identify the Contractor's licenses, permits and approvals associated with the Environmental Monitoring and Management Plan in accordance with the Conditions of Contract Annex 2, Part B (Licenses, Permits and Approvals);
 - Nominate the Contractor's performance criteria in accordance with the Owner's Requirements; and
 - Issue environmental plans and management programs.
- (iii) The implementation procedures that specify the capabilities, support mechanisms and resources necessary to achieve the objectives and targets of the environmental policy. Responsible personnel with appropriate knowledge, skills and training for specific tasks shall be identified. In addition, the Environmental Monitoring and Management Plan shall define communication and reporting responsibilities.
- (iv) The proposed quality assurance plan for the Environmental Monitoring and Management Plan, in accordance with Appendix A1-17, Quality Assurance Plan.
- (v) An overview of the impacts that the construction work, within the scope of the Contract and that does not include activities for which the Owner is responsible, will have on the physical, biological and social environment.
- (vi) The detailed sub plans to be included in the Environmental Monitoring and Management Plan.
- (vii) A formal certification from the Contractor that the Environmental Monitoring and Management Plan:
 - Has been prepared by duly qualified consultants and specialists;
 - Complies with the undertakings specified in this Appendix A1-12 and Part 14, Environmental and Social Requirements, of the Owner's Requirements; and
 - Complies with the Conditions of Contract, including Applicable Laws and Applicable Standards which relate to the Environmental Monitoring and Management Plan.

The Contractor shall submit a draft of the Contractor's Environmental Monitoring and Management Plan, in the then current version of the Plan, to the Owner for review and comment no later than six (6) months prior to the Commencement Date.

The Contractor shall submit the Contractor's Environmental Monitoring and Management Plan to the Owner for non-objection no later than four (4) months before the Commencement Date.

2. Contractor's Environmental Monitoring & Management Plan for Preliminary Construction Activities

The Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities shall establish an environmental management system that specifies how the Contractor proposes to meet the Owner's Environmental Requirements while undertaking any part of the Preliminary Construction Activities. The Environmental Monitoring and Management Plan for Preliminary Construction Activities shall comply with the following requirements as a minimum:

- (i) ISO 14001:1996 (Environmental Management Systems)
- (ii) Be based on the requirements of the Contractor's Environmental Monitoring and Management Plan, but be specific to the construction tasks related to the Preliminary Construction Activities to be undertaken.
- (iii) Comply with the relevant undertakings specified in this Appendix A1-12 and Part 14, Environmental and Social Requirements, of the Owner's Requirements.

The Contractor shall submit the Contractor's Environmental Monitoring and Management Plan for Preliminary Construction Activities to the Owner for non-objection no later than six (6) weeks prior to the commencement date of any preliminary construction work.

3. Preliminary Draft Plan of the Contractor's Environmental Monitoring & Management Plan

The Contractor shall submit a Preliminary Draft Plan, of the proposed Environmental Monitoring and Management Plan, which shall include:

- (i) A summary of the proposed methodology to develop and implement the plan and shall outline the proposed actions for all the requirements given in Part 14 and this Appendix A1-12 of the Owner's Requirements.
- (ii) A proposed shortlist of personnel, specialists and consultants to be employed by the Contractor.
- (iii) Provide basic information regarding the Contractor's proposed quality assurance plan and, in particular, the proposed compliance monitoring program.
- (iv) Outline the Contractor's Environmental Monitoring and Management Plan.

The Contractor shall submit the Preliminary Draft Plan of the Contractor's Environmental Monitoring and Management Plan to the Owner for non-objection no later than nine (9) months before the Commencement Date.

ATTACHMENT B

Sub Plans for Implementing Protection & Mitigation Measures

1. Erosion and Sediment Control Plan
2. Spoil Disposal Planning and Management Plan
3. Quarry Management Plan
4. Water Quality Monitoring Plan
5. Chemical Waste/ Spillage Management Plan
6. Emergency Plan for Hazardous Materials
7. Emissions and Dust Control Plan
8. Noise Control Plan
9. Physical Cultural Resources
10. Landscaping and Revegetation Plan
11. Vegetations Clearing Plan
12. Waste Management Plan
13. Reservoir Impoundment Management Plan
14. Environmental Training for Construction Workers Plan
15. On-site Traffic and Access Management Plan
16. Explosive Ordnance Survey and Disposal Plan
17. Construction Work Camps and Spontaneous Settlement Areas Plan
18. Manual of Best Practices in Site management of Environmental Matters
19. Project Staff Health Program

1. EROSION & SEDIMENT CONTROL PLAN
Impact Identified
There is the potential for site erosion and sedimentation of downstream waterways if the site activities are not carefully managed.
Owner's Requirement
<ul style="list-style-type: none"> • Erosion and sedimentation shall be controlled during the construction of the Works. Areas of the site not disturbed by construction activities shall be maintained in their existing condition. A principal effort at the Construction Areas shall be management of erosion of excavated surfaces especially during the wet season when the volume of runoff is expected to be high. A Manual of Best Practices shall be prepared for use at all the construction sites as part of the Contractor's Environmental Monitoring and Management Plan, that shall include environmental management and pollution control techniques for all these areas of activity including drainage measures for underground works. • The Contractor shall prepare an erosion and sediment control plan in conjunction with the Contractor's Environmental Monitoring and Management Plan which shall be prepared in accordance with the Landscaping and Re-vegetation Plan and the Manual of Best Practices. It shall detail all site-specific measures the Contractor will implement during the construction phase to prevent an increase in pollution loads being exported from the site. It shall cover site drainage, especially related to stormwater management. In particular it must include: <ul style="list-style-type: none"> - An assessment of the potential for water pollutants to be generated; - Measures to be taken to collect, store and treat stormwater prior to any discharge from the site, (considering options for water re-use on site); - Management of material storage areas, including raw materials, chemicals, fuels and oil; - Measures to prevent litter entering water courses (e.g. by providing trash racks or traps) and details of permanent gross pollutant traps or other water pollution control devices proposed for the operational stage; - Identification of any significant effects on hydrological conditions and appropriate hydrological studies; - Monitoring proposals; - Consideration of the impact of the proposal on upstream and downstream flooding; and - An inspection and maintenance program to maintain the effectiveness of erosion and sediment control measures. • Examples of activities, requirements, and practices that should be included in the Contractor's Environmental Monitoring and Management Plan

1. EROSION & SEDIMENT CONTROL PLAN

Owner's Requirement (continued)

and the Manual of Best Practices include the following:

- Areas within the Construction Areas not disturbed by construction activities shall be maintained in their existing condition;
- Soil erosion and sediment control practices shall be implemented prior to any major soil disturbance, or in their proper sequence, and maintained until permanent protection is established. Only approved areas due for construction activity according to the Programme shall be cleared of vegetation and topsoil in accordance with sub-plan 11;
- Prior to each wet season, the Contractor shall implement appropriate measures to ensure that erosion is minimized from works where the permanent drainage and erosion control measures, if any, are not yet complete;
- Materials excavated by the Contractor from open and underground excavations, which are unsuitable for incorporation into the Permanent Works or are surplus to such requirements shall be disposed of as spoil dumps in spoil disposal areas. Materials suitable for roads, saddle dams, slope protection, channel armoring or riprap and resettlement area fills shall be stockpiled separately from spoil disposal areas, at agreed locations for later use by the Contractor or Owner;
- Soil excavated during construction shall be stockpiled separately. The soil shall be used for landscaping and restoration of work areas. All stockpiles and spoil dumps shall be constructed and stabilized, including provision of drainage and erosion control measures in accordance with the Landscaping and Re-vegetation Plan and the Manual of Best Practices. The height of stockpiles and spoil dumps in spoil disposal areas shall be proposed in the Sub Plan and shall be limited to 3 m for topsoil and materials for future use. The height of spoil dumps shall be determined by the locations occupied, but generally shall be not more than 6 m, with a 2 m berm at 3 m. Topsoil stockpiles shall be deep ripped to provide for moisture retention and re-growth. Drainage and erosion from the stockpiles shall be controlled by locating them in areas away from drainage lines. The erosion of the base of the dump shall be prevented by providing a diversion bank uphill to prevent any runoff from reaching the pile, and at the same time constructing a silt fence to contain any sediment in any runoff resulting from the stockpile or spoil dump;
- Stockpiles and spoil disposal areas shall not be located on drainage lines or in floodway zones or other areas important for the conveyance of floodwaters during major floods. Flooded areas behind spoil disposal areas shall be allowed to drain to the Downstream Channel;
- Plans for water management during construction shall be in accordance with the Manual of Best Practices, and include development of drainage works, sediment traps, diversions, culverts and other structures designed to treat water to the water quality requirements of this Sub Plan and Sub Plan 4, Water Quality Management Plan before discharge into natural watercourses. All these structures shall be constructed progressively prior to commencement of each stage of the earthworks. Regular inspection and maintenance shall be conducted to monitor their efficiency. All runoff from the construction areas shall be directed to the sediment settling areas;
- The drainage works shall direct site runoff to established watercourses. They shall be inspected regularly for damage caused by scouring, sediment deposition, channel obstruction, and loss of vegetation cover. Non-erodible segments shall be established along the slope lengths through temporary banking for diversion to stable outlets at non-erosive velocities, with adequate capacity to manage runoff from 20 year ARI storm flows for Permanent Works structures and 2-year ARI storm flows for Temporary Works structures. These outlets shall be located along the natural drainage lines;
- Sedimentation controls shall be implemented in the form of silt trap fences and sedimentation basins where appropriate depending upon the size of the catchment, and other physical and environmental constraints. The silt trap fences shall control sheet flows along minor drainage lines, whereas the sedimentation basins shall be utilized for removing sediment-laden runoff from the construction areas. These shall be built prior to the start of the activity and shall be maintained until the completion of that activity. The basins shall be designed in accordance with the Manual of Best Practices and it shall be desilted when the basin capacity gets reduced by approximately fifty percent (50 %); and
- Potential sandstone quarry sites are located near rivers, with one located on the Nam Theun downstream of the dam, and one along the Nam Nian. Special attention to sediment control measures will need to be taken in these areas. Sedimentation traps are compulsory.

2. SPOIL DISPOSAL PLANNING & MANAGEMENT PLAN

Impact Identified

Impacts from spoil disposal from excavation activities on surface water drainage shall be properly addressed during construction period.

Owner's Requirement

The Contractor shall prepare a Spoil Disposal Planning and Management Plan for the total Works in conjunction with the Contractor's Environmental Monitoring and Management Plan. The Contractor shall also submit Spoil Disposal Planning and Management Plans for each proposed spoil disposal sites, to the Owner for non-objection at least three (3) months prior to commencement of construction work at each site.

The Spoil Disposal Planning and Management Plans shall include environmental studies and consultations which analyze the potential impacts of each proposed spoil deposit and shall be complete at least six (6) months prior to commencement of construction activities in the particular area.

The Contractor shall submit to the Owner, prior to submission of the Reference Design, drawings showing the proposed locations for spoil disposal areas for all features of the Works. The drawings shall include consideration of the satellite photographs provided by the Owner, and topographical maps. The Contractor shall also include the requirements of the activities given below which are the Contractor's responsibility when preparing the drawings. The Owner will provide comments on the locations of the spoil disposal areas as shown on the drawings, which shall be modified in accordance with the Owner's comments and incorporated in the Reference Design.

For the proposal to use spoil from the Headrace Channel to provide additional land in the Nakai area, the Contractor shall submit drawings showing the proposed location of spoil disposal areas associated with the proposed general filling of low areas between the Headrace Channel and Nakai township and east of the Headrace Channel. The areas to be filled could include Saddle Dams 1A and 2B and adjacent downstream areas, areas downstream of relocated Saddle Dam 12B and adjacent to existing Road 8B in Nakai township. The spoil shall be placed in reverse order of excavation, with finer materials in layers towards the top of the spoil dump, and stockpiled topsoil placed as the final layer. All layers shall be of uniform thickness and compacted sufficiently to minimize future settlement, in accordance with agreed procedures.

The Contractor shall carry out all of the following activities, except for (h) and (i), and shall use the findings and results in the preparation of the drawings showing the proposed locations of the spoil disposal areas:

- (a) Field inspection of sites and geomorphological studies to determine if any proposed spoil disposal areas are located in floodway zones of the flood plain;
- (b) Land use impact assessment, with attention to those areas of land used and designated for agricultural purposes;
- (c) Estimation of flood stage frequency at relevant locations;
- (d) Determination of the reduction in flood storage volume that would result from spoil dumps in main segments of flood plain, by means of pegging and surveying of anecdotal flood levels and the use of existing ground level data to estimate over-bank flood volumes;
- (e) Determination of the reduction in cross-section area that would result from the positioning of each spoil platform;
- (f) Survey of the flood experience of inhabitants of those relevant locations;
- (g) Assessment of impacts caused by increases in the general depth of flooding in each proposed spoil disposal area. The determination of what constitutes "negligible" flooding shall be established from consideration of current and historical land use, frequency of inundation and inconveniences caused;
- (h) If preliminary flood studies show that the effect of spoil disposal in a particular site would be so small as to have little impact on users of the flood plain, the application of more rigorous hydrological analysis and hydraulic modeling may not be necessary. However, if the preliminary studies show that significant adverse impacts might accrue to the well-being of the flood plain inhabitants, more rigorous analytical methods shall be applied to determine, with greater accuracy, the effects of spoil disposal in a particular site; and
- (i) Consultations with those communities, if any, living close to the proposed spoil disposal sites which may be affected. The consultations shall provide local villagers with detailed information of the potential spoil disposal site, collect relevant information which may be of use in determining the most appropriate site, and provide an opportunity for villagers to express their opinions and concerns with the proposed plans. Information and feedback from the consultation process shall be incorporated into the final design for each spoil disposal site. Consultations for each site shall follow internationally accepted procedures for conducting public consultations, including special attention to vulnerable households and ethnic minorities if required.

The Owner shall consider all of the above requirements when reviewing the drawings showing the proposed locations of the spoil disposal areas, which may require modifications to the proposals, in accordance with the comments provided by the Owner. The modifications shall be incorporated in the Reference Design.

The Contractor shall also use the findings and results of the above activities to prepare a Spoil Disposal Planning and Management Plan as a sub-plan under the Contractor's Environmental Monitoring and Management Plan. The Spoil Disposal Planning and Management Plan shall:

- Include allowance for spoil disposal sites to be located in flood storage areas only in those cases where the studies have determined that the impact is not significant;
- Include the requirement for all spoil disposal sites to be located outside of flood conveyance areas;
- Not permit the obstruction of access to gardens or dwellings, or require re-routing of roads and tracks;
- Include provisions regarding the environmental management of the day-to-day construction of the spoil platforms with cross-reference to the Contractor's Manual of Best Practices (Sub Plan 18, Manual of Best Practices on Site Management of Environmental Matters);
- Require disposal sites not to be located in areas of land, which, prior to the commencement of the construction works, were used for agricultural purposes, or were designated for agricultural purposes;
- Include provisions for incorporating the most appropriate stabilization techniques for each disposal site;
- Assess risks of any potential impacts regarding leaching of the spoil, both in terms of impacts on surface water as well as on ground-water supplies;
- Include appropriate engineering analysis to determine that the selected spoil disposal sites do not cause unwanted surface drainage;
- Include recommendations for measures to be implemented regarding stabilization and erosion relating to the spoil disposal sites, in accordance with the requirements of the Landscape and Re-vegetation Plan and the Manual of Best Practices;
- Include a social and environmental assessment of risk in case of failure of each spoil disposal site;

2. SPOIL DISPOSAL PLANNING & MANAGEMENT PLAN

Owner's Requirement (continued)

- Require that spoil from excavation of the Downstream Channel be disposed of by being incorporated into levee banks where feasible, while still maintaining adequate drainage for the Downstream Channel catchment area;
- Include provisions for the spoil from the excavation of the Downstream Channel to be configured as reasonably requested by local communities during the public consultation process, provided there is no significant additional resultant cost; and
- Incorporate information and feedback obtained from public consultation meetings as provided by the Owner for the areas identified above or as practical for the other areas.

Topsoil shall be stripped from areas to be used for spoil platforms and subsequently used to landscape and grass the top and slopes of the spoil platforms.

The Contractor shall identify spoil materials which have potential for use by others in future construction work. Such spoil shall be stockpiled and secured by the Contractor according to those requirements relevant within this Appendix A1-12 and in such a manner to allow future use of the spoil by others.

3. QUARRY MANAGEMENT PLAN

Impact Identified

During construction there is potential for noise, dust and sedimentation of waterways, and increased traffic hazards if the development and operation are not carefully managed.

Owner's Requirement

The Contractor shall have the right to quarry construction materials such as soil, sandstone, limestone, stone, sand, gravel and any other materials from the Quarry Areas subject to the requirements of these Environmental Requirements and the Conditions of Contract Annex 16 (CA Obligations).

The Contractor shall prepare an overall Quarry Management Plan for the total Works in conjunction with the Contractor's Environmental and Management Plan.

At least 6 months prior to commencing any activities in a particular Quarry Area, the Contractor shall submit a separate Quarry Management Plan to the Owner for non-objection for the proposed quarrying activities. The Plans shall include the following considerations:

- An assessment of the following impacts at all quarry sites shall be identified and assessed for their magnitude and importance:
 - Erosion and sedimentation;
 - Road damage;
 - Spoil and other waste generation; and
 - Noise and dust generation.
- A plan showing the extent to the area to be developed;
- A method statement defining the proposed working methods;
- The proposed access and haulage routes between the quarry and the destination for the extracted material;
- A justification for the quantities of material to be extracted, an estimate of the waste materials to be generated and disposal details for such waste materials;
- Details of the measures taken to minimize the quarry area and its visual impact on the surrounding area;
- Details of the measures to be taken for the long-term rehabilitation of the quarry and borrow workings. These shall include re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas wherever possible, achievement of stable slopes, and avoidance of features which would otherwise constitute a risk to health and safety or a source of environmental pollution;
- Where the excavated quarry and borrow areas cannot be reasonably drained, the Contractor shall minimize their number and consult with the local population as to that population's preference for their location for reuse for fish farming or other community purposes;
- Measures which are recommended to minimize the significance of each identified impact;
- Quarry faces and excavations shall be made safe and buildings, plant, equipment and debris and miscellaneous stockpiles of material shall be removed from the areas; and
- Materials, other than waste materials, extracted from quarrying operations on the Construction Phase Land Areas shall be used exclusively for the Construction Works.

4. WATER QUALITY MONITORING PLAN

Impact Identified

Construction activities may impact water quality in areas downstream of the construction activity.

Owner's Requirement

The Contractor shall prepare a Water Quality Monitoring Plan in conjunction with the Contractor's Environmental Monitoring and Management Plan. The Water Quality Monitoring Plan shall be designed to monitor the effects of surface water runoff from areas disturbed by all construction related activities. The plan shall include the following:

- Detailed plans regarding monitoring the effects of surface water runoff from all construction areas, including cleared land, roads, construction camps, quarry areas, which may affect water quality in natural waterways. The plans shall include the locations of sampling water in waterways upstream and downstream of the entry points of surface water runoff from construction areas. The frequency and method of testing shall be in accordance with internationally recognised standards;
- The Contractor shall ensure that all construction related activities shall not pollute waterways, in accordance with Applicable Standards. The Water Quality Monitoring Plan shall include the Applicable Standards for suspended solids, biochemical oxygen demand and phosphates from rural sites in similar tropical areas;
- The Contractor shall submit water quality data reports to the Owner within the Monthly Reports;
- The Contractor shall warn the Owner within 48 hours of the discovery or measurement of any abnormal and/or dangerous concentrations which could cause harm to human beings or the environment; and
- The water quality monitoring program shall also monitor the quality of potable water supplied to the construction work camps, work sites and Residence Nam Theun.

5. CHEMICAL WASTE/SPILLAGE MANAGEMENT PLAN

Impact Identified

During construction there will be a potential for the pollution of adjacent habitat areas and downstream waterways if site activities are not carefully managed.

Owner's Requirement

The Contractor shall prepare a Chemical Waste/Spillage Management Plan.

The Plan shall include proposed actions for the following situations, and any other situations which could involve similar products:

- All refuelling of heavy equipment and machinery shall be undertaken by a service vehicle, with appropriate safeguards and protection measures to prevent any spillage or contamination by chemical wastes or maintenance oils, lubricants etc.;
- All the fuel and hazardous material storage shall be adequately banded to prevent any spillage problems;
- Stormwater runoff from open workshop servicing and repair areas and banded storage areas shall be collected and treated in hydrocarbon separation pits/tanks before discharge to drains or waterways;
- Chemical portable toilets shall be installed at each short term work site employing 5 workers or more. At least one toilet shall be installed per 20 workers. The toilets shall be kept clean and a special service unit shall be responsible for collection and distribution of toilet units. The sludge shall be treated according to the requirements of the Contractor's Waste Management Plan;
- Suitable sanitary sewage and solid waste disposal facilities or systems shall be provided at all long term work sites, workshops stores and offices;
- All explosives shall be transported, stored and handled in accordance with Applicable laws and Good Design Engineering, and Construction Practice. The Contractor shall provide details of proposed storage and security arrangements; and
- Pesticides shall be packaged, labeled, handled, stored and disposed of according to standards acceptable to World Bank OP4.09, Pest Management.

Note: for chemical and other hazardous spills: See 6. Emergency Plan for Hazardous Materials.

6. EMERGENCY PLAN FOR HAZARDOUS MATERIALS

Impact Identified

During construction there will be a potential for the pollution of adjacent habitat areas and downstream waterways if site activities are not carefully managed.

Owner's Requirement

The Contractor shall prepare an Emergency Plan to handle situations resulting from accidental spills of hazardous materials, including chemicals and hydrocarbons or other similar incidents.

The Owner shall be informed immediately of any accidental spill or incident in accordance with the plan.

Following any spill or incident the Contractor shall immediately initiate remedial action.

The detailed Emergency Plan must include provision of trained personnel, specialised plant and equipment, and defined and approved treatment and disposal methods for the known range of hazardous materials.

The Contractor shall subsequently provide a report detailing the reason for the spill or incident, remediation action taken, consequences/damage from the spill, and proposed corrective actions. The Emergency Plan for Hazardous Materials shall be subsequently updated and submitted to the Owner for non objection.

7. EMISSIONS & DUST CONTROL PLAN

Impact Identified

Fugitive dust from site disturbances, and emissions from vehicles and plant have the potential to negatively affect air quality in the vicinity of the construction sites and access roads.

Owner's Requirement

The Contractor shall prepare an Emissions and Dust Control Plan. The Plan shall include the following:

- Proposed methods and action to control dust resulting from construction related activities, including quarry sites, crushing and concrete batching plants, earthworks including road construction, embankment and channel construction, haulage of materials and construction work camps. As a minimum, dust shall be controlled by water spraying or any other similar measures. These are to be applied as necessary to reduce to a minimum the spread of dust from unsealed construction roads and public roads when construction equipment is active, in areas of major earth excavation, and any other areas which produces dust;
- The exhaust gases from construction machinery and vehicles are accepted. However the engines shall be inspected and adjusted as required to minimize pollution levels;
- The Emission and Dust Control Plan shall include an internationally recognized air quality standard such as from ITA (International Tunneling Association) which shall be applied to designing, monitoring and controlling air quality/ pollution in the underground works;
- For all underground works, for all activities and type of material excavated, the Contractor shall install mechanical/forced ventilation systems which shall provide air pollution concentrations that comply with the requirements of the internationally recognized air quality standard included in this sub plan. When internal combustion engines are operated in the underground works only diesel engines shall be used; and
- The burning of waste and/or garbage shall be done in designated areas at a distance of at least 5 km from nearby villages and in accordance with Applicable Law and the Contractor's Environmental Monitoring and Management Plan. Burning of any material which produce toxic gases is not allowed.

8. NOISE CONTROL PLAN

Impact Identified

Although noise impacts on communities on the plateau are unlikely, excessive noise will impact on wildlife. In the Power Station and Downstream Channel area, excessive noise will impact upon communities.

Owner's Requirement

The Construction Contractor shall be prepare a Noise Control Plan. The Plan shall include the following:

- The Noise Control Plan shall include an internationally recognized noise level standard, such as BS 5228 or equivalent, which shall be applied to designing and managing noise levels in construction plant, equipment and vehicles (except for tunnel drills);
- Mufflers and other noise control devices of construction equipment and vehicles to be repaired or replaced if defective;
- Construction works may generally be carried out 24 hours a day: Within 1 km of villages and construction camps, work practices may have to be modified outside the period of 6:00 and 18:00 hours; and
- Construction workers exposed to noise levels of 80 dB or more shall be provided with adequate hearing protection, in accordance with the requirements of the Health and Safety Plan.

Blasting, except for underground, only permitted between 6:00 and 18:00 hours (subject to approval for extended periods), within 2 km of villages.

9. PHYSICAL CULTURAL RESOURCES

Impact Identified

Objects and sites of physical cultural resource may be encountered during construction activities in the Construction Areas.

A procedure is required to prevent damage to the objects and sites of Physical and Cultural Resource and to enable appropriate action to be taken by the Owner.

The Owner will be responsible for the appropriate management of all items or sites of physical cultural resource located in Construction Areas in coordination and consultation with Government Authorities.

Owner's Requirement

The Owner has completed surveys for objects and sites of physical cultural resource within selected Construction Areas. The results of the completed surveys indicate that few, if any, objects and sites will be affected by construction activities. The Owner intends to conduct another survey for objects and sites of physical cultural resource for all Construction Areas.

Objects and sites of physical cultural resource which may be encountered during construction activities include sites having archaeological (prehistoric), palaeontological, historical, religious, sacred and unique natural values (for example, canyons and waterfalls). Physical cultural resources encompass remains left by previous human inhabitants, such as middens, shrines, battlegrounds, graveyards and burial sites.

Prior to commencement of work by the Contractor in any portion of the Construction Areas, the Owner will have:

- Completed a Physical Cultural Resource Survey for the particular portion of the Construction Area;
- Informed the Contractor of any known objects and sites of physical cultural resource within the particular portion of the Construction Area; and
- In accordance with Conditions of Contract Clause 4.25 (Fossils and Antiquities), advised the Contractor of the required actions to be implemented by the Contractor for any such known objects and sites of physical cultural resource.

The Contractor shall prepare a Physical Cultural Resources Plan for dealing with any objects and sites of physical cultural resource notified by the Owner or encountered by the Contractor within the Construction Areas. Such Physical Cultural Resources Plan shall include proposed methodologies for:

- Documentation and identification of any locations of any objects or sites of physical cultural resource notified by the Owner or encountered by the Contractor within the Construction Areas;
- Notification to the construction workforce of the need to be vigilant in the detection and reporting of, and the prevention of disturbance and damage to, objects and sites of physical cultural resource;
- In relation to previously identified locations of objects and sites of physical cultural resource, notification to the Owner at least 28 days prior to the disturbance of such locations of the Contractor's intention to commence construction activities at the locations;
- Notification to the Owner of any objects or sites of physical cultural resource encountered by the Contractor within the Construction Areas; and
- Stopping work and securing the areas adjacent to the objects and sites of physical cultural resource to prevent damage to such objects and sites.

The Contractor shall be responsible for the prevention of disturbance and damage to objects and sites of physical cultural resource within the Construction Areas and for advising the Owner with at least 28 days prior notice of the Contractor's intention to commence work at locations of objects and sites of physical cultural resource previously identified to the Contractor by the Owner.

The Contractor shall be responsible for ensuring that the construction workforce is appropriately informed and vigilant in the detection and reporting of, and the prevention of disturbance and damage to, objects and sites of physical cultural resource.

If the Contractor encounters objects or sites of physical cultural resource within the Construction Areas, the Contractor shall immediately stop work adjacent to the objects or sites, advise the Owner and await further instructions from the Owner.

The Owner, in coordination and consultation with Government Authorities, will be responsible for the appropriate overall management, protection and preservation of all objects and sites of physical cultural resource encountered within the Construction Areas and will, in accordance with the Conditions of Contract Clause 4.25 (Fossils and Antiquities), instruct the Contractor on the actions to be taken by the Contractor in relation to avoiding or minimising disturbance and damage to such objects and sites of physical cultural resource, including:

- What, if any, protection and preservation measures are to be taken by the Contractor;
- What, if any, additional mitigation, management, notification and reporting measures are to be taken by the Contractor to enable the construction activities to proceed;
- What, if any, changes to the Works and construction methods are required to be taken by the Contractor; and
- What, if any, related changes are required to the Construction Areas.

10. LANDSCAPING & REVEGETATION PLAN**Impact Identified**

During construction there will be a potential for the pollution of adjacent habitat areas and downstream waterways if site vegetation activities are not carefully managed. Necessary vegetation and habitat destruction on construction sites will have unavoidable but limited negative impacts on local biodiversity values managed.

Owner's Requirement

The Contractor shall prepare a Landscaping and Re-vegetation Plan which shall include the following:

- Restoration of cleared areas, quarries which are no longer in use, spoil areas, construction roads, construction camp areas, borrow areas, stock pile areas, working platforms and any areas temporarily occupied during construction of the works shall be undertaken using landscaping, provision of adequate drainage and revegetation;
- All areas disturbed by construction activity, including temporary access roads and tracks, shall be landscaped to reflect natural contours, restore suitable drainage paths and encourage the re-establishment of vegetation;
- Land used for agricultural activity prior to use for construction activities shall be, as much as reasonably possible, restored to a state to allow the same agricultural activity to continue;
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion;
- Topsoil stripped from the areas occupied by the spoil heaps shall be used for landscaping works;
- Re-establishment of vegetation shall be commenced at the earliest possible opportunity. Appropriate local species of vegetation shall be used;
- Local depressions created by construction activities shall be either backfilled or drained to prevent ponding wherever possible. Where the local depressions cannot be reasonably drained, the Contractor shall minimize their number and consult with the local population as to that population's preference for their location for reuse for fish farming or other community purposes;
- All hazardous materials, construction plant and waste shall be removed from the site and safely disposed of in an environmentally acceptable manner. Reusable construction materials shall be either removed from site or, with the approval of the Owner, left in a secure manner such that they do not constitute a risk to health and safety or a source of environmental damage. Temporary buildings and installations should be demolished and removed, with concrete base slabs broken up and debris buried; and
- Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths.

11. VEGETATION CLEARING PLAN**Impact Identified**

During construction there will be a potential for areas to be cleared in excess of real requirements, and insufficient consideration given to retaining vegetation and avoiding UXOs.

Owner's Requirement

The Contractor shall prepare a Vegetation Clearing Plan for the total Works which shall include the following requirements:

- Areas proposed for clearing shall be submitted with the Plan, and only those proposed areas shall be cleared in accordance with the Plan. The Vegetation Clearance Plan shall reasonably consider the existing usage of the Project Land to allow its existing usage to continue as long as is practicable, without interference with the Contractor's activities. Vegetation shall not be disturbed in those areas not submitted with the Plan for non objection;
- The Plan shall include the requirements of 'Logging and Removal of Waste Forestry Products' given below in this Sub Plan;
- If major trees form part of the vegetation to be cleared, then the requirements of the Health and Safety Plan shall be followed. Large or significant trees in camp areas and access roads should be preserved wherever possible;
- The design of roads, including temporary and permanent access roads, shall avoid crop areas where reasonable and practical;
- The application of chemicals for vegetation clearing shall be minimized to the greatest extent reasonable and practical;
- Chemicals shall be selected on the basis of being non-residual and with regard to human health;
- Herbicides used in the Project shall:
 - have negligible adverse human health effects;
 - be shown to be effective against the target vegetation species;
 - have minimal effect on the natural environment; and
 - be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them;
- Herbicides shall be appropriately packaged, labeled, handled, stored, disposed of, and applied according to international standards to be proposed by the Contractor for the Owner's non objection;
- Persons applying herbicides should be provided with appropriate training, equipment, and facilities to handle, store, and apply these products properly;
- All herbicides shall have labels in both English and Lao languages to allow those handling the herbicides to comprehend the labeling fully; and
- Clearing shall be carried out in accordance with the following requirements, 'Logging and Removal of Waste Forestry Products' given below, which describes the Contractor's responsibilities in Schedule 13 of the Concession Agreement, which is referred to in the Conditions of Contract Annex 16 (CA Parallel Obligations), Section 3.3.5 (CA Clause 10.6, Ancillary Rights).

Logging and Removal of Waste Forestry Products**1. Prior to Commencement of the Preliminary Construction Phase**

Prior to the commencement of the Preliminary Construction Phase, the GOL shall have the right, but not the obligation, to remove or arrange for the removal of commercial and non-commercial timber as well as other forestry products from the designated Construction Areas, including land

11. VEGETATION CLEARING PLAN**Owner's Requirement (continued)**

that falls into the following areas:

- a) Those areas for which the boundaries are largely final:
 - i) Nakai Reservoir Area;
 - ii) Nakai Dam;
 - iii) Nakai saddle dams;
 - iv) Headrace Channel;
 - v) Power Conduit Water Intake;
 - vi) Surge shaft;
 - vii) Power Station;
 - viii) Substations;
 - ix) Regulating Pond;
 - x) Regulating Dam;
 - xi) Residence Nam Theun; and
 - xii) Road from Thakhek to Oudomsouk (Nakai); and
- b) Those areas whose boundaries will be progressively adjusted:
 - i) Dam Site Access road;
 - ii) Downstream Channel;
 - iii) Transmission Lines Routes; and
 - iv) Road from Oudomsouk (Nakai) to Ban Nam Nian.

2. After commencement of the Preliminary Construction Phase

After commencement of the Preliminary Construction Phase the Contractor shall have the right to log and remove forestry products remaining as required to clear areas to carry out the construction of the works in the Preliminary Construction Phase and Construction Phase Areas, as necessary:

- a) The Contractor shall submit plans for removal of the remaining timber and other forestry products in the areas permitted under this clause to the Owner for approval at least three (3) months in advance of any work being executed by the Contractor;
- b) The plan shall be in accordance with the Contractor's obligations in this Appendix A1-12 of the Owner's Requirements, including in particular the following items:
 - i) Erosion and sedimentation control and mitigation;
 - ii) Vegetation clearing;
 - iii) Air quality; and
 - iv) Noise pollution;
- c) The Contractor's plan shall provide detailed information regarding the proposed logging and clearing work, including the following:
 - i) Clear identification and justification of the areas to be logged and cleared;
 - ii) Identification of those parts of the areas referred to in paragraph (i) which the GOL may elect to log and clear in accordance with paragraph (d) within a time period to be specified at as early a time as is reasonably possible by the Contractor, such period to be as much time as is reasonably possible so as not to interfere with the Contractor's construction schedule;
 - iii) Name of company or organization to do the logging and clearing work;
 - iv) The schedule for logging and clearing to be undertaken;
 - v) Methods and procedures to be used consistent with the requirements of the Owner's Requirements and of this Appendix A1-12; and
 - vi) Clear identification of disposal sites for the timber and forestry products;
- d) If the GOL elects to log and clear the areas nominated in the Contractor's plan as areas which the GOL may log and clear, it shall have the right to do so within the period specified by the Contractor and agreed to by the Owner provided that it uses techniques consistent with the obligations of the Contractor referred to in paragraph (b) above. If the GOL has not completed the logging and clearing within the period specified by the Contractor, then the GOL must cease its logging and clearing activities in the nominated areas and the Contractor may from the expiry of that time period carry out that logging and clearing;
- e) All works involving the logging and removal of timber and other forestry products after the commencement of the Preliminary Construction Works must be carried out in accordance with the Contractor's non objected Vegetation Clearance Plan;
- f) The Contractor shall arrange for the employment of Construction Contractors and locally licensed logging firms to log, clear and where the logs and forest products are not required by the Contractor to be used in the construction of the facility, and the Owner has advised that they have no requirements for the logs and forest products, sell the commercial timber and forestry products from the areas to be cleared and will be liable to pay GOL the applicable royalty under the Forestry Law in respect of the sale of such commercial timber and forestry products, in accordance with Section 3.3.5 of Annex 16 (CA Parallel Obligations) of the Conditions of Contract;
- g) Other than the Contractor's rights to use commercial timber obtained from areas permitted under this clause for the construction of the Facility or for the temporary works necessary for that construction and other than the sale rights described above, the Contractor must not sell, use or obtain any other benefit from the commercial timber of forestry products from the Construction Areas;
- h) The Contractor shall dispose of any timber or forestry products resulting from clearing not used in the Construction Works and which are not sold, in a manner selected by the Contractor including:
 - i) Leaving the timber and forestry products at the perimeter of the cleared Construction Areas or areas selected by the Contractor within the cleared Construction Areas for collection by GOL; or
 - ii) Burning or burying the timber or forestry products in an environmentally acceptable manner, provided that in the case of commercial timber and forestry products, the Contractor first gives the Owner fourteen (14) days notice of its intention to burn or bury such timber and forestry products and GOL or its nominated representative is allowed a reasonable opportunity to remove same during that fourteen

11. VEGETATION CLEARING PLAN**Owner's Requirement (continued)**

(14) day period, provided that the Contractor shall not be obliged to dispose of any forestry products cut by the GOL but not removed by the GOL;

- i) For timber and forestry products discarded by the Contractor and left at the perimeter of the cleared Construction Areas or at areas selected by the Contractor within the cleared Construction Areas, the GOL shall have the right to arrange for the removal of such discarded timber and forestry products under the following conditions;
- j) Such removal by the GOL shall be done at times and in such a manner so as to not provide any disturbance or obstruction to the Contractor's construction activities or damage to the Contractor's Construction Works. The Contractor must inform the Owner as to the times and the manner in which the GOL may remove the timber and forestry products without providing any disturbance or damage to the Contractor's Construction Works;
- k) The Contractor will be under no obligation to provide special access for GOL to discarded forest products, nor shall the Contractor be obliged to prepare forestry products for removal by GOL; and
- l) The Contractor shall not be obliged to transport any forest products.

12. WASTE MANAGEMENT PLAN**Impact Identified**

During construction there will be potential for garbage and waste collection and disposal to be given a low priority with resultant, efficiency and health problems.

Owner's Requirement

The Contractor shall prepare a Waste Management Plan which shall include the following:

- A sufficient number of garbage bins and containers shall be made available at Residence Nam Theun, the work camps, the areas of planned and spontaneous resettlement and at the main work sites;
- Garbage and other waste shall be regularly collected and be transported to a designated waste disposal site;
- The waste disposal site shall be located at least 2 km from the nearest village. Connections to the groundwater or surface water shall be avoided, either by clay or impervious membrane at the bottom and walls of the waste disposal site;
- Burning of solid waste is permitted, according to the relevant requirements included in the Emissions and Dust Control Plan;
- When parts of the waste disposal area are full, they shall be covered by a minimum depth of 1.5 m of soil, and then revegetated according to relevant requirements included in the Landscaping & Re-vegetation Plan;
- A separate collection and storage procedure shall be developed for hazardous or toxic waste, such as batteries, unused paint thinners and hydrocarbons, disused electronic equipment, etc. This waste shall be stockpiled in accordance with the requirements of this Appendix A1-12 and, Applicable Laws and subsequently transported to special solid waste treatment plant capable of proper disposal of such hazardous or toxic waste;
- Suitable sanitary and solid waste collection and disposal facilities or systems shall be provided at all camps (including those areas set aside for spontaneous settlement), workshops, stores, offices, long term main work sites, and personnel shall be provided to operate and maintain the systems; and
- Rehabilitation of those areas used to bury waste shall be done in accordance with the requirements of this Appendix A1-12.

13. RESERVOIR IMPOUNDMENT MANAGEMENT PLAN**Impact Identified**

During construction there will be a potential for the rising water levels in the Reservoir to result in stranding or drowning the inhabitants of the area.

Owner's Requirement

The Contractor shall, with not less than 30 days prior notice, inform the Owner of any planned construction events likely to raise water levels in the Reservoir.

The Owner shall take necessary action with regard to stranded animals.

14. ENVIRONMENTAL TRAINING FOR CONSTRUCTION WORKERS PLAN**Impact Identified**

During construction there will be a potential for workers to damage the forests and waterways adjacent to camps and work areas.

Owner's Requirement

The Contractor shall prepare a training plan for all construction workers. The plan shall address the following items:

- All employees of the contractor shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they have attended the training sessions detailed in the plan;
- The goal of the "Environmental Training for Construction Worker" program shall be to educate all construction workers on the following issues: fire arms possession, traffic regulations, illegal logging & collection of non-timber forestry products (particularly in the resettlement areas, and NBCA), non disturbance of resettlement communities, hunting & fishing restrictions, waste management, erosion control, general health issues including the information and education given in Sub Plan 19, Project Staff Health Program, safety issues and general information on the environment in which they will be working and living;
- Explosive and chemical fishing, which shall not be permitted;
- Penalties for those who violate the rules shall be established; and
- Proposed methods for conducting the training program, which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and 'tool box' meetings.

15. ON-SITE TRAFFIC & ACCESS MANAGEMENT PLAN**Impact Identified**

During construction there will be a potential for large numbers and size of vehicles to result in hazardous conditions on public roads, camps, project roads and work areas.

Owner's Requirement

The Contractor shall prepare an On-site Traffic and Access Management Plan. The plan shall address the following:

- Details regarding expected road quality, sealing type, maximum permissible vehicular speed on each section of road, establishment of safe sight distances including within construction areas and construction camp sites;
- Detailed plans for signage around the Construction Areas to facilitate traffic movement, provide directions to various components of the Works, provide safety advice and warnings. All signs shall be in both English and Lao language and be constructed to Lao standards;
- Estimated maximum concentration of traffic (number of vehicles/ hour) and effects on existing traffic patterns for different times of day, and at individual locations within the Construction Areas;
- Detail the provisions to be made by the Contractor for adequate off-road parking of all construction related vehicles. Parking shall be provided for all classes of vehicles traversing the site. At no time shall construction vehicles be parked in a manner which may restrict movement of traffic on public roads;
- Plans to be followed while moving special loads, such as hazardous material, or heavy loads;
- Monitoring and methods of enforcing the requirements of the traffic management plan;
- Construction traffic, including heavy loads, must not damage public roads;
- Plans for controlling site access, including both construction areas and construction camp areas; and
- Personnel authorised to the Construction Areas shall be briefed on traffic regulations applicable to the Construction Areas.

16. EXPLOSIVE ORDNANCE SURVEY & DISPOSAL PLAN**Impact Identified**

During construction there will be a potential for UXO to be encountered.

Owner's Requirement

The Contractor shall prepare an Explosive Ordnance Survey and Disposal Plan for the total Works. The plan shall be prepared and executed by a specialist professional organization experienced in work in this area and address the following:

- Assessment of extent of ordnance survey and disposal to be undertaken in accordance with the Conditions of Contract;
- Detailed procedures for identifying, securing, disposing of unexploded ordnance, implementation of Quality Control procedures and UXO awareness training; and
- Submission of reports to the Owner, including proposed reporting format, for the following:
 - Report on each Construction Area searched, cleared, audited and certified, within 14 days of completion of this work; and
 - Six (6) monthly reports of all search, clearing, disposal, quality control, auditing, certification, UXO awareness training etc., activities carried out in the period.

17. CONSTRUCTION WORK CAMPS & SPONTANEOUS SETTLEMENT AREAS PLAN**Impact Identified**

During construction there will be potential for construction work camps and spontaneous settlement areas to be developed without sufficient consideration of planning, health and environmental requirements.

Owner's Requirement

Where required, the Owner will plan and provide, in the vicinity of each major work site, areas outside formal construction camps for the spontaneous settlement and development that will be associated with the families and merchants that may be attracted to the construction activities.

Administration and management of the spontaneous settlement areas will be performed by relevant GOL departments.

The Contractor shall plan, design and construct construction work camps for the construction workers which satisfy the following requirements:

General:

- Plans shall be prepared for all camps and preliminary plans and information shall be submitted with the Contractor's Environmental Monitoring and Management Plan. Final plans, including plans and details of all buildings, facilities and services, and approvals from GOL and local authorities, shall be submitted no later than three (3) months before commencing any camp construction work;
- The Contractor shall advise proposed changes to the camp arrangements no later than two (2) weeks before the planned change;
- Approvals and permits shall be obtained in accordance with Applicable Laws, Applicable Standards and Environmental Requirements for the building and infrastructure work for each camp area;
- Camp site selection and access roads shall be located so as to avoid clearing as many major trees and vegetation as possible from the areas and to avoid aquatic habitats;
- Camp areas shall be sited to allow effective natural drainage;
- Effective sediment control measures during construction and operation of the construction work camps in accordance with the Environmental Requirements, especially near rivers;
- Adequate drainage structures shall be located and constructed to prevent formation of stagnant pools; and
- Suitable sanitary, sewage and solid waste collection and disposal facilities shall be provided to serve the construction camps. Sewage effluent shall meet water quality criteria required by Applicable Laws, Standards and Environmental requirements before discharge.

Construction Camp Areas:

- Paved (concrete, DBST or gravel surfaced as required) internal roads; stormwater drainage system to prevent stagnant water; adequate day-time, night-time and security lighting shall be provided;
- Camps shall consist of living facilities with housing, mess, shopping, recreational and sanitary facilities for all workers accommodated within the camps;
- Fire fighting equipment and services and portable fire extinguishers shall be provided for all buildings;
- Medical and first aid facilities shall be provided at each camp area;
- The camp areas shall have an adequate supply of potable water compliant with WHO criteria and Applicable Laws;
- Ventilation of buildings within the camp areas shall be in accordance with Applicable Laws and Standards; and
- Mess halls and residential accommodation shall be mosquito and fly proofed.

18. MANUAL OF BEST PRACTICE**Owner's Requirement**

The Contractor shall prepare a Manual of Best Practices which shall provide implementation prescriptions for all of the sub-plans within the Contractor's Environmental Monitoring and Management Plan.

The Manual of Best Practices shall follow internationally recognized standards and codes of practice associated with earthworks and environmental protection, stockpiling materials, agricultural considerations and erosion control.

19. PROJECT STAFF HEALTH PROGRAM

Impact Identified

During construction there will be potential for workers to be affected by diseases associated with the tropical location and camp/temporary living conditions.

Owner's Requirement

As part of the Contractor's Health and Safety Plan, the Contractor shall prepare and enforce the Project Staff Health Program in respect to matters regarding the health and safety of the construction workforce, which shall ensure that:

With regard to the construction camps:

- In general, anti-malaria measures following current accepted practice shall be instituted at campsites and facilities established for the early diagnosis and treatment of patients with the disease;
- Disease control and pest management measures are to be implemented by the construction contractors at the time the construction camps are built;
- Decisions regarding siting of camps shall be made with regard to good drainage, water supply, sewage disposal and disease transmission potential, especially malaria; and
- Where buildings can not be made mosquito proof, pyrethroid-treated mosquito nets shall be provided.

With regard to providing high quality health services to the Contractor's employees, the program shall include:

- Appropriate measures to address mosquito control, including dengue fever control;
- A medical centre, sited at the main construction camp(s), for the diagnosis and treatment of communicable diseases, simple medical complaints and the handling of medical emergencies and accidents. It shall be staffed by one medical officer, one trained nurse of senior level, two medical auxiliaries, one laboratory technician (who shall also be responsible for monitoring water quality in construction camp areas), one driver, one ambulance (4WD), with subsidiary treatment or first aid posts at each smaller construction camps staffed by either a trained nurse or locally trained personnel, as required;
- Suitable workers shall be selected from the workforce and receive additional training in occupational health and first aid and shall form teams of two or three personnel at each work site. They shall do this as part of their normal work and shall be under the supervision of the person responsible for occupation health and of the medical officer;
- For the control of communicable diseases and other public health issues the following staff shall be employed: one sanitation/disease control officer, one mechanic, three semi skilled labourers, one driver, one vehicle;
- Provision shall be made for health checks of employees, including checks, where required, for drug abuse and sexually transmittable diseases in accordance with ILO and WHO resolutions, recommendations and guidelines for construction workers including an ILO document entitled "ILO code of practice on STD HIV/AIDS and the world of work"; ILO Geneva (June 2001);
- The Contractor shall include a pest management program for the construction areas, including construction work camp areas in the Project Staff Health Program, which shall provide for:
 - Controlling pests primarily through environmental methods. When environmental methods are alone not effective, the use of pesticides shall be considered;
 - Promoting the safe use of all pesticides;
 - Incorporating integrated pest management strategies where feasible;
 - Selecting and using pesticides given in the attached Annex, Pesticides (Extract from Nam Theun 2 Hydroelectric Project, EAMP, March 2004: Pest Management Plan); and
 - Pesticides shall be handled, stored, disposed of, and applied according to standards acceptable to World Bank Operational Policy OP4.09, Pest Management; and
- The Contractor shall employ a sanitation and pest management and control officer who shall work full time to:
 - Control vector borne and other diseases;
 - Ensure the continued safe disposal of all solid waste and sewage;
 - Implement fly and other insect pest control at construction camp sites and in the project area;
 - Implement and monitor the pest management programme throughout the project area including construction camps and spontaneous resettlement areas;
 - Provide appropriate information and education to the workforce on prevention of diseases, including, malaria, opisthorchiasis, diarrhea, STD and HIV/AIDS;
 - Investigate and document disease outbreaks within the Contractor's workforce; and
 - Ensure correct maintenance of water and sewage treatment plants with the assistance of two labourers, appropriate transport and one driver.

To reduce the risk of workers contracting malaria, the following measures shall be followed for mosquito control at construction sites:

- Education of workers about problems and preventive measures;
- Require protective clothing;
- Repellents applied to clothing;
- Minimise presence of containers full of water;
- Remove discarded items that could contain water;
- Keep storm water drains and borrow pits free of vegetation; and
- Insecticide control as a last resort method, & only after studies indicate primary locations of mosquitoes.

The Contractor's Project Staff Health Program shall also provide some assistance to nearby communities for emergency matters if spare resources become intermittently available. Availability of health services from the Contractor's Project Staff Health Program to local communities is not required to be guaranteed.

