



# Environmental and Social Monitoring Report

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Project Number: 38919  
April 2009 – October 2009

## INDONESIA: Tangguh Liquefied Natural Gas Project Operator's Environmental, Health and Safety Report

Prepared by BP Berau Limited  
Tangguh LNG Project Operator

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**Asian Development Bank**



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

**April – October 2009**

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**ENVIRONMENTAL AND HEALTH SAFETY REPORT**  
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## EXECUTIVE SUMMARY

At the end of October 2009, the overall LNG project progress stands at about 99% complete with construction workforce numbers at about 850 personnel. The workforce continues to decrease throughout 2009 as construction approaches completion. At the same time, approximately 1100 operations personnel are already on site.

LNG production commenced on 14 June 2009 from Train 1, with first export achieved on 6 July 2009 using Tangguh Foja ship. First export shipment of condensate was achieved on 14 June 2009. Train 2 started LNG production at end of September 2009. Train 1 was shutdown in August for resolution of technical issues, and re-started in mid-October 2009. During this reporting period, four LNG and three condensate shipments have been sent to customers.

On 25th October 2008, Tangguh issued the AMDAL Implementation report for the period of April – October 2009 to MOE and related government institutions including the local Government of Bintuni, Ditjen MIGAS and BPMIGAS. This report is developed based on the AMDAL implementation report.

The environmental management and monitoring programmes continue to be implemented in line with the approved AMDAL and relevant permits granted for Tangguh.

Tangguh recorded cumulative project-to-date man-hours of approximately 93 million, and a Days Away From Work Case (“DAFWC”) rate of 0.02 from early 2005 until end of October 2009. There is no DAFWC during this reporting period.

## **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 April – October 2009 which is consistent with Tangguh 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 **April – October 2009** include the following:

#### **1.1.1. Gas Production Facilities – Platforms:**

The drilling program has been completed for both VR-A and VR-B platforms and reported in the previous reporting period. A total of nine wells were planned to be drilled from the VR-B platform but only eight reached to the production zone. Six wells from the VR-A platform have been completed as planned. These platforms have been in service already to supply gas to LNG plant onshore.

#### **1.1.2. Gas Transmission – Pipelines**

Two offshore subsea pipelines, one from each platform, have been installed to transport the multiphase flow from the VR-A and VR-B to the LNG plant onshore. These two pipelines will ensure reliability of supply, which is a critical consideration for Tangguh and its customers. Both gas transmission pipelines have been brought into service.

#### **1.1.3. 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 (KBR), Japan Gas Corporation (JGC), and PT Pertamina. 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, communication facilities, power generation, and waste management facilities.



**Tangguh LNG Facilities Overview**

At the end of October 2009, the overall LNG project progress stands at about 99% complete with construction workforce numbers at about 850 personnel which were accommodated at the Step 3 camp. The workforce continues to decrease throughout 2009 as construction approaches completion. At the same time, approximately 1100 operations personnel are already on site and accommodated at the dormitory A and B and Step 3 camp (Matoa camp).

Most of the supporting facilities have been completed and handed over to BP, including waste related facilities such as composter, wood chipper and wastewater treatment plants.



**Process Train and Utility**

LNG production commenced on 14 June 2009 from Train 1, with first export achieved on 6 July 2009 using Tangguh Foja ship. First export shipment of condensate was achieved on 14 June 2009. Train 2 started LNG production at end of September 2009. Train 1 was shutdown in August for resolution of technical issues, and re-started in mid-October 2009. During this reporting period, four LNG and three condensate shipments have been sent to customers.

During this reporting period, Tangguh's major achievement in term of production is the shipment of five LNG and three condensate cargos to customers. First LNG shipment (to POSCO) was achieved on 6 July 2009 using Tangguh Foja LNG carrier, while the first shipment of condensate (using Ocean Crimson tanker to Singapore) was achieved on 14 June 2009.



**LNG Tanker Tangguh Foja**

During the start-up period, hydrocarbon and emulsion carried in the produced water were found, resulting in a higher hydrocarbon concentration than the AMDAL and permitting requirements. Phenol and COD concentrations were also found higher than

the estimation during design phase. Current design does not include equipment to treat phenol and COD to be in line with discharge requirements. Temporary treatment unit is now in use on site, while preparing for the long term permanent solution. Close communication with BPMIGAS and the Ministry of Environment is maintained.

As part of start-up process, some gas has to be flared with an early estimate of 200,000 tonnes feed gas (equal to 9,842 MMSCF feed gas) as referred in the AMDAL. Prior to start up, Tangguh conducted a re-estimation of the flaring, which resulted in a new estimate of maximum 704,655 tonnes feed gas (equal to 34,675 MMSCF feed gas). This estimate was higher than the AMDAL estimate and has been formally communicated to the Ministry of Environment (MoE) at the end of 2008. The MoE requested Tangguh to implement efforts to minimize emission during start up as well as to conduct management and monitoring of the start up activities. Despite efforts to manage start-up activities, some technical issues were experienced recently; hence the maximum amount of 34,675 MMSCF might be exceeded. This has been communicated to MoE on early October 2009. BP will continue to implement efforts to minimise flaring activities; and volume of gas flared. Flow meter has been installed on the flare and monitoring of ambient air quality has been done on a regular basis.

Site activities for the next several months will focus on completion and hand over of Train 1 and Train 2

#### **1.1.4. Marine Facilities**

The Combo Dock is fully operational allowing access to LNG site for loading and unloading equipment and material. The helideck, which is attached to the Combo Dock trestle, is complete and has been certified by DGAC (Directorate General of Air Communication), Transportation Department in March 2008. The helideck will be utilized for emergency purposes only. For non emergency use, the current onshore based helipad will still be used for air transport using the helicopter.

#### **1.1.5. Resettlement-Related Construction Activities**

There was no new construction activity in Tanah Merah and Saengga. See parallel Operator's LARAP Report for details.

#### **1.1.6. Tangguh Plant Property Perimeter Fence**

Construction of the 24 km long Tangguh LNG Plant property perimeter fence was completed in May 2006. Security patrols are conducted on regular basis using the local guard force employed by KJP. Some parts of the perimeter fence are currently inaccessible and maintenance plan has been developed.

#### **1.1.7. Seismic Activities**

A seismic program was carried out from December 2008 – July 2009 for Western Berau Block at West of Bintuni Bay area in the Fakfak Region, West Papua. The Environmental Management and Monitoring Effort Document (UKL/UPL) required by the applicable Indonesian regulation for the program has been approved by Ditjen Migas in December 2007. The seismic survey was done based on Ocean Bottom Survey (OBS) technology,

where sensor cables were laid on the seabed. The energy source of the seismic wave is provided by airgun. The environmental and social management and monitoring programs for this seismic activity were implemented as per the approved UKL/UPL, Tangguh Marine Mammal and Marine Reptile Guideline and the JNCC (Joint Nature Conservation Committee) guideline was also implemented to minimize acoustic impact to marine mammals. The report of the UKL/UPL implementation has been submitted to Ditjen Migas and the relevant government institutions as required.

#### **1.1.8. Status of Key Permits**

Tangguh is required to have permitted vessel to transport hazardous waste for disposal to the certified waste treatment facility (PPLI) at Bogor. The transportation permit for the LCT has been issued by Department of Sea Transportation no PK.694/2/10/DK-09 dated 3 September 2009 and valid for one year.

All other environmental related permits have been approved by Ministry of Environment, and reported in previous periods.

## **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 as well as the preparation of the Operations phase.

Environmental training and socialisation continued for Tangguh operations and 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 onshore GPF activities are completed. There is essentially no more construction activity on the GPF area. The VR-A and VR-B platforms, and the two subsea pipelines are now in operation. The platforms are normally unattended platform, however, routine monitoring/maintenance visits are required.

### **1.2.2. Gas Transmission - Pipelines**

The onshore GPF activities are fully completed.

### **1.2.3. Drilling**

Drilling activity was completed as outlined in the previous report. DCRI (Drilling Cutting Re-Injection) was successfully implemented for the management of drilling mud and cutting generated from the drilling of 15 wells at VR-A and VR-B. The remaining hazardous waste from the drilling activities has been shipped off site to PPLI in July 2009. Shore base facility has been handed over to BP Operation including the hazardous waste incinerator previously operated by drilling contractor. The incinerator is currently not in operation, pending permit extension approval from the Ministry of Environment. The hazardous waste from Tangguh construction and operation is currently collected and stored temporarily for later disposal to PPLI. Once the permit extension is granted from MoE then the incinerator will be used for burning used oil, contaminated rags, medical waste and other hazardous waste suitable for incineration.

### **1.2.4. Tangguh LNG Plant**

The environmental management efforts continued on slope stabilization and re-vegetation, waste management, water supply, management of surface water run off, fuel and chemical storage and handling, and emission and ambient air monitoring.

### **A. Slope Stabilization and Re-vegetation**

By end of October 2009, the majority of site revegetation work (111 ha) is completed leaving about 29 ha flat area for revegetation with cover crop only. The flat area is currently still utilized for temporary facilities which include laydown, step 3 camp, and construction office. Some of these facilities are currently being dismantled and the area is being restored prior to revegetation. This flat area will be the focus for the remaining revegetation program expected to complete in 4<sup>th</sup> Q 2009.



**Re-vegetated Plot**

Responding to the Tangguh Lenders' External Panel recommendation raised during the regular environmental compliance monitoring visit in March 2009, Tangguh improved its erosion management in the construction vicinity area (at Burma Creek) where some dying trees are found possibly due to sedimentation. KJP is improving its erosion management efforts to minimize sedimentation on the drainage as well as nearby downstream area. A bigger sediment pond has been constructed to prevent sediment flow into the forest and regularly cleaned to remove sediment. Concrete piles were installed along the temporary drainage bank to prevent erosion and sediment flows into the drainage and subsequently flow into the forest. To further improve the erosion management at the Burma Creek, a consultancy firm is hired to conduct review and provide recommendation. The progress will be provided in the next reporting period.



**Sedimentation Pond**

## **B. Waste Management**

### **Solid Waste**

In line with the completion of the construction phase the volume of construction waste is also substantially decreasing. The waste management has been gradually handed over from KJP to BP along with some supporting waste management facilities starting 1 September 2009. Currently BP is already starting the operation of the non-hazardous waste incinerator, wood chipper machine and composter.

The waste management program at the LNG Plant site continues to improve. The program covers the organic and inorganic waste as well as hazardous waste, such as used oil, used batteries, etc. In addition to waste generated from LNG construction activities, BP operation is also generating waste from the current operation activities. BP operation is now responsible to manage the waste generated from the Shore Base activities, Dormitory A and B, Administration and Central building activities, including the waste generated from LNG plant activities, while KJP is responsible for the waste management of the remaining LNG construction activities which is decreasing significantly compared to the previous reporting period.

The waste segregation criteria and the waste disposal routes are explained below:

1. **Hazardous waste** (used oil, oil filters, paint cans, batteries, oily rags, aerosol cans, contaminated soil/materials, etc) generated from BP Operation activities is delivered to BP Temporary Hazardous Waste Storage prior to shipment to licensed hazardous waste collector (PPLI) in Bogor. BP Operation has a contract in place with PPLI for hazardous waste disposal, including onsite assistance in the packaging and labeling of the hazardous waste prior to transportation to Bogor. The first shipment of the hazardous waste from BP operations to PPLI was done in early September 2009.  
Hazardous waste generated from LNG construction activities is still managed by KJP under the control of the KJP's Environmental section, including regular shipment to PPLI's facility in Bogor. The waste is regularly transported to PPLI. The last shipment was in mid September 2009.
2. **Landfill waste** which includes damaged cement bags, rock wool, styrofoam boards, small scrap metal & cables, asphalt drums, HDPE-sheets is still disposed into KJP operated onsite non-hazardous landfill, including the waste generated from BP operation. The new KJP non-hazardous landfill has been in service to accommodate the waste from remaining construction activities as well as from the BP Operation activities. The landfill has been completed with HDPE liner and proper storm water management system to minimize any surface run off flow into the landfill.
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/cartons are stored in a container next to construction jetty for regular shipment to the non-hazardous waste collector in Sorong.
5. **Construction timber waste**. An intensive program has been implemented to manage timber waste generated from construction activities mainly from equipment packaging. A wood chipper machine is used to chip the timber waste. The wood chipper machine has been handed over to BP and is operating on continuous basis to chip the timber waste. The wood chip is utilized for covering the organic waste pit and for composting and revegetation program. BP through the logistic contractor provides a dedicated team to operate and segregate the timber waste for chipping.
6. **Food waste**. Majority of food waste is processed in the onsite composter however small amount is still disposed into waste pits such as fat oil and grease. The report from lenders, as well as regular inspections by the MoE have resulted in recommendation to improve the practice on the food waste management. KJP has engaged with PPLI as their waste management consultant. Per the input from PPLI, KJP is constructing a new sanitary landfill. At the end of October 2009, the earthwork activities (pit excavation, grading, compacting, sloping and HDPE sheet installation) have been completed. The waste from the existing waste pits is being removed into the new landfill. The new landfill is equipped with 6 monitoring wells, in line with AMDAL requirement.



**Sanitary Landfill Construction**

The composter has been operating under BP since 1st September 2009 to compost food and organic waste generated from construction as well as from the dormitories and office complex operated by BP operation. The composter produces about 15,000 kg/month of compost to be used for revegetation and landscaping program as planting media and fertilizer.

7. **Combustible waste** (paper, carton, wood chips etc) is transported to non hazardous waste incinerator for burning.

Regular monitoring is conducted at the waste collection and storage points within Tangguh site and 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 inspections are also conducted on CWAA, landfill and incinerator.

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**

Wastewater generated from the site activities consists of sewage from camps and dormitories, brine water reject from the Reverse Osmosis (RO-desalination) and desalination units, and waste water from plant operation (chemically contaminated water, oily water and produced water). The permanent desalination facility is operated to supply water to dormitories and office complex (administration, central, warehouse, fire office and workshop) while the RO unit supplies the water to step 3 camp.

Sewage from dormitory A and B as well as from Admin building and Main Control Building is processed in the permanent STP, while the three STPs in Step 3 treat sewage from Step 3 Camps and other construction related buildings. The treated waste water from both construction STP and permanent STP is discharged to -13m LAT outfall line at the LNG jetty.

Since last reporting period the BOD levels of treated sewage effluent from the accommodation camps has been continuously maintained within the standard of 100mg/l consent level as required by the MoE regulation No 112 Year 2003 and wastewater discharge permit No 222 Year 2008.

KJP has handed over the operation of the onshore Reverse Osmosis (RO) desalination facility to BP. The facility produces an average of 1,700 m<sup>3</sup> per day of desalinated water and reject brine water of about 4,800 m<sup>3</sup>.

During the start-up period, hydrocarbon and emulsion carried in the produced water were found, resulting in a higher hydrocarbon concentration than the AMDAL and permitting requirements. Phenol and COD concentrations were also found higher than the estimation during design phase. However, current design does not include equipment to treat phenol and COD to be in line with requirements in the MoE permit No 222 Year 2008. Tangguh has prepared a plan to treat these phenol and COD which is implemented in several stages. The short term plan has been implemented in which temporary filtration units have been installed, combined with biological treatment in STP zone B at Step-3 camp. During the start up period, we experienced some deviation from the limit as the bacteria in the biological unit needs to be acclimatized. The system is rigorously monitored to prevent deviation for extended period. Progress update is provided to BPMIGAS and MoE on a regular basis.

For the long term, a permanent produced water treatment system is being designed and planned to be constructed in 2010 to be in service by end of 2010 or early 2011. The permanent system will be a combination of hydrocarbon/water separation (dissolved air floatation system), biological treatment unit (activated sludge system) and polishing unit (filtration system).

### ***C. Water Supply***

Fresh water supplies required for project activities is secured from several sources including bottled water, temporary RO facility and the permanent desalination facility. The average water production of the RO is 1000 m<sup>3</sup>/day while the permanent desalination facility is 750 m<sup>3</sup>/day which gives the total production of 1750 m<sup>3</sup>/day.

Drinking water is treated by a filtration system of sand and sometimes carbon filters and chlorination. Some treated sewage effluent from the STP's is used for regular dust suppression.

Monitoring of the pH from the drainage outlet on the Tangguh Shorebase shows that the result continuously meets the baseline range of 5-9. It is considered that the pH is already back to natural condition. However regular monitoring is continuously performed to ensure that the water from the outlet meeting the standard and baseline.

### ***E. Fuel and Chemical Storage and Handling***

The project's policy is to confine all fuel and liquid chemical storage in retention berms/secondary containment to prevent against the risk of spill contamination to the soil. The standards for the containment are being monitored periodically for compliance through internal audits and inspections.

Drip pan trays are used during maintenance and refuelling and personnel involved in these activities have been properly trained. Posters are strategically placed to maintain awareness on proper refuelling and maintenance procedures. 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.

The focus on the storage and handling of chemicals and oil used for construction and commissioning activities is continuing. Any deficiencies identified in the storage of these products are immediately directed to KJP. Any deficiencies found within operation activities are directed to relevant department within BP Operation.

During the period of reporting, there was only one significant hydrocarbon spill incident of more than 15 barrel, which occurred in June 2009 when Recovered Oil Tank spilled over via its overflow pipe work. At the time of this overflow the drain tundish immediately below the overflow piping that should have routed the overflow back to the Oily Water System was sealed by a plug. Consequently the condensate spilled to grade around the tank. The total quantity of condensate spilt was estimated to be about 17 bbls of condensate. The condensate spilled to soil/gravel around the tank and immediate

actions were taken by isolating the source of spill to prevent the spill reach the drainage. The impacted soil/gravel is removed. The waste from this spill, including the contaminated soil/gravel is handled as hazardous waste and sent for disposal to PPLI.

### ***F. Emission and Ambient Air Monitoring***

Air monitoring program has been performed as per the AMDAL requirement. Sampling of emissions and ambient air for this reporting period was conducted by the external accredited laboratory, Sucofindo. Samples for air emission were taken from the electric diesel generators, hazardous waste and non hazardous waste incinerators, and boiler. For ambient air, samples were taken from several locations within the site such as step 3 Camp, utility, flare and hazardous waste areas. The result of monitoring activities conducted in May 2009 shows that all parameters were in compliance with relevant Indonesian regulation (Kep-13 of 2009 for emission air and PP 41/1999 for ambient air) as well as Tangguh LNG project standard as stipulated in the AMDAL.

#### **1.2.5. Marine Facilities**

The environmental management for marine facilities focused on actions to prevent oil spills for all marine construction activities and management of waste disposal from offshore vessel operations.

##### ***A. Oil Spill Mitigations***

Regular oil spill drills are conducted to ensure readiness for responding to an oil spill incident. Discussions and assessments were conducted after the completion of each drill to identify lessons learnt for further improvements required to sharpen the skills of the response team.

As the project moves from construction to operation phase, the Oil Spill Contingency Plan (OSCP) has to be updated to reflect the needs in the operation phase. The update has been completed in February 2009.

##### ***B. Waste Management for Vessels Operations***

Vessel activities are to support the project personnel transfer from Combo Dock to various ports in Indonesia, Bintuni as well as to support the LNG and condensate export.

The marine waste management covers liquid and solid domestic waste as well as hazardous waste, if any. The liquid domestic waste is managed according to the AMDAL and MARPOL requirements. The solid non-hazardous waste is transferred to shore for disposal to landfill, incineration or further disposal to offsite waste collector 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 (PPLI) for disposal.

### **1.2.6. Seismic Activities**

A seismic program for Western Berau at West of Bintuni Bay area in the Fakfak Region, West Papua was performed from December 2008 to July 2009. The seismic survey is done based on Ocean Bottom Survey (OBS) technology, where sensor cables were laid on the seabed. The energy source of the seismic wave was standard seismic airgun.

Environmental monitoring and management program is being managed in line with the requirements of UKL/UPL which was approved by Ditjen Migas in December 2007. Waste management refers to the MARPOL guideline. Solid wastes are segregated and brought to disposal facility at Sorong for further handling. Domestic wastewater is treated on barge prior to discharge in line with MARPOL. As required by UKL/UPK, seawater was monitored before seismic activities to obtain baseline data, and during the seismic period. The results show that the seawater condition during the seismic condition is basically the same with the baseline data.

Tangguh Marine Mammal and Marine Reptile Guideline and the JNCC (Joint Nature Conservation Committee) guideline is also implemented to minimize acoustic impact to marine mammals. Soft start method is applied prior to seismic airgun activities. If during airgun shooting, marine mammals are spotted within 500 m, the shooting is stopped and continued after the area is clear. During the reporting period, the shooting activities were stopped twice to allow marine mammals to swim away from the seismic area.

The UKL/UPL implementation report has been submitted to Ditjen Migas in June 2009, with the next reporting due in December 2009.

### **1.2.7. Operations**

A number of environmental contracts and programs are already in place. Currently there are several contracts in place and being executed including the ISO-14001 EMS development, waste management study to include design of operation sanitary landfill, environmental monitoring contract as well as hazardous waste management and disposal to PPLI.

The draft design of operation sanitary landfill has been obtained from the consultant and is being reviewed. The current plan is to have KJP constructing the landfill with expected completion date by end 2010.

KJP has handed over some temporary waste management facilities to BP Operation as outlined in the previous section. The facilities include non hazardous waste incinerator, wood chipper and composter located at Central Waste Accumulation Area (CWAA) #2. The transition from KJP to BP was very smooth and now BP Operations performs all day-to-day operation activities of the facilities.

### 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 environmental management and monitoring programmes are being implemented in line with the approved AMDAL and Lenders E&S requirements. Improvement in environmental performance is evident in many areas. Internal audits and inspections are regularly performed and findings and actions to close these out are recorded in a tracking system to check compliance to the AMDAL and relevant regulations. Discussions are conducted with contractors on a weekly basis to update them on any issues or concerns and agree the way forward for continuous improvement.

Preparations for environmental management and monitoring for the Operations phase are ongoing. This is to ensure smooth transition from construction to the Operations phase and to ensure that the existing best practices implemented during the construction phase are carried forward. The development of the plan also includes identification of potential gaps as early as possible and the implementation of corrective measures.

Environmental training and socialisation are conducted for contractors' as well as BP operations 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.

#### 1.3.2. Health and Safety Performance

##### Safety

Key indicators on safety performance are presented in the table below.

**Table 3. Safety Performance Key Indicators**

HSE Performance	2009 Plan	October - 09	YTD 2009	Project YTD (since Mar'05)
<b>Fatality</b> (Number of Cases)	0	0	0	1
<b>HiPO</b> (Number of cases)	Monitored	0	2	6
<b>DAFWF</b> ([Number of cases x 200,000]/Total man-hours)	0.03(2)	0	0.00	0.02(8)
<b>RIF</b> ([Number of cases x 200,000]/Total man-hours); (number of cases)	0.29(19)	0	0.08	0.22(103)
Tangguh Project man-hrs.	12,885,240	698,190		92,755,765

worked			9,520,258	
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Note:

- HiPO = High Potential
- DAFWF = Day Away from Work Frequency
- RIF = Recordable Injury Frequency
- SOC = Safety Observation & Conversation

The project has recorded approximately 93 million work hours from the start of work in March 2005 with the average of 3000 project personnel employed in the field on a monthly basis. There is no DAFWC during this reporting period.

The subcontractor workers and KJP’s staff who completed the construction activities are in the process of demobilization. Therefore, the safety campaign continues with the topic of “**Safe To The End**”. The content of the safety campaign address potential safety risks during the ending period of Tangguh project where normally workers often face a lack of focus to carry out their jobs safely.

BP HSE operations is preparing the transition of site HSE Management from KJP (e.g. ID issuance, training, FRC, Administration, Plant access control, 8 Golden role socialization, Zero tolerance socialization, Training facilities such as Work at Height, Confined Space Entry, Driving).

Starting October 2009, BP Operations HSE separates the incident report at BP Tangguh sites into two categories Process Safety and Personal Safety Incidents. There were five incidents in October related to Process Safety including 4 Loss of Primary Containment and 1 property damaged cases. On Personal Safety, there were 14 incidents related to personal safety (including 1 diarrhea case) and 5 incident cases related to driving especially during reverse moving (parking). Immediate actions related to the incidents have been taken to response and prevent for the similar incident.

**Health.**

Implementation of health program is continuing including the monitoring of related health issues such as noise, heat stress etc on worksite as well as program to ensure the healthiness of the personnel which cover regular medical check up, etc. Tangguh Clinic has been set up and already in operation, assisted by Medika Plaza as the Clinic operator. The Clinic has received formal license from Health Department. Health related procedures have been developed and implemented. Regular drills have been performed as well particularly on medical evacuation and mass casualties’ response.

**1.3.3. Environmental Management System**

The ISO 14001 EMS development has commenced since August 2008 with the preparation of aspect and impact register. The register has been completed and approved. A series of training on ISO 14001 has been conducted and more training will be provided to relevant personnel within operation organization. Up to October 2009,

more than 500 BP operations and contractor personnel have participated in the training sessions. Environmental Management System Manual and procedures are also completed. The formal launching of ISO14001 implementation was performed in July-August 2009, marking the milestone of the ISO14001 implementation and later certification in 2010. BP supported by ISO14001 consultant PT Surveyor Indonesia (PTSI) are currently performing extensive training, socialization and coaching to ensure compliance of the operation activities to ISO14001 standard.

As required by the AMDAL, the target for the certification of ISO 14001 is one year after hand over from construction to BP operation.

#### **1.4. Summary of New Major Environmental Regulations during the Reporting Period**

During the reporting period, the government issued a new Law no 32 year 2009 regarding the Environmental Protection and Management, replacing Law no 23 year 1997 regarding Environmental Management. There is a one year transition period of this new law until related implementation regulations completed and put in place by the government.

#### **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 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**

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.

Based on the Fifth Compliance Monitoring Report by External Panel, there is one Level 1 Non Compliance which is the organic waste pit(s) operation does not comply with AMDAL requirements and commitments.

The corrective actions taken by the Project in response to the above finding are explained below:

KJP has engaged with PPLI as their waste management consultant. With the recommendations from PPLI, KJP is constructing a new sanitary landfill. As of end October 2009, the earthwork activities i.e. pit excavation, grading, compacting and sloping has been completed and HDPE sheet installation, have been finalized. The waste from the existing waste pits is starting to be removed into the new landfill. The new landfill is equipped with 6 monitoring wells, in line with AMDAL requirement.

### **1.7. Other Relevant Information**

The Lenders, Lenders' External Panel and Lenders' Consultant jointly visited Tanguh LNG site in the month of November 2009. The report will be issued in Q1 2010. Based on the close-out report discussion, no major issue (Level-1 and Level-2 non-compliance) related to Health, Safety and Environment was noted. Some recommendations for improvement have been provided to BP, such as related to the sedimentation issue in the Burma creek area, and hazardous material management.

### **2. Level 2 Non Compliance Matrix**

There were no environmental incidents categorised as Level 2 Non Compliance during this reporting period.