CHAPTER V
ENVIRONMENTAL MANAGEMENT DIRECTION

The negative impacts caused by all activities of the Tangguh LNG Expansion Project will be managed through principles of prevention, control and mitigation in proper and suitable manner to be applied. Efforts will be made to keep negative impacts to a minimum while the positive impacts will be maximized so as to provide benefits for local community social lives.

Approach to environmental management within Tangguh LNG Expansion activities will be carried out through :

1. Compliance with applicable Indonesia regulations and relevant international standards which are referred by this AMDAL study.
2. Technological approach, among others:
   a. Water quality management
      i. Produced water management using primary treatment with Dissolved Air Flotation (DAF), secondary treatment with biological treatment process, and continued with tertiary treatment through filtration process as required;
      ii. Management of hydrocarbon contaminated wastewater with Corrugated Plate Interceptor (CPI);
      iii. Management of chemically contaminated wastewater using neutralizing pit (pH neutralizing process with H_2SO_4 and NaOH);
      iv. Domestic wastewater management using biological treatment process;
      v. Management of hydrocarbon contaminated water from workshop and permanent warehouse activities will be flowed to collecting pond then to the CPI;
      vi. Management of rainwater runoff will be conducted with drainage pattern control, applying erosion control system, providing sediment trap and sediment pond.
   b. Air quality management using Dry Low NOx burner, recovery of BOG (Boil off Gas) and HRSG (Heat Recovery Steam Generator) for energy efficiency.
   c. Solid waste and hazardous waste management
      i. Solid waste and hazardous waste management will apply Reduce, Reuse, Recycle (3 R) principle;
      ii. Management of organic solid waste such as food waste by using macerator and/or composter and/or disposal to non-hazardous waste landfill;
      iii. Management of solid waste that can be burned by using non-hazardous waste incinerator;

iv. Management of solid waste that can be recycled by using plastic shredder and compactor before being sent to recycle facility outside the Tangguh LNG;

v. Management of wood waste by using wood chipper to be used as mixture for compost, used for revegetation activities as well as for Landfill layering;

iv. Inert waste management by disposal to non-hazardous waste landfill;

v. Management of combustible hazardous waste using hazardous waste incinerator. Non-combustible hazardous waste will be stored in temporary hazardous waste storage before being sent to licensed hazardous waste management facility.

d. Management of drilling mud and cuttings by using two options, which are reinjection of drilling mud and cuttings to subsurface formation option and overboard discharge option.

e. Revegetation will be conducted in areas that are cleared for construction activities but not used for project physical facilities. Revegetation activities will utilize local Papua vegetation.

3. Social Management Approach

Social impacts predicted to arise from Tangguh LNG activities will be managed in social aspects within Environmental Management Plan, while management of other social aspects will be managed in Tangguh Social Management commitments. In order to implement the Tangguh Social Management Plan, Tangguh LNG will prepare the TSDP/Tangguh Sustainability Development Programs document as continuation of the ISP/Integrated Sosial Programs which was adapted to the most recent social approach.

The approach was selected as an effort from Tangguh LNG to minimize the cumulative social impacts due to development of Bintuni Bay and Berau Bay region in which Tangguh LNG operates. By far, as the only gas company that is operating in the region, it has raised community and local government expectations for Tangguh LNG to contribute more in development.

The approach made so far referred to the AMDAL document for Tangguh LNG Integrated Activities (2002) that has considered social impacts to the local communities inhabiting the affected villages. Therefore, the commitment made at the time was directed at protecting the local community from the impacts caused by Tangguh LNG activities. For instance, locating growth centers far from the Tangguh LNG Plant location, in Sorong, Manokwari and Fakfak, policy to control in-migration, closed camp policy, and business development for entrepreneurs in the Bird's Head region of Papua.

In its development, the approach has been re-assessed in line with regional progress. In future, there is potential for industrialization growth in the region, which could be a threat to the Indigenous People.

In this regard, Tangguh LNG has revised its Diversified Growth Strategy (DGS). Firstly, territorial approach or Directly Affected Villages (DAV) is now focus on Indigenous People approach as center of development. Secondly, economic growth approach in the Bird's Head Region of Papua will be defined in more detail to make the Bintuni Bay and Berau Bay regions the centers of growth, therefore Bintuni Township, Babo and Kokas will be supported to become the economic artery for regional growth. Management strategy for cumulative impact is described in Sub chapter 1.4 Tangguh Social Management.

The TSDP document as operational document of Tangguh Social Management as mentioned above will implement seven major social programs that will be reassessed every 5 years, as follows:

a. Community Health;
b. Education;
c. Livelihood;
d. Governance;
e. External Relations;
f. Papuan Entrepreneurship;

Papuan Development and Industrial Relation.The last two programs are additional programs from existing Integrated Social Program (ISP) document. During TSDP implementation, Mid-term Evaluation and Final Evaluation will be done on a regular basis, together with an independent institution, to evaluate program direction and performance. Annual evaluation will be done to ascertain output achievement of each program.

4. The ISO 14001 Environmental Management System Approach

Current Tangguh LNG has applied the Environmental Management System for its operational activities and has received ISO 14001:2004 certification since 2010.

In the construction phase activities of the Tangguh LNG Expansion Project, the contractor will be required to apply the Environmental Management System in accordance with the principles of ISO 14001 in implementing all activities. During operation phase, ISO 14001 certification will be renewed by incorporating facilities of the Tangguh LNG expansion within the scope of ISO 14001 certification for the entire Tangguh LNG facilities.

5. Lessons learned from previous construction experiences and current operation of the Tangguh LNG Plant and its supporting facilities will be used as reference.