Environmental Monitoring Report

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INDONESIA: Tangguh Liquefied Natural Gas Project

Prepared by BP Berau Limited
Tangguh LNG Project Operator

Asian Development Bank

Operator's Environmental, Health and Safety Report
Tangguh LNG Project

October 2006-April 2007

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EXECUTIVE SUMMARY

There were no major environmental, health or safety issues during the six month reporting period ended 30 April 2007. Construction activities continued throughout the period both onshore and offshore with good progress achieved on all fronts.

At the end of this reporting period, overall the LNG Project remains ahead of schedule with actual progress reported at 74.7% achieved versus 70.7% planned.

Construction progress for the two platforms reached 97% and preparations are in progress to hand these over to BP's Operations group in Q2, 2007. The hook up barge, Perwira Perkasa, arrived in the Bintuni Bay in April to complete the remaining platform hook up works on VR-A and VR-B.

Pipeline installation is approximately 90% complete at the end of April. Progress during the reporting period included the successful completion of the horizontal directional drilled ("HDD") pipeline/cable shore crossings, installation of subsea pipelines, installation of subsea telecommunication and power cables, installation of the tie-in spools connecting the pipelines to the platform risers. Demobilisation of some of the workers and equipment working on the platforms and pipelines commenced in the reporting period and is being managed in a planned manner with appropriate communication to workers and the local communities.

The ENSCO 108 drilling rig began its tow to Bintuni Bay on the 26th April with a planned arrival at site in mid May. Rig crew inductions and a BP Rig Acceptance Audit were successfully completed prior to sail away. Preparations for the Tangguh Shore Base to move into full drilling support operations proceeded on track with Eka Nuri Consortium and drilling service companies setting up their personnel and equipment at the Shore Base and Combo Dock. The project received MOE approval in the form of a "No Objection Letter" for Drill Cutting Re-injection in November 2006. This permit was valid for six months and has been extended for another six months by MOE on early May 2007 prior to the commencement of the drilling programme.

The Ministry of Environment visited Tangguh site in November 2006 for the annual AMDAL Compliance audit. The project received the MOE audit report on January 2007. In general, the MOE found the project is in compliance with the AMDAL. Most of the findings have been closed and the recommendations have been implemented. The remaining action items are in progress. On 26th April 2006 the Project issued the October 2006 to April 2007 AMDAL Compliance report to MOE and other relevant GOI institutions.

The environmental management and monitoring programmes continue to be implemented in line with the approved AMDAL and improvement is evident in many areas. The slope protection programme using cover crops is progressing well as evidenced by the green slopes around the site. A re-vegetation plan has been developed and will be implemented by the end of this year. The overall waste management programme is also improving especially in terms of the waste segregation, waste recycling and management of hazardous waste. A tracking system to check the compliance to AMDAL, Lenders' requirement and relevant regulations was implemented

and is discussed with the EPC Contractors on a weekly basis. All incidents were properly investigated, recorded, and resolved in compliance with AMDAL, the government laws and regulations and the environmental covenants in the loan agreements.

1. Tangguh E&S Project Implementation of the Environmental and Health and Safety Aspects of the E&S Requirement

This six-monthly report covers the period of October 2006 to April 2007 which is consistent with the Project AMDAL reporting period to the Indonesian Ministry of Environment.

This report has been prepared to fulfil the Borrowers' obligations under: Section 1.12 (Certain Environmental, Involuntary Resettlement and Indigenous Peoples Matters), Paragraph (B) (Regular Reports), sub-paragraph (a)(Environmental and Health and Safety Report) of the ADB Tranche PSC Parties Agreement dated as of 31 July 2006 and Section 1.18 (Certain Environmental, Involuntary Resettlement and Indigenous Peoples Matters), Paragraph (B) (Regular Reports), sub-paragraph (a)(Environmental and Health and Safety Report) of the Japanese Tranche PSC Parties Agreement" dated as of 31 July 2006.

The Social Report, consisting of two sections; (a) Land Acquisition Resettlement Action Plan ("LARAP") and (b) Social Report on the integrated social programme ("ISP") required under Environmental and Social Requirement Section 1.12 on ADB Tranche (or Section 1.18 on Japanese Tranche), point (B) Regular Report, items (b) and (c) will be submitted separately.

The report format follows the agreed template outlined in the PSC Parties Agreement.

1.1. Update on the Status of the Construction Activities of Tangguh E&S Project

Tangguh E&S project construction activities during the 6 month period from **October 2006 to April 2007** include the following:

1.1.1. Gas Production Facilities – Platforms:

PT Saipem Indonesia is the Engineering, Procurement, Construction and Installation (EPCI) contractor for the VR-A and VR-B platforms, pipelines, and subsea cables. The installation of platform facilities was completed by the end of March 2007. The subsea tie-in of the pipelines to the VR-A and VR-B platforms has also been completed. Both platforms have been completed and handed over to BP by the end of May 2007.

VR-A Platform

VR-A Platform

VR B Hook up & Spool Tie in

VR-B Platform Hook Up

1.1.2. Gas Transmission – Pipelines

Two offshore subsea pipelines, one per platform, have been installed to transport the multiphase flow from the VR-A and VR-B to the LNG plant onshore. This will ensure reliability of supply, which is a critical consideration for the Project and its customers. The pipeline installation was started in September 2006 with Horizontal Directional Drilling (HDD) work for shore approach. The HDD was completed in March 2007. The onshore pipeline section from the shore landing point ("HDD area") to Onshore Receiving Facility will be constructed in Q2 2007.

Onshore Pipeline

Subsea cables for power, instrument and telecommunication from the platforms to shore has been installed while the onshore section is still in progress.

VR-A Cable Installation – Fu Hai

1.1.3. Drilling

The first of the two drilling rigs, the ENSCO 108, has been constructed and fitted out for Tangguh drilling operations. The rig sailed from Singapore to Bintuni Bay on 26st April and arrived on Tangguh site on 17th May 2007. Drilling of the first well is scheduled to commence before the end of May 2007. Preparation work to support drilling activities continued throughout the reporting period. Key service contracts have been placed and well casing has been delivered to the Shore Base. The Bulk Liquid Mud Plant ("BLMP") which will be operated by Halliburton has been erected at the end of the Combo Dock. This facility will mix all of the drilling mud prior to transportation to the rig for drilling operations.

Ensco 108

A contract was awarded to Eka Nuri Consortium (ENC) to manage and operate the shore base facility. A 150 man camp has been constructed at the shore base site to accommodate personnel working in support of the drilling programme.

Other preparation activities include obtaining required permits and developing and finalising drilling procedures well-by-well. These procedures incorporate BP's safety and environmental commitments as described in AMDAL.

A key AMDAL commitment for the drilling programme is the management of drilling mud wastes and cuttings. Drill Cuttings Re-Injection ("DCRI") was the option recommended and approved in the AMDAL for use at Tangguh. DCRI is not a new technology and has been successfully used for more than 20 years in UK, US and other countries. The Tangguh Project views the use of DCRI as the preferred method for handling mud and cuttings from the 15 gas production wells to be drilled in Bintuni Bay. Bintuni Bay is a sensitive environment surrounded by mangrove forest and is home to protected species of dolphins (*Sousa*), and fishing that supports local communities. DCRI offers a method to minimise the environmental impact in the bay from drilling operations. Drill cuttings will be re-injected back to where they originated. Discharge into the bay water will be significantly reduced to the first well and top hole sections of subsequent wells where water based mud is used. DCRI will significantly reduce the potential environmental impacts resulting from overboard discharge.

The MOE issued a "No Objection Letter" through Letter No. B-7792 DEP.IV/LH/11/2006 granting approval for the use of DCRI for all but the first well on each platform and the top hole sections of subsequent wells for Tangguh project. BPMIGAS approved the budget for DCRI in early 2007.

1.1.4. Tangguh LNG Plant and its Associated Facilities

The EPC contractor for the engineering, procurement and construction of the Tangguh LNG Plant and its supporting facilities is a consortium of Kellogg Brown Root, JGC, and Pertafinikki. The consortium is referred to as "KJP". The facilities being built by KJP include:

- LNG processing plant and storage;
- Marine facilities (Temporary Construction Jetty, Combo Dock and LNG Jetty);
- Living accommodation;

- Administration offices,
- Shore Base for drilling and LNG production operations
- Supporting facilities such as roads, communications, power generation, and waste management facilities.

Tangguh LNG Site Overview

Work on the LNG Plant and supporting facilities commenced in February 2005. At the end of April 2007 the project is on schedule with overall progress standing at 77.5% complete.

Tangguh LNG Facilities Overview

Manpower level at site is currently about 8,500 personnel. The majority of these are accommodated in Step 3 camp with some still housed at Step 2 and subcontractor camps. The camps include facilities such as potable water and waste water utilities, catering, laundry, recreation/gym and so on.

Statistically the Project's safety record remains very good with cumulative Project-to-date man-hours exceeding 34 million, and a Days Away From Work Case ("DAFWC") rate of 0.04 for the reporting period. As construction and commissioning activities become more complex, all of BP's Golden Rules of Safety become current requiring high levels of worker supervision and work-front control. Safety remains a daily challenge for all contractors and sub-contractors at the site. The project is currently logging more than

600,000 man-hours per week. A total of 50 million Project man-hours is estimated for the entire KJP portion of the Tangguh Project.

Major activities and achievements for the October 2006 - April 2007 time period are described below.

The Tangguh Shore Base ("TSB") facility is operating and is being utilised to support the drilling programme. The activities at TSB include warehousing and storage of drilling materials, including chemicals and base fluids for drilling mud. The Bulk Liquid Mud Plant (BMLP) is currently under construction at the end of the Combo Dock with target for completion prior to commencement of drilling operations in May 2007.

Tangguh Shore Base

Erection of the shell plate and welding work continues for both LNG Tanks. The eight course of the inner wall and seventh course on the outer wall are under construction on Tank 1. Roof fabrication is complete. The overall progress of the LNG Tank 1 erection is approximately 60%. The fifth course of the inner and outer walls is under construction on Tank 2. The roof fabrication is approaching completion. The overall progress of the LNG Tank 2 erection is approximately 45%.

LNG Tank 1 and Tank 2

Erection of equipment for Train 1, Train 2, ORF and the Utility areas is ongoing. Electrical and mechanical work is also in progress including cable installation for power and instrumentation, piping installation and welding, etc.

LNG Train 1, 2, ORF and Utility Area

Process Train 1

Process Train 2

ORF & Refrigerant Storage

Condensate Tank

The civil work on Dormitory and Administration building area is ongoing with pre-cast concrete beam installation, form work and brick wall installation. Mechanical, electrical as well as plumbing work is also in progress in both dormitories. Construction on other areas such as BOG, condensate tank, warehouse, and workshop is progressing well.

Dormitories and Admin Building

BOG Compressor & Desalination

Site activities for the next several months will focus on:

- Mechanical and electrical work for piping, power installation, lighting, instrumentation, installation of water disposal and seawater intake for desalination.
- Completion of LNG Tank 1 and the Condensate Tank.
- Completion of civil and structural work in all areas.
- Continuation of mechanical and electrical work on Train 1, 2 and Utilities areas including piping, cable installation, lighting, instrumentation, etc.
- Completion of the installation of all heavy equipment.
- Continued structural work on Administration, Dormitory and its associated facilities (Central Building, Clinic, Mosque, Church, Warehouse, Fire Station, Workshop, and Customs Building).
- Continued installation of piping and cables along the major roads to connect the various facilities. These services include fire water, fresh water, and product (LNG and condensate) delivery lines.

1.1.5. Marine Facilities

The Combo Dock is fully operational for loading and unloading work and is servicing both Shore Base and LNG construction activities. Remaining works include completion of the helideck construction, piping commissioning and painting.

Combo Dock

Piling for LNG Jetty has been completed. Major structural work continues and is more than 70% complete. Piping installation has commenced out from the shore and includes the LNG product lines from the LNG tanks to the ship loading arms as well as piping for firewater, desalination water intake and other utility purposes.

LNG Jetty

Site activities for the next several months will focus on

1. Completion of LNG Jetty structure.
2. Completion of helipad installation as a spur off the Combo Dock trestle.

1.1.6. Resettlement-Related Construction Activities

There was no new construction activity in Tanah Merah and Saengga during the reporting period. For Onar Baru, the Resettlement team and villagers have set up development committee for the construction of village hall, church, health clinic and teacher's housing. Construction will be followed up in the following period.

1.1.7. Tangguh Plant Property Perimeter Fence

Construction of the 24 km long Tangguh LNG Plant property perimeter fence was completed in May 2006. Since the completion of the fence construction, security patrols have commenced on regular basis using the local guard force employed by KJP.

The construction camp previously used by the fence contractor is now being utilised by KJP's subcontractor to house additional personnel required to complete the Combo Dock construction. The plan is to demobilise this camp by year end.

1.1.8. Seismic Activities

There is no seismic activity during this reporting period

1.1.9. Status of Key Permits

The Project has no outstanding permits which could delay the construction activities at this time.

LNG Plant and Its Supporting Facilities

KJP is responsible to obtain all permits for the construction of LNG Plant and its supporting facilities and has successfully secured all required permits. The permits secured during this reporting period include the following:

- The Minister of Environment Permit for the Centralised Hazardous Waste Incinerators
- The Minister of Environment Permit for the Centralised Storage of Hazardous Waste;
- The Minister of Environment Statement Letter for the Desalination Water Processing and Brine Discharge from Tangguh LNG Project.

Permits currently being pursued by KJP include the following:

- The Minister of Environment Permit for the combined sewage and brine water discharge into sea
- The Minister of Environment Permit for the hydro-test water discharge

Application documents for these permits have been submitted to MOE. As part of this permitting process, the MOE will send representatives to Tangguh site in June 2007.

Gas Production Facilities and Gas Transmission Pipelines

PT Saipem Indonesia ("Saipem") is responsible for obtaining permits for the construction of the two platforms and two pipelines.

Permits secured during this reporting period include:

- The Ministry of Environment permit for the HDD drilling mud disposal;
- The Ministry of Environment permit for brine water discharge from offshore desalination vessel;
- The Ministry of Environment permit for the discharge of gel, flooding and hydro-test water;
- MIGAS Revised Permit for the Platform Location

Drilling

During this reporting period from October 2006 to April 2007, Tangguh Drilling and its Shore Base contractor ENC have successfully secured the following permits:

- No Objection Letter from MOE for the use of DCRI for all but the first well on each platform and the top hole sections of subsequent wells.
- No Objection Letter from MOE for the operation of the hazardous waste incinerator at the Tangguh Shore Base area.

Currently, ENC is pursuing other environmental related permits required to support the drilling activities including:

- Temporary Hazardous Waste Storage at the shore base facility

1.2. Progress on the Implementation or Fulfilment of the AMDAL Commitments

The main environmental programmes for Tangguh at this stage of project development focus on providing day-to-day assurance on AMDAL and environmental compliance for all construction activities at site. A solid environmental field team has been deployed to monitor and support the contractors with their environmental performance at site. There are two environmental field engineers dedicated to monitor LNG site activities, one engineer for the platform and pipeline construction activities and one for the Drilling activities.

The environmental management and monitoring programmes have been implemented in line with the approved AMDAL and improvement is evident in many areas. A tracking system to monitor the compliance to AMDAL and relevant environmental regulations has been maintained. The system is updated and discussed on a weekly basis with the EPC Contractors. This facilitates identification of gaps as early as possible and implementation of the necessary measures to correct these. Environmental training and socialisation are conducted routinely for contractor personnel to improve the working

level awareness on environmental commitments for the Project. Environmental induction is included as part of the Contractors kick off meeting prior to mobilisation to site.

Below is summary result of the environmental management and monitoring programmes for each of the Tangguh Project E&S activities.

1.2.1. Gas Production Facilities - Platforms

The focus of environmental management for the Platforms construction activities is on solid waste management, sewage treatment and fuel storage and handling.

Waste generated from Saipem's offshore and onshore activities was sent to KJP's waste treatment facility. Sewage generated from Saipem onshore facilities is temporarily collected in a holding tank which is regularly emptied by a KJP vacuum truck. All fuel and chemical storage were managed properly with secondary containment as a mandatory requirement. Continuous monitoring is performed to ensure that all requirements in the storage of fuel and chemical are fulfilled.

1.2.2. Gas Transmission - Pipelines

The focus of environmental management for the pipeline construction activities is on the HDD water based mud disposal management, hydro-test water discharge management, general waste management and fuel storage and handling.

Saipem manages the waste generated from their activities and as agreed in the EPC Contract, they dispose the waste to KJP's waste treatment facility. The HDD work was completed in March 2007. There was about 450 m^3 of mud generated from HDD activities. LC-50 test was performed to prove that the water based mud from the HDD is classified as non hazardous waste so as per the MOE permit it can be disposed to the mud landfill located next to KJP non hazardous waste landfill area.

HDD Activities

HDD Mud Landfill

All fuel and chemical storage were managed properly with secondary containment as a mandatory requirement. Continuous monitoring is performed to ensure that all requirements in the storage of fuel and chemical are fulfilled.

1.2.3. Drilling

The main focus of environmental management during the reporting period was waste management at the Tangguh Shore Base operated by ENC on behalf of the Project. ENC manages the hazardous and non hazardous waste generated from their activities and KJP removes this for disposal to either their waste facilities or for transfer to an off-site waste collector. Sewage at the Shore Base is temporarily collected in a holding tank which is regularly emptied by a KJP vacuum truck.
ENC has installed a hazardous waste incinerator at the Shore Base. Emission sampling from the incinerator was conducted in March 2007 as part of the permit application requirements. The sampling was witnessed by representatives from MoE. The ash from hazardous waste incinerator will be stored temporarily on site and will be disposed of by KJP at their hazardous waste collector's (PPLI) facility. The MOE has released the No Objection Letter for the operation of this incinerator on 20 April 2007. Based on this MOE permits, ENC commenced the operation of this incinerator.

1.2.4. Tangguh LNG Plant

The environmental management for the LNG Plant site during this period focuses on the erosion control, top soil management, site rehabilitation and slope stabilisation, waste management, hazardous material management, and water management.

A. Erosion Control

The Project has generally adopted a slope gradient of 4:1 compared to the 2:1 gradient requirement in the AMDAL to minimise the risk of soil erosion and slope slippage given the actual soil conditions at Tangguh site. The lower gradient reduces the speed of run off flow hence reducing erosion. Some of the unstable slopes have been treated with geo-textile and geo-grid to ensure its stability.

Temporary and permanent drainage systems have been constructed to direct the stormwater to its natural path. Sediment ponds completed with brush barriers constructed from leaves, branches and unsuitable non commercial timber (biomass) were installed to prevent sediment flow into the rivers or creeks.

Permanent Drainage at the Shore Base Area

Erosion Control and Land Stabilisation at the Shore Base area

During the reporting period several slopes near the LNG tanks and close to Train 2 encountered a slippage problem caused by continuous heavy rains. Immediate mitigation efforts were taken, for example, by installing tarpaulin sheet to prevent run off flow directly to the slope. A plan for permanent repair of the slope is being prepared. Regular maintenance of erosion measures is required particularly during the rainy season.

In our last report we noted that earthworks in the Boil-Off Gas area resulted in spoil disposal into a nearby creek which is considered as sacred creek by local community. KJP has since removed the spoil and debris from the creek and has planted a cover crop to prevent soil sliding and erosion. The creek is not part of the construction footprint and is a natural drainage to direct run off flow to the sea. No further erosion or sliding has been observed at this creek.

A re-vegetation plan has been completed by KJP. The next step is to select a subcontractor to implement the plan including the establishment of a nursery to support the re-vegetation operation. It is expected that the programme can be started by the end of 2007.

Sacred Creek Slope Protection

Slope Protection on the Road to Jetty

Visual monitoring of the erosion control measures has been conducted. This includes monitoring the sedimentation levels in the pond and the maintenance work performed to clean the pond. Monitoring of brush barrier as well as temporary drainage is also conducted to ensure that these measures are functioning properly. Temporary and permanent drainage systems are regularly monitored for debris or blockages and follow up maintenance activities are verified. Natural drainage, including creeks within the site, is also monitored for blockages resulting from construction activities. Monitoring of turbidity in surface water within the site shows that turbidity level has decreased. It is evident that management of erosion and sedimentation is improving.

Table 1. Turbidity of Surface Water within Tangguh LNG Construction Site

Period	Turbidity range (NTU)	Remarks
October 2005- April 2006	11-7200	Site preparation phase
October 2006- April 2007	2.55 -3800	Above ground activities- Construction phase

Note:

- Based on AMDAL, for surface water Tangguh refer to Indonesian standards (PP82 of 2001)
- There are no turbidity standards for all categories of surface water under the PP 82 of 2001. The Baseline surface water turbidity based on AMDAL is >10 mg/l.

B. Top Soil Management

Top soil has been spread over the slopes for slope protection and to promote the growth of cover crops and later revegetation with native trees. Only a small volume of topsoil remains since all of it has been utilised for the slope protection. About 98% of all slopes have been covered with a crop. The remaining topsoil will be progressively spread over the remaining slopes as well as area to be revegetated with trees later. Visual monitoring of top soil stockpiles continued to ensure that is the stockpiles are properly protected.

C. Waste Management

The waste management programme at the LNG Plant site covers organic, inorganic and hazardous waste. In addition to waste generated from LNG construction activities, KJP is also responsible to manage the waste generated from onshore GPF and Shore Base activities. The following are the waste segregation criteria and the waste disposal routes:

1. **Hazardous waste** (used oil, oil filters, paint cans, batteries, oily rags, aerosol cans, contaminated soil/materials, etc). The waste is delivered to Central Waste Accumulation Area #1 (CWAA) in the Step 1 area and stored in the temporary hazardous waste storage. It is transported regularly to the certified hazardous waste facility (PPLI) at Bogor. The burnable hazardous waste e.g. oil rags and some used oil is delivered to the hazardous waste incinerator located next to the temporary hazardous storage. KJP obtained a permit from the Minister of Environment through the Minister Decree No B-7559/Dep IV-4/LH/11/2006 dated 10 November 2006 for the operation of Temporary Hazardous Waste Storage. KJP has secured the Minister of Environment Decree No B-1408/Dep IV-4/LH/02/2007 dated 26 February 2007 to authorise the operation of the Hazardous Waste Incinerator.

Hazardous Waste Incinerator

2. **Landfillable waste** (damaged cement bags, rock wool, styrofoam boards, small scrap metal & cables, asphalt drums, HDPE-sheets). This waste, estimated at an average of about 350m^3 per month, is disposed in the non hazardous waste landfill areas (2 x 9,000m^3).

Landfill for Inert and Non Hazardous Waste

3. **Reusable waste**, such as, used tires, large scrap metal-spools, pipe cut-offs, cable, timber is transported to Central Waste Accumulation Area (CWAA) 2 located next to non hazardous waste incinerator. This waste is available to any subcontractor that may wish to use it.

4. **Re-cycleable waste**, such as, food/drink cans, plastic bottles, glass bottles cardboard/carton is stored in a container next to construction jetty for regular shipment to the non hazardous waste collector at Sorong. Recycling of these wastes is performed to some extent in this facility. A total of 6 containers (225.5m^3) were sent to the recycler on the 5th and 16th March 2007.

Waste Segregation

5. **Food waste** – Average monthly food waste of about 100m^3 is deposited into a clay-based waste pit. KJP has installed 12 drain sinks and two food waste extractors. Only one food waste extractor is currently operational. The food waste extractors are expected to reduce the volume of food waste going into the pit by about 80%. The mulch produced will be incinerated or composted and used for soil improvement. However, some amount of food waste (meat and fats) cannot be composted and will continue to be dumped into the waste pit.

6. **Combustible waste** (paper, carton, wood chips etc) is transported to non hazardous waste incinerator for burning. There is about 180 tons/month of combustible waste burnt in the incinerator.

Non Hazardous Waste Incinerators

7. **Medical waste** is transported regularly to medical waste incinerator facility belong to Mitra Masyarakat Hospital at Timika. During this period of reporting, there was about 486 kg of medical waste (comprising infusion bottles, soiled cotton wool, gloves bandages, sharps, catheter set, etc) have been sent to the Hospital for incineration.

KJP has assigned PT Prasmanindo Boga Utama (PBU), one of its subcontractors, to operate the non hazardous waste incinerators, collect and transport wastes arising from the camps and offices to the designated disposal facilities and ensure good housekeeping at the facilities. PBU has two (2) waste trucks with eight (8) dumpsters (additional 6 dumpsters being purchased) for the collection and storage of camp and office wastes respectively. At the incinerator location, there is a dehumidifier (garbage

dryer) and 2x2 ton incinerators; sorting shelter, an ash pit. There are 13 personnel from PBU involved in this waste management operation.

At the CWAA-2 there is a sorting shelter for combustible wastes and lay down area for scrap timber and metal. There are two personnel from KJP's Environment section to oversee the segregation and dumping of waste in the laydown area. There are also two personnel from KJP's Environment section to oversee the operation of the hazardous waste incinerator at CWAA -1, receipt and shipment of recyclable and hazardous waste. There is a KJP's Environmental Assistant who oversees and controls waste disposal in this location through a manifesting system.

Hazardous waste management is coordinated by the KJP's Environmental section. For transporting and disposal of the waste, KJP has set up a contract with PPLI, a certified hazardous waste management company to provide support in packaging, transportation and later treatment/disposal on PPLI's facility in Bogor.

Each of KJP's subcontractors is responsible for collecting and transporting all wastes arising from their activities to the designated disposal or waste laydown areas (CWAA 1 and 2, landfill, waste pit, etc). Currently there are 20 subcontractors and each has an Environmental Representative that oversees the implementation of Environmental requirements of their activity.

The Project has made significant improvement in waste management during this period. However, there are still concerns regarding the food waste management system. Efforts to discontinue the use of the waste pit as a disposal option include the maceration of the waste and incineration. One of the options currently being considered is to have a large scale composter with capacity of 1.5 tonnes/day to compost the food as well as other organic waste (saw dust, chipped waste timber etc). Other efforts include the site wide awareness campaign on waste segregation and disposal routes.

The Project shipped recyclable wastes to the offsite recycler in Sorong. Six containers (225.5m^3) were sent to the recycler on March 2007. About 40% of polypropylene cement bags and 5% of scrap timber were reused and 99% of cooking oil is recycled to PPLI.

The Project continues to assess more recycling options especially for cement bags and scrap timber. A typical example is the chipping of scrap timber for use as compost and recycling of good quality cardboard and cartons.

Monitoring is conducted on the waste collection point on the site to determine whether it is emptied regularly, where it is collected and when the removal of the waste to landfill or to the waste collector is performed. Documentation for waste transfer, including the manifest, when the waste is transported offsite and received by the collector is reviewed as part of the monitoring process. Regular inspection is also conducted on CWAA, landfill and incinerator.

A dedicated team has been assigned to manage the waste disposal. Corrective actions were taken immediately when problem is encountered. Actions taken included; segregation of wastes, review of the operation procedure for the incinerator, minor repairs to the equipment, and re-training of operators. Currently most waste is segregated at source and the balance is segregated at the incinerator area. The

operator skill levels have improved, however, regular reminders and monitoring are still required to ensure that operators follow the operating procedure.

Liquid Waste

Liquid waste generated from the construction activities consists of sewage from camps and field toilets and brine water reject from the Reverse Osmosis (RO-desalination) units. Sewage is treated with 5 Sewage Treatment Plants (STP). List of STP's is outlined in the following table:

Table 2 List of STP's and its location

STP	Location	Capacity	Remark
Step 1	Step 1 area	200 m^3	
Step 2	Step 2 camp	550 m^3	
Zone A	Step 3 camp	250 m^3	The capacity is being increased to 325 m^3
Zone B	Step 3 camp	1000 m^3	
Zone C	Step 3 camp	250 m^3	The capacity is being increased to 625 m^3

There are 31 field toilets with holding tanks installed on site. The holding tanks are emptied regularly and sewage is discharged to the Camp STP facility using vacuum trucks.

The BOD levels of treated sewage effluent from the accommodation camps have been a concern for the past year. KJP continued its efforts to maintain compliance to the 100mg/l consent level as required by the MoE regulation No 112 Year 2003. These efforts included the treatment of oil and grease traps from the kitchens which reduced the BOD levels to the required standard at the end of 2006. However, as the number of personnel at site increased, so did the BOD loading as well. Technical assessments of the various treatment units revealed that the BOD loading of some of the STPs had exceeded the design capacities and consequently reduced their efficiencies. From March 2007, the capacities of the two STPs at Step 3 camp (Zone A and C) were increased and now are operational. Secondly, the effluents from the various STPs are now being discharged through one outfall line to the seabed next to construction jetty. The BOD of the combined discharge of STP's effluent to the outfall line to seabed, however, is still within the Indonesian standard of less than 100 mg/l. KJP plans to bring the discharge of sewage to the LNG jetty trestle at -13m LAT as required by the AMDAL in August 2007. A permit application for the discharge of sewage to sea was submitted on 2 March 2007 and is in process with MoE. The temporary and permanent discharge locations are clearly explained in the permit application submitted to MOE. As part of the permitting process, MOE representatives are scheduled to visit Tangguh Site in June 2007.

The treated effluent from Sewage Treatment Plants is monitored prior to discharge into the seawater The effluent discharge and receiving ambient sea water are assessed weekly and measured against the prevailing Indonesian regulations KEP-

112/MENLH/2003[1] and KEP 51/2004 respectively as stipulated in AMDAL and applicable Indonesian regulation.

The BOD readings in April confirm BOD_5 for all STP's meet the standard of maximum 100mg/l, except for the Step 3 camp zone C STP which is about 121 mg/l. Expansion of this STP has been completed and now is operational. With the operation of expanded Zone C STP, it is expected that the BOD will decrease significantly. Other parameters such as, pH, Residual Chlorine, TSS and Oil/grease values are also being monitored and within consent levels. The regular maintenance particularly regular cleaning of grease trap is proven to be effective measure to reduce the BOD level to meet the required standard.

E. Water Supply

Fresh water supplies required for project activities is secured from several sources including barged supplies from Fak Fak and Wimro, temporary desalination units installed onboard an LCT located close to the Project site, and bottled drinking water. The LCT operates the Reverse Osmosis (RO-desalination) plant offshore for certain times and stores the desalinated water in the tanks onboard the LCT. The LCT comes to shore regularly to transfer the water into the water truck which transfers the water to holding tanks for construction needs. KJP is now operating a temporary onshore desalination plant to replace the temporary offshore LCT plant and to reduce the fresh water barge supply from Fak Fak. The offshore plant onboard the LCT will be removed and installed onshore. The removal of the desalination plant will be performed in stages. This is to ensure the continuity of water supply to support construction activities while the transfer is ongoing. The target is to complete the transfer by the end of June 2007.

The current intake capacity of the onshore RO plant is 1600 m^3. This produces 400 m^3 of desalinated water and reject brine water of 1200 m^3 The temporary discharge of the brine water from RO is to the Combo Dock at -7m LAT while the permanent discharge location to -13 LAT at the LNG jetty trestle as stipulated under the AMDAL is scheduled to be in place by August 2007. KJP submitted an application to MOE for a brine and sewage discharge permit on 2 March 2007. The temporary and permanent discharge locations and the schedule are explained in the permit application.

[1] Before 2003, there was no specific standard for sewage discharge for industry; therefore the standard initially referred in Tangguh AMDAL is the MOE Regulation KEP 52/MENLH/1995 regarding Sewage Standards for Hotel. MOE released KEP-112/MENLH/2003 as a specific standard for sewage discharge for industry in 2003. Tangguh consulted MOE on the standards to be used in Tangguh project and was advised to use the specific industry standards as per KEP-112/MENLH/2003.

Below is summary of the planned and actual raw water delivery and consumption during this reporting period.

Table 3. Raw Water Delivery and Consumption October 2006 - April, 2007

Month (A)	Personnel on board (POB) (B)	Planned water supply (m^3) (C)	Actual water deliveries + onshore RO production(m^3) (D)	Quantity of water consumed by Subcontractor construction activities (m^3) (E)	Quantity of water planned for camp life consumption (m^3) @ 200l/pers/ day (F)	Actual quantity of water consumed for camp life (m^3) (D-E)
October 06	5,019	55,800	70,170	210	31,117.80	69,960
November	5,666	60,000	72,932	1,375	33,996.00	71,557
December	5,822	65,100	70,846	1,650	36,096.40	69,196
January 07	6,409	71,300	120,575	1,650	39,735.80	118,925
February	6,893	67,200	46,334	1,540	38,600.80	44,794
March	7,048	48,000	41,570	1,282	28,192.00	40,288
April	8,821	59,450	45,890	549	52,926.00	17,251
TOTAL		**426,850**	**468,317**	**8,256**	**260,664.80**	**431,971**

Monitoring was conducted on the intake and discharge point of the RO facility and the results indicate that the discharge brine water meets the requirements of maximum 5% above the average ambient seawater salinity. The ambient salinity measured is in the range of 23-29 ppt and the salinity within compliance point (30 m radius from discharge point) is in the range of 0.3 to 3% above the ambient salinity.

Drinking water is treated by a filtration system of sand and sometimes carbon filters and chlorination. Recycling of treated waste water and rain water collected in retention ponds for dust suppression and minor concrete works are performed to conserve water. The water supply to the camp was rationed for certain periods during each day to conserve usage.

F. Management of Surface Water Run off

The problem with low pH of surface run off water previously documented across the site has been resolved. This is mostly attributed to the completion of earthwork activities which facilitated progress on slope protection. Areas with exposed soil decreased significantly with the completion of some of the permanent facilities including the Shore Base, Combo Dock, and the paving of site roads. This reduces the release of acid due to oxidation of pyrite soil.

The application of limestone has improved the pH values in all areas except the drainage outlet at the Shore Base area, to baseline conditions of about 5-9 while the Indonesian standard for pH on surface water (PP 82 of 2001) as adopted in Tangguh AMDAL is 6-9. Regular sampling of pH is undertaken in areas where there is indication of low pH on surface water.

Monitoring has indicated that run-off flow from the drainage outlet at the Shore Base (GS-30) is still below the baseline of 5-9 even though this facility is complete and not much soil is exposed to air which should reduce the low pH run-off. The run-off outlet is directed into a neutralisation pond prior to discharge into natural water course near the

Shore Base area. Regular liming applied on this pond has successfully increased the pH to the average value ranging from 5.1 to 7.4 which is within the baseline level. The Project continues to monitor the pH from this area..

The monitoring and assessment of surface water at 9 LNG site locations were witnessed by representatives from an external laboratory, Sucofindo. The pH and turbidity levels were assessed and measured against ANDAL baseline result of pH of 5.6 and Turbidity of >10mg/l while the pH standards based on government regulation PP 82 no 2001 category III adopted in Tangguh AMDAL is 6-9. No standard for the surface water turbidity on the regulation no 82, 2001, so the focus of monitoring is based on the baseline data. The on-site results ranged from pH of 3.68 to 7.86 while the Turbidity ranged from 2.55-3800 NTU in the wet season.

G. Fuel and Chemical Storage and Handling

The project's policy is to confine all fuel and liquid chemical storage in retention berms with capacity to hold a minimum of 110% of the content of the largest container. The guidelines for the containment specified in the AMDAL and applicable regulations are being monitored periodically for compliance through internal audits and inspections. There are 64 fuel and liquid chemical storage locations on site. 34 of these are fuel tanks for gasoline and diesel, 18 are fuel drums containing kerosene, diesel, lube oil, and gasoline and 12 are chemical drums for storage of acid, cement additives, paint, thinners and grease.

Drip trays are used during maintenance and refuelling and personnel involved in these activities have been properly trained. Regular briefings and training for new and existing subcontractors are provided. Posters are strategically placed to maintain awareness on proper re-fuelling and maintenance procedures. Proper labelling and symbols on chemical/waste/fuel storage is improving. Full and detailed records are maintained of any spills, however minor. The frequency and volume of spills due to fuel handling and storage activities has decreased and any occurrences are immediately cleaned up and recorded.

H. Emission and Ambient Air Monitoring

In February 2007, KJP conducted emission and ambient air monitoring activities. Sucofindo laboratory did sampling on electric diesel generators, incinerators, and several locations within the site. The report indicates that all parameters were in compliance with the relevant Indonesian regulations **(**Kep-13/MENLH/3/1995 for emission air and PP 41/199 for ambient air) as well as the Tangguh LNG project standards as stipulated in the AMDAL.

1.2.5. Marine Facilities

KJP is also the EPC Contractor for marine facilities. Therefore, the environmental management for marine facilities is an integrated part of KJP environmental management and monitoring for the LNG Plant. For this reporting period, the environmental management for marine facilities focused on the preventive actions to avoid oil spills for all marine construction activities and management of waste disposal from offshore vessel operations.

A. Oil Spill Mitigations

The mitigation efforts to prevent oil spills for marine facilities are similar to those discussed in section 1.2.4 G above regarding secondary containment for all fuel storage facilities and applying strict fuel handling procedures. A comprehensive Oil Spill Contingency Plan has been developed and socialised to all Tangguh staff and contractors on site. Basic OSCP training has been provided to the Tangguh field team and contractors organisations. The OSCP topic is also covered in the routine environmental awareness programmes provided to the construction workers through class sessions or the daily tool box meeting. The Project has purchased equipment to respond to any offshore, near-shore or onshore oil spills. This equipment is now available at the site. Oil spill response training was conducted on November 2006 and further sessions are planned for May and June 2007. IMO level 1 Oil Spill response training is planned for 4-8 June 2007.

B. Waste Management for Vessels Operations

Waste management for marine vessels/barges covers liquid and solid domestic waste as well as hazardous waste, if any. The liquid domestic waste is treated according to the AMDAL and applicable regulations. For the vessel/barges equipped with a sewage treatment plant (STP), sewage is treated in the STP prior to discharging to the sea. The sewage on the vessel/barges that do not have a STP facility is pumped regularly with vacuum truck onboard an LCT and then discharged to the sea at a distance of 8 nautical miles from the nearest bay according to MARPOL requirements for untreated sewage discharge.

The contractor, PSJO, has installed field toilets with a central holding tank located on a barge. The barge anchors along side the LNG Jetty head for easy access to the workers. Raw sewage is regularly pumped and transferred by vacuum truck to the onshore STP located in PSJO camp.

The solid non hazardous waste is transferred to shore for disposal to landfill, incineration or further disposal to a waste recycle company. The used oil which is considered as hazardous waste is transferred to an onshore hazardous waste temporary storage facility prior to shipment to the certified collector for disposal.

1.2.6. Resettlement-Related Construction Activities

The Saengga village renovation was completed in May 2006 and the community moved to their new houses. There will be no other resettlement related construction activities and therefore this item will be dropped starting the next reporting period. The Resettlement related activities will be covered under the social report which will be submitted separately.

1.2.7. Tangguh Plant Property Perimeter Fence

The perimeter fence construction activities have been completed in May 2006. There is no environmental management programme specific on the Fence operations, therefore this item will be dropped starting from the next reporting period.

1.2.8. Seismic Activities

There is no seismic activity in this reporting period

1.3. Tangguh E&S Project's Performance on the Environmental and Health and Safety Aspects of the E&S Requirement

1.3.1. Environmental Performance

The Tangguh E&S Project environmental management and monitoring programmes have been implemented in line with the approved AMDAL and Lenders E&S requirements. Improvement in environmental performance is evident in many areas. The challenge is to ensure consistent implementation of the programme for all site activities. A tracking system to check compliance to the AMDAL and relevant regulations was developed and the output is discussed with relevant contractors on a weekly basis. The environmental programmes are reviewed periodically to ensure that they are still relevant as the project transitions through various stages of development. This process facilitates identification of gaps as early as possible and leads to prompt implementation of the necessary corrective measures.

Environmental training and socialisation were conducted for contractors' personnel on a regular basis to improve the working level awareness of the environmental commitments of the Project and get their support for continuous improvement of the Project's environmental performance. Environmental posters, pamphlets and brochures relating to waste management, fuel storage and handling, flora and fauna protection, and marine mammals protection are provided as part of the environmental awareness campaign.

1.3.2. Health and Safety Performance

The Tangguh project continues to deliver good safety performance, with no major incidents during the reported period. Key indicators on safety performance are presented in the table below.

HSE Performance	2007 Plan	YTD 2007 (Jan-April)	Project YTD (since Mar'05)	Reporting Period (Oct 06-April 07
Major HiPO Frequency ([Number of cases x 200,000]/Total man-hours)	Monitored	0.02(1)	0.01 (2)	-
DAFWC ([Number of cases x 200,000]/Total man-hours)	0.03 (4)	0.04 (2)	0.02 (3)	0.04 (3)
RIF ([Number of cases x 200,000]/Total man-hours); (number of cases)	0.31 (40)	0.49 (24)	0.36 (62)	0.37 (31)
STOP: cards/employee/month	5	1.58	1.58	1.59
ASA: cards/employee/month	5	14.62	12.35	15.15

HSE Performance	2007 Plan	YTD 2007 (Jan-April)	Project YTD (since Mar'05)	Reporting Period (Oct 06-April 07
% **HSE Training Hours** from total man-hours	2.80%	2.71%	2.55%	2.79%
% **Action Closure** (Total action items closed due on time/total action items in the reported month)	90%	94%	88,81%	93,79%
Tangguh Project man-hrs.worked	***25,817,080***	***10,185,156***	***34,744,220***	***16,607,343***

Note:

- HiPO = High Potential
- DAFWF = Day Away from Work Frequency
- RIF = Recordable Injury Frequency
- ASA = Advance Safety Audit

The safety of hands and fingers is still a significant challenge. They continue to be the most frequently injured body parts. A Hand and Fingers safety campaign has been conducted and continuously refreshed with the construction workforce. The safety focus changes with the construction risks encountered in the implementation of the work. During this reporting period, the focus was on heavy lifting operations and working at heights. All of BP's "Golden Rules" of safety are relevant to the operations across the site and this will continue to be the case as the project moves towards completion.

There were 3 DAFWC (day away from work cases) during this reporting period. The first incident occured on 3 December 2006 involved a boat mechanic from PT. Pelayaran Tanjung Kumawa (a service provider of water taxis for the Tangguh Project). He attempted to replace a damaged dynamo motor starter bearing. In order to gain a better view of the condition of the bearing, he took his safety glasses off. One of the ball bearings was ejected at high velocity and hit his left eye. The mechanic received medical treatment at the Babo site clinic right after the incident and was evacuated to the Sorong General Hospital, where he underwent a surgical operation on his eye. On 11 December 2006 he was evacuated to Jakarta for further treatment.

Second incident occured on 18 January 2007 involved a Building Supervisor from Team Module. He fractured his hand, when he fell approximately 1.7 meter from a scaffold while carrying out an inspection to the gable end of the new mess hall and kitchen being constructed for the new 150 man-camp at the Shore Base. He was immediately taken to the ISOS Clinic at the LNG main Camp, and was given medical treatment. Based on recommendation from the clinic doctor he was then medivac to Jakarta on 19 January 2007 for further treatment in a hospital facility.

The third DAFWC occurred on 22 April 2007 during the maintenance activities of electrical generator on the VR-B Platform. An electrical cable was to be used to transfer the power from Perwira Perkasa vessel and the VR-B Platform and during the set up the cable was thrown to the Injured Person who missed it and as a result the plug struck him on or about the left eye.

The Contractors underwent an extensive and detailed review of their compliance with the Project's Scaffolding and Rigging & Lifting requirements. A series of inspections and scaffolding safety campaigns have been carried out; as well as an audit focusing on the scaffolding standard compliance and personal competencies by the scaffolding experts. Action plans identified from these inspections are logged and monitored on weekly basis until those issues are satisfactorily addressed and closed out.

Training sessions in Hazard Recognition, Lifting and Cranes, Working at Heights and the correct set up and use of Static Lines have been conducted for all BP staff. It is intended to continue training on a weekly basis on the 8 Golden Rules, Getting HSE Right and topics that are relevant to the status of the project.

1.4. Progress on the Applicable Environmental Studies during the Reporting Period

1.4.1. Marine Mammals

A follow up marine mammals and marine reptiles survey was conducted in September 2006 with focus on the Indo-Pacific Humpbacked Dolphins (Sousa chinensis) and and again in January 2007 with focus on Bryde's whale and spinner dolphin habitats and nesting habitats of sea turtles in Kokas/Arguni Island region, Berau Bay. The January 2007 provided conclusive data on the habitat of spinner dolphins (Stenella longirostris), which are overlapping with Tangguh VR-A and VR-B platforms. This species is frequently sighted near this area. A major search effort on the Bryde's whale was done during the January survey for the off-shore waters of Berau Bay including tanker routes. No whales were sighted during this survey. The January survey identified the Kokas area as a sensitive habitat for protected turtles. Kokas is located more than 80km away from the project site and is not expected to be impacted by Project activities.

Project continues to implement the recommended actions to minimise potential impacts to marine mammals and marine reptiles in Bintuni Bay. The current mitigations include the following:

- Enforcement of AMDAL waste disposal management for all vessel operations and offshore construction activities;
- Regular monitoring to ensure AMDAL compliance for marine related activities especially waste management.
- Where appropriate, employ 'ramp-up' measures to reduce cetaceans' exposure to high-decibel underwater noise. Begin loud activities with a 'soft start' and slowly increase decibel levels. Ramp-up allows cetaceans the opportunity to move away from acoustic disturbances. It is hoped that any displacement will be short-term as most loud activities (pile-driving, pipe-laying, etc.) will take place over the course of weeks to months
- Establish a boat-free "dolphin habitat zone" by re-routing speedboats between Babo and the LNG Plant Site to deeper (>12m) waters, during all months with calm sea conditions. The offshore route aims to minimise acoustic disturbance and collision threats for Sousa dolphins while reducing wake impacts on mangrove habitats.
- Route LNG tankers along established international sea lanes through Halmahera (Maluku) waters. Avoid travel through the marine sensitive area of Raja Ampat.

- Presentation and distribution of posters and pamphlets on marine mammal protection to contractors and marine vessels and barge operators, particularly those working on marine facility installations to increase marine mammal awareness. Posters have also been placed at LNG site locations, Babo camp and at the Babo jetty to raise awareness on Tangguh's commitment to protection of marine mammals;
- Regular socialisation during daily toolbox meetings on the marine subcontractors;
- Develop a brochure highlighting the wonders of the marine eco-system in Bintuni Bay. The plan is to distribute this brochure to Tangguh employee, local government and local community to increase awareness on marine mammals and marine reptiles inhabited the bay waters.

So far there are no recorded incidents or any known disturbances in relation to the marine mammals and marine reptiles as consequences of actions by project personnel or project marine construction activities.

The next marine mammal survey will focus on the shipping lane and has been scheduled to be performed before end of 2007.

1.4.2. Oil Spill Contingency Plan ("OSCP")

A comprehensive OSCP covering all Tangguh construction sites has been developed with support from EARL, an oil spill expert. The OSCP manual is available in two versions, a full report, "Tangguh Project Integrated Oil Spill Contingency Plan (OSCP) – 1st Edition May 2006" and the summary form "Oil Spill Contingency Plan (OSCP) Summary – 1st Edition – May 2006". This plan has been widely socialised with all relevant Tangguh staff and contractors at the Jakarta offices and field locations. The recommended oil spill equipment has been procured is and available for use at the Tangguh site. Training and drill plans have been developed for the oil spill response team that will be involved in any spill incident.

1.4.3 Planned for Other Environmental Studies or Monitoring Programmes

The environmental studies and monitoring programmes which have been scheduled to be performed for this year include the following:

1. Marine water and sediment quality sampling to update the baseline data is scheduled for May 2007
2. Fishery Study to update information on Bintuni Fishery from the 2004 Fishery Study is scheduled for June/July 2007
3. Flora and Fauna Survey as required by the AMDAL is scheduled for July/August 2007

Results of those studies and monitoring will be discussed in the next reporting period to Lenders

1.5 Summary of Corrective Action Plans Closed Out during The Reporting Period

Specific corrective action plans will be developed if there is a Level 2 non compliance incident. There were no Level 2 incidents categorised recorded in this reporting period. As there were no Level 2 incidents in the previous report there are no outstanding actions to be closed.

1.6 Summary of Progress on the Implementation of Outstanding Recommendations made by the External Panel under the EP TOR

This section provides a summary of progress made during the reporting period in the implementation of all outstanding recommendations (to the extent related to the environmental, health and safety aspects as described in the Tangguh Environmental Management Plan) made by the External Panel in the context of any review or monitoring conducted by it under the External Panel Terms of Reference. As at the time this report is being written, the External Panel has not published the Final Report with its recommendations, therefore no implementation of recommendations can be reported at this point.

1.7 Other Relevant Information

Two senior staff from the Ministry of Environment visited Tangguh site on 19-22 November 2006 as part of regular monitoring on the project's compliance in the implementation of the AMDAL commitment,. In general, the MOE found the project is in compliance with the AMDAL. At this reporting period, most of the MOE findings and recommendation have been closed and the remaining are well in progress.