



Environmental and Social Monitoring Report

Project Number: 38919
April – October 2010

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 2010

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TANGGUH LNG PROJECT

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EXECUTIVE SUMMARY

Tangguh has been moved from construction to operation phase since July 2010. LNG production efficiency was successfully ramped up and Tangguh has delivered 72 LNG cargoes and 17 condensate cargoes to the customer for the period of January-October 2010. Minor construction activities are still on going in Tangguh to complete some supporting facilities, such as waste water treatment plan and camp facility upgrade.

On 25th October 2010, Tangguh issued the AMDAL Implementation report for the period of April-October 2010) to the Minister of Environment (MOE) and related government institutions including the local Government of Bintuni, Ditjen MIGAS and BPMIGAS. This report is developed mainly based on the AMDAL implementation report.

The EMS implementation is ahead of target to achieve ISO 14001 certification from Q1 2011 now to December 2010. Main certification audit was conducted by certification body in the third week of October 2010, with no major finding, 5 minor findings and 13 observations. All of the findings and observations have been closed and reported to the auditor by mid of November 2010. The ISO 14011 Certificate is granted to Tangguh on 9 December 2010.

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

Strong focus remains on all HSE aspects. Tangguh is now fully conformed to the BP Control of Work (CoW) Group Defined Practices (GDP). The operation has now moved into the continuous improvement stage of the BP COW GDP. An impressive quarter on the personal safety front with no injuries recorded across the Tangguh in 2Q. There were two recordable injuries in Tangguh in Q3. Both incidents have been thoroughly investigated and lessons learned have been circulated internally.

1. Regulatory Compliance

1.1. Summary Description

As a follow up to the issuance of the new Law no 32 year 2009 regarding the Environmental Protection and Management, Government of Indonesia (GoI) is now developing related implementation regulations including AMDAL and Environmental Permitting regulations and these are expected to be issued within the next reporting period. A series of new regulations have been issued, and the ones most related to Tangguh are :

- a. Ministry of Environment Decree no 1 year 2010 regarding Water Pollution Prevention
- b. Ministry of Environment Decree no 13 year 2010 regarding Environmental Management and Monitoring Efforts (UKL/UPL) and Commitment Letter regarding Ability to Conduct Environmental Management and Monitoring (SPPL).

1.2. Implications for Tangguh

The new Law no 32 year 2009 is stricter in term of pollution definition and consequence for non-compliance. Tangguh maintains its commitment to comply with the applicable regulatory requirements in Indonesia.

Based on the new Law and the new regulations, the local government now has more active roles, such as approval of UKL/UPL, SPPL, and wastewater discharge to water bodies permit.

2. Environmental Management Plan

This six-monthly report covers the period of April-October 2010 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.

Tangguh E&S project construction activities during the 6 month period from **April - October 2010** include the following:

2.1. LNG Plant and its Supporting Facilities including Marine Facilities

Tangguh has moved into operation phase since July 2010. Approximately 2,000 operations personnel are on site and accommodated at the dormitory A and B and Step 3 camp. LNG production efficiency was successfully ramped up and Tangguh has successfully delivered 72 LNG cargoes and 17 condensate cargoes to the customer for the period of January-October 2010.



Figure 1. LNG Plant and its Supporting Facilities, with LNG Tanker in the Foreground

To support the operation of Tangguh LNG, currently there are some projects on going such as the construction of the wastewater treatment plant, camp upgrade and plant debottlenecking.

2.1.1. Wastewater Management

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 treated wastewater from the five streams is discharge through -13 m LAT discharge point.

Wastewater	Maximum Debit (m ³ /day)*	Average Actual Debit (m ³ /day)
Sewage	504	200
Brine water	11544	1300
Produced water	1992	600
Oily contaminated water	2400	**
Chemically contaminated water	3600	500

* MoE Wastewater Discharge Permit no 222/2008

** CPI effluent is routed to produced water system due to COD content, so there is no discharge for oily contaminated water

Sewage

Sewage from dormitory A and B as well as from Admin building and Main Control Building is processed in the permanent STP, while two STPs in Step 3 (Zone A and Zone C) treat sewage from Step 3 Camps and other related buildings. One STP (Zone B) has been dedicated solely to treat produced water from plant since January 2010. The treated waste water from both ex construction STPs and permanent STP is discharged to -13m LAT outfall line at the LNG jetty. Since last reporting period the treated sewage effluent from the accommodation camps has been continuously maintained within the standard as required by the MoE Wastewater Discharge Permit no 222 year 2008 for all parameter (pH, BOD, TSS and oil&grease).

Brine 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. Average volume of water generated from desalination plant is approximately 1000 m³/day and average brine water discharge is about 1500 m³/day. The brine water discharge meets the required standards on +/-5% salinity of seawater within 30 meter radius from discharge point as required by the MoE Wastewater Discharge Permit no 222 year 2008.

Produced water

As informed in the previous reporting period, the short term plan to treat produced water has been implemented in which temporary filtration units have been installed, combined with aeration pit and biological treatment in STP zone B at step 3 camp.

As follow up action regarding concern on the performance of temporary facility, and following BPMIGAS and MOE guidance, Tangguh proposed MP3 (Mekanisme Pembinaan Penuaan PROPER - PROPER Compliance Assistance Mechanism) to MoE through letter no. 2347/BPMIGAS/Berau/06/2010 and subsequently letter no 099/MNLH/Berau/09/2010 requesting MoE to consider using the load-based factor COD, Phenol and NH₃-N standard of the temporary unit until the completion of permanent produced water treatment unit at the end of 2011. The proposed emission loading calculated based on the daily record of the actual produced water discharge and estimated discharge up to the end of 2011, which also supported by the modeling result to ensure the minimum impacts on environment. MoE has responded Tangguh's request by issuance of letter no B-7088/MENLH/09/2010, which approve the use of maximum load factor instead of concentration as the standard for COD, Phenol and NH₃ until the completion of the permanent treatment unit. The approved loading limit is Phenol 24 kg/month, COD 7500 kg/month, NH₃-N 55 kg/day and 480 kg/month. MoE also instructed Tangguh to regularly report the performance of the produced water treatment unit and to complete the construction of the permanent produced water treatment by December 2011.

As mentioned in the previous report due to capacity limitation of the temporary produced water unit against the volume of produced water generated from the plant, some of produced water had to be contained in a temporary pond and once the pond is full, the produced water had to be shipped off site for treatment. During this reporting period Tangguh has performed another three shipments of produced water for further treatment in PPLI. The second, third and fourth shipment to PPLI was performed at the end of April ($\pm 4000 \text{ m}^3$), May ($\pm 4000 \text{ m}^3$) and early September 2010 ($\pm 4000 \text{ m}^3$) respectively.

The construction of permanent produced water treatment unit is in progress. Piling for equipment foundation has been completed and now concrete pouring for foundation is ongoing. The permanent unit is expected to complete prior to end 2011.



Figure 2. Commence Bottom Plate Erection of Tank TK-34

As required by the MP3, Progress update is provided to MoE, BPMIGAS and MIGAS on a quarterly basis.

Oily contaminated wastewater

The oily contaminated wastewater is treated in the CPI (Corrugated Plate Interceptor) to remove hydrocarbon as per MoE permit no 222/2008, prior to discharge to the -13 m LAT discharge point. However, based on the design basis in Tangguh, the oily contaminated sewer also receives wastewater from production system such as from Amine unit, causing high level of COD, hence from CPI can not be discharged directly to the sea. The wastewater is currently put into the produced water tank to be treated with the produced water.

Chemically contaminated wastewater

The chemically contaminated wastewater is treated in the neutralization pit to normalize the pH level between 6-9 as per MoE permit no 222/2008 and then discharge through the -13m LAT discharge point. The average discharge from this source is about 500 m³/day with pH level within 6-9 range.



2.1.2. Solid Waste Management

The volume of solid waste is continuing to decrease along with the completion of construction phase and the steady state operation. The weekly solid waste generated from day to day operation is about 30 m³/week in average compare to last period of reporting which is about 150 m³/week due to reduced workforce on site. The solid waste management facilities in Tangguh include the operation of the non-hazardous waste incinerator, wood chipper machine and composter, plastic shredder and can compactor, temporary hazardous waste storage and disposal as well as the operation of ex-KJP inert landfill and new organic waste landfill. The waste profile generated during this reporting period is presented in Monitoring Section below.

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 management, such as, used oil, used batteries, oily sludge and carbon active waste from plant operation etc. The Tangguh LNG **Logistics** department is now fully responsible to manage the waste generated from Shore Base activities, Dormitory A and B, Administration and Central building activities, including the waste generated from plant activities.

The Hazardous waste (used oil, oil filters, paint cans, batteries, oily rags, aerosol cans, contaminated soil/materials, etc) generated from Tangguh LNG activities is delivered to an on site Temporary Hazardous Waste Storage prior to shipment to licensed hazardous waste collector (PPLI) in Bogor. The temporary storage facilities is permitted under MOE Permit No 858 year 2008. Tangguh LNG has a contract in place with PPLI for hazardous waste disposal, including onsite assistance for packaging and labelling of the hazardous waste prior to transportation to Bogor. Regular shipments have been performed to meet the maximum 90 days of storage period per the permit requirement. For the reporting period, there were six shipments of hazardous waste to PPLI since April 2010 with the last shipment in September 2010.

The landfillable waste (damaged cement bags, rock wool, styrofoam boards, small scrap metal & cables, asphalt drums, HDPE-sheets) is disposed into ex-KJP non hazardous inert landfill which is now managed by Tangguh LNG. The landfill has been completed with HDPE liner and proper storm water management to minimize any surface run off flow into the landfill. The landfill is also provided with groundwater leachate monitoring.

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

Recycleable waste, such as, food/drink cans, plastic bottles, glass bottles cardboard/carton is stored in the CWAA for further process, such as shredding and compacting to reduce volume, prior to regular shipment to the non hazardous waste collector at Sorong. Recycling of these wastes is performed to some extent in

this Sorong facility.

The wood chipper machine is operating on continuous basis to chip the timber waste. The wood chip is utilized for covering the organic waste pit and later for new organic landfill, as well as for composting and revegetation program. A dedicated team working through Logistic Contractor is hired to operate and segregate the timber waste for chipping.

The operation of organic waste landfill continues to improve. Dedicated personnel are assigned to manage and monitor the day to day operation of the landfill.



Figure 3. Organic Waste Landfill

It is initially estimated that the current organic waste landfill can be used up to Q4 2011. Currently Tangguh is in the process to develop the program for provision of long term sanitary landfill for operation phase. Detail design and bidding process is at the final stage. The construction of the landfill is expected to be finalized by Q1 2012. To increase the utilization time of the organic waste landfill, a continuous improvement program was initiated to include the improvement of composter efficiency which will increase the food waste feeding hence reducing food waste disposal into the landfill.

The first phase of the program was to investigate the improvement on feeding composition to the composter. The initial composition consisted of food waste and wood chip with 1:2 ratio. Trial effort was performed to find suitable composition which will increase the food waste feeding. Ash from non hazardous incinerator was selected and mixed with food waste and wood chip. The composition was then reformulated to be food waste, wood chip and incinerator ash with ratio of 1:1:0.5 and applied for about two weeks. The ratio was then modified gradually to be 1:1:1 and then 1:1:2 which applied for two weeks period for each ratio respectively. The program indicates a significant increase of food waste feeding into the composter for about 20%. With the program, the composter produces approximately 18,000/month kg compare to the previous reporting of about 15,000 kg/month of compost. The compost is used for revegetation and landscaping program as planting media and fertilizer.

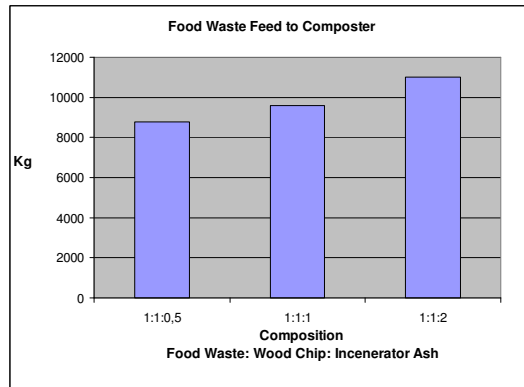


Figure 4. Food Waste Feeding into Composter

2.1.3. Revegetation

The revegetation within Tangguh site have been growing well. Regular maintenance is performed to ensure the vegetation can grow and sustain naturally. Maintenance is continuing until all revegetation sustain back to its natural condition.



Figure 5. Maintenance of Revegetation

The remediation of Siripa creek has been completed as informed in the previous reporting period and now the area is back to its natural condition. Monitoring is continuing to ensure that the area is sustained and fully recovered.



Figure 6. Siripa/Burma Creek

2.1.4. Air Emission

Tangguh has proposed MP3 to MoE for air emission monitoring through letter 0092/MNLH/Berau/05/2010 with the purpose to improve emission monitoring from the LNG plant facility. Tangguh submitted as well letter no 0096/MNLH/Berau/05/2010 regarding the estimate maximum flaring during normal operation of 8,900 MMSCF from July-December 2010 and 17,800 MMSCF in 2011. Per MoE letter no BP-5590/Dep-I/LH/07/2010, MoE has approved Tangguh’s updated maximum flaring figure for operation phase which was effective since 1 July 2010. In the letter, MoE has also requested Tangguh to closely monitor flaring number as well as conduct reduction efforts. Up to the end of October 2010, the volume of gas flared is 3,614 MMSCF and it is predicted that the flaring will be within the maximum figure of 8900 MMSCF up to December 2010. Tangguh has been performing continuous monitoring and effort to reduce the flaring. The monthly flaring has been decreasing from 1123 MMSCF in April 2010 to be about 665 MMSCF in September 2010. The effort in reducing the flaring is continuing to minimize impact to the environment, with the target of 5% reduction from the 2011 number of 17,800 MMSCF.

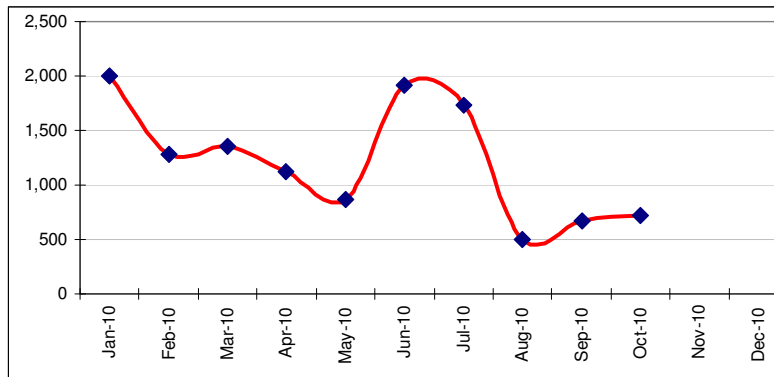


Figure 7. Flaring during Operation Period

Actual CO2 emission from Tangguh activities from January-October 2010 is 3.8 million tonnes. The source of the emission are the LNG plant operation (flaring, turbines, boilers, Acid Gas Incinerator, etc) and smaller portion from internal combustion engine emission calculated based on fuel consumption used for vehicle, boat, vessel and other equipments using diesel/gasoline fuel. The total number for 2010 is expected to be lower than the initial estimate of about 6 millions tonnes. The CO2 emission is expected to be lower during stable operations.

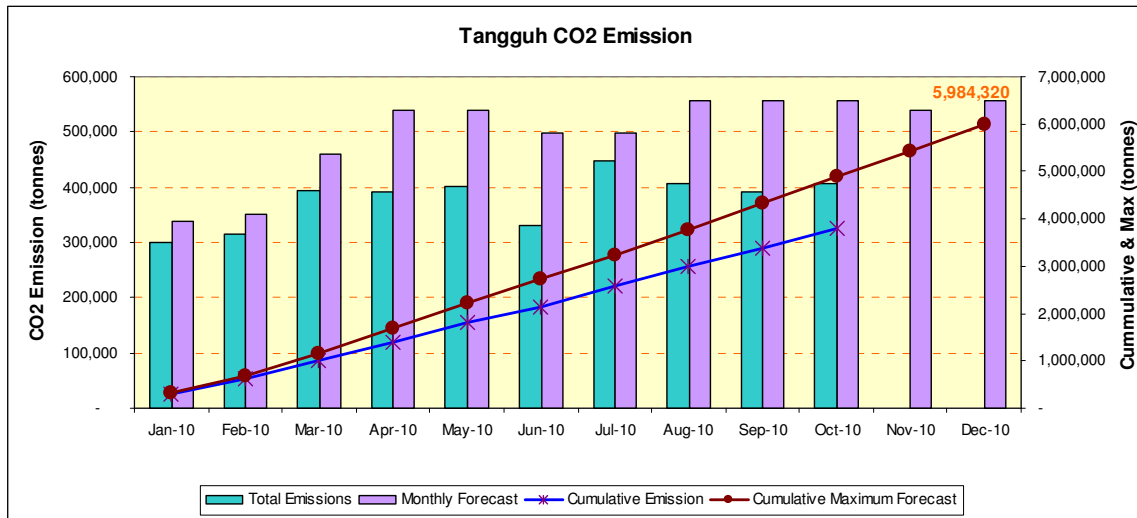


Figure 8. CO2 Emission January-October 2010

2.1.5. Water Management

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 m³/day while the permanent desalination facility is 750 m³/day which gives the total production of 1750 m³/day.

2.1.6. Fuel Management

The Tangguh LNG’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 refueling and personnel involved in these activities have been properly trained. Posters are strategically placed to maintain awareness on proper re-fueling and maintenance procedures. Oil and chemical spill kit have been distributed within needed area for immediate response in case of spill. 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. Any spill is recorded and reported every 6 months to Ditjen Migas for spill less than 15 bbls. Immediate notification to Ditjen Migas will be prepared for spill more than 15 bbls. No spill more than 15 bbls occurred during the reporting period.

2.2. Gas Production Facilities and Gas Transmission (GPF)

The two VR-A and VR-B platforms, as well as the two subsea pipelines are operational. The platforms are normally unattended platform, however, routine monitoring / maintenance visit are ongoing.

2.3. Drilling Activities

Drilling activity was completed in Q2 2009 as outlined in the previous reporting. The remaining hazardous waste from the drilling activities has been shipped off site to PPLI during this reporting period. Shore base facility has been handed over to Tangguh LNG including the hazardous waste incinerator previously operated by drilling contractor. The incinerator is currently waiting for vendor to be repaired, once the repair work finished, the permit extension for the incinerator will be processed. Once the permit extension is granted from MoE, then the incinerator will be utilized for burning hazardous waste as listed in the permit such as used oil, contaminated rags, medical waste and other hazardous waste suitable for incineration. It is expected that the repair work will be finalized by mid 2011.

2.4. Environmental Management System

The ISO 14001 EMS development continues with the implementation of Environmental Management program, Internal Audit, Management Review as well as series of training on ISO 14001. During the reporting period, one session of Management Review was completed in July 2010. Contract for ISO14001 certification has been secured.

Initial certification audit by auditor has been completed in early September 2010 with no major finding. The audit findings are minor ones consist of 14 Non Conformity and 5 Recommendations. The findings have been closed and reported to the auditor. The initial certification audit is another major milestone in the ISO14001 implementation which will be continued with final certification audit scheduled at the third week of October 2010, with no major finding, 5 minor findings and 13 observations. All of the findings and observations have been closed and reported to the auditor by mid of November 2010. The EMS implementation is ahead of target to achieve ISO 14001 certification which was planned in Q1 2011 to 9 December 2010.

3. Environmental Monitoring Plan

The objective of environmental monitoring program is to ensure that environmental management has been performed effectively and to ensure compliance with AMDAL's requirements and applicable environmental regulations.

BP has secured environmental monitoring contract with a certified external Indonesian laboratory to perform regular monthly and quarterly sampling and laboratory analysis in line with AMDAL and permitting requirements. In addition, BP has also internal site laboratory to conduct regular day-to-day internal sampling and monitoring programs onsite.

3.1.1. Wastewater Monitoring

Sewage

The treated effluent from Sewage Treatment Plants is monitored prior to discharge into the seawater. The effluent discharge and receiving ambient sea water are analysed

weekly and measured against the prevailing Indonesian regulations KEP-112/MENLH/2003 and KEP 51/2004 respectively as stipulated in AMDAL and applicable Indonesian regulation and MOE permit No 222/2008.

All treated waste water from permanent STP and STPs in step 3 camp, except waste water from STP zone B which is now exclusively used as Produced Water (PW) treatment facility, was in general consistent within the consent level as stipulated in the standard. The BOD consistently below the limit of 100 mg/l in the value of 5 - 70 mg/l. The pH value is within the standard in the range of 6-9. Only the TSS that tend to increase from 5-80 mg/l but still below the maximum limit of 100 mg/l. Intensive effort was put in place to ensure all parameter meets the standard.

Produced Water

As per informed in the previous section, the short term plan to treat produced water has been implemented in which temporary filtration units have been installed, combined with aeration pit and biological treatment in STP zone B at step 3 camp. The temporary facility particularly the zone B STP has sometimes experiencing technical problem which resulting in fluctuation of effluent quality.

During this reporting period, the concerned parameter that sometime exceed the maximum limit stipulated in the MoE Wastewater Discharge Permit no 222/2008 is NH₃-N (Ammonia) with the range of 0.1-31 mg/l against the standard of 5 mg/l. The deviations from the standard limit on NH₃-N occurred as during upset condition of the STP, the bacteria needs to be enriched with fertilizer (NPK) to increase the condition to the required number. The source of NH₃-N is coming from the addition of NPK fertilizer, not from the gas well. COD during this reporting period is mostly within the standard, only two occasions with 202 mg/l and 205 mg/l each for one day. Phenol remains within the standard. The system is rigorously monitored to prevent deviation for extended period. Communication to the related government has been conducted.

Brine Water

Monitoring was also conducted on the discharge point of the permanent desalination facility as well as the RO unit. The results indicate that the discharged brine water meets the requirements in the permit. The salinity within 30 m radius from discharged point is already the same with the ambient seawater salinity. The ambient salinity measured is in the average value of 28.9-29 ppt and the salinity within compliance point (30 m radius from discharge point) is in the average value of 29 ppt.

Oily Contaminated Wastewater

As mentioned in the management section, after treatment in the CPI (Corrugated Plate Interceptor) to remove hydrocarbon content, the oily contaminated water is routed to the Produced Water Tank to treat the high level of COD. No direct discharge from the CPI unit.

Chemically contaminated wastewater

The results of the monthly monitoring showed that the quality of the chemically contaminated wastewater is consistently meeting the standard as per MoE Permit no

222/2008. TSS is below 10 mg/l (standard 100 mg/l), pH within 6-9, COD below 50 mg/l (standard 200 mg/l) and total toxic metal below 5 mg/l (standard 5 mg/l).

3.1.2. Solid Waste Monitoring

Monitoring continues on Tangguh LNG waste management including also on contractor's temporary waste storage facilities to ascertain regular collection of waste, collection place and disposal at the organic waste pits or inorganic waste collection place to be later sent to waste collector outside project area.

**Weekly Waste Delivery to CWAA2 Area Exclude Recyclable Waste
April - September 2010**

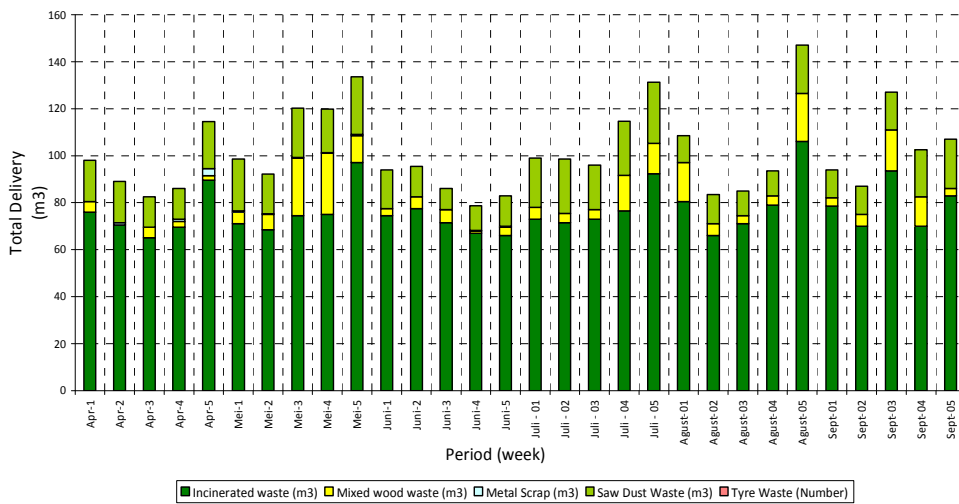


Figure 9. Non Hazardous Waste Profile

**Weekly Waste Delivery to Inert Landfill Area (m3)
April - September 2010**

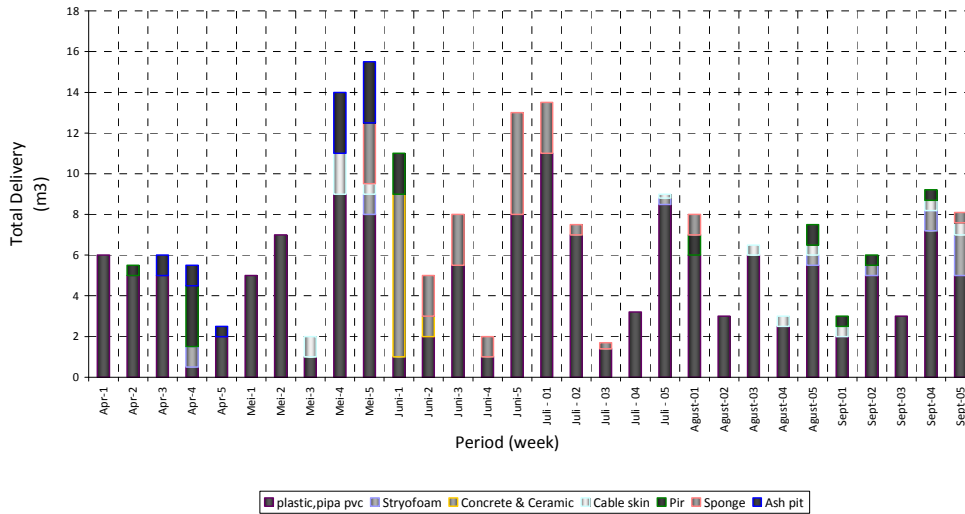


Figure 10. Organic Waste Profile

Documentation for waste transportation, including waste manifests, are assessed as part of monitoring process. Routine monitoring is also carried out in CWAA, landfill, STP and incinerator.

3.1.3. Revegetation

Monitoring of slope stabilization and revegetation is continuing. The maintenance of revegetation continues to ensure the vegetation can sustain to its natural condition. The revegetation has proven to be an effective measure to prevent erosion and further sedimentation on drainage and water ways. Monitoring of turbidity on surface water within the site shows that the level is consistent with the baseline condition and currently it is in the range of 8-68 mg/l compared to the standard of 1000 mg/l for surface water. Continuous monitoring is performed on the drainage system to ensure that blockages and sediment are cleaned regularly.

3.1.4. Air Emission

The result of emission and ambient air monitoring activities conducted during this reporting period showed 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 standard as stipulated in the AMDAL. BP contracted external laboratory to perform sampling on boilers, acid gas incinerator stack, gas turbine, gensets, solid waste incinerators, and several points within the site including offshore platforms.

Table 1. Air Ambient Sampling at Tangguh LNG

Parameter	Unit	Analysis Result				Standard PP No. 41/1999
		Process area near AGI	ORF	Dormitorr	Soccer Field at Matoa Camp	
SO ₂	µg/Nm ³	<90	<90	<90	<90	900
CO	µg/Nm ³	<5000	<5000	<1000	<1000	30000
NO ₂	µg/Nm ³	<50	<50	<50	<50	150
HC	µg/Nm ³	<100	<100	<100	<100	160
Particulate	µg/Nm ³	22.5	20.5	<20	52.8	230
PM 10	µg/Nm ³	<10	<10	<10	<10	150
PM 2.5	µg/Nm ³	<10	<10	<10	<10	65

Tabel 2 AGI Emission

Parameter	Unit	Acid Gas Incinerator (AGI)	Standard (MoE Decree 13/2009)
Hydrogen Sulfide	H ₂ S	mg/m ³	<0.1
Nitrogen Dioxide	NO _x	mg/m ³	60.1
Sulphur Dioxide	SO ₂	mg/m ³	375
Oxygen	O ₂	%	6

Tabel 3. Boiler Emission

Parameter	Unit	Boiler Stack A	Boiler Stack C	Standard (MoE Decree 13/2009)
Total Particulate	mg/m ³	<1	<1	300
Opacity *	%	<0.2	<0.2	40
Nitrogen Dioxide	NO _x	mg/m ³	31.6	320
Sulphur Dioxide	SO ₂	mg/m ³	88	873
Oxygen	O ₂	%	14.5	-

Tabel 4. Gas Turbine Emission

Parameter	Unit	Gas Turbine Train 1 - PR	Gas Turbine Train 1 - MR	Standard (MoE Decree 13/2009)
Total Particulate	mg/m ³	<1	<1	50
Nitrogen Dioxide	NO _x	mg/m ³	7.76	150
Sulphur Dioxide	SO ₂	mg/m ³	<6	320
Oxygen	O ₂	%	18	-

Tabel 5. Flaring

Parameter	Unit	Flare Stack - ORF	Standard (MoE Decree 13/2009)
Opacity	%	11	40



3.1.5. Water Supply

Monitoring is continuing at drainage outlet within the site. Regular surface water sampling shows that pH values on majority of the site conform to its baseline of 5-9, except for shorebase area where recently the pH is decreasing again to 4.52 compare to previous reporting period of above 5. This is suspected as natural phenomenon as there is no more bare soil in the vicinity of the area which was previously suspected as the cause of low pH water. All bare soil on the vicinity of the shorebase has been completely revegetated which prevent exposure of acid soil to air. There was no earthwork activity on the area that can possibly expose the acid soil. Water sampling is ongoing to monitor the cause of the low pH.

3.1.6. Fuel Storage and Handling

The management of fuel and chemical used onsite is robust and in compliance with AMDAL and the Indonesian regulations. The number and volumes of spills were significantly reduced compared to previous period of the project. During this reporting period, there were 7 hydrocarbon spills with total around 2.7 bbls, compared to 8 spills with total of 17 bbls in previous period. Actions were immediately taken to handle all spill. The waste from the spill, including the contaminated soil/gravel is handled as hazardous waste, to be later disposed to PPLI. Regular spill drill and training were performed to ensure the readiness of response team in handling oil/chemical spill. Regular inspection and socialization was also conducted on the storage area with particular focus on the storage for chemicals and oil.

During the period of reporting, no significant hydrocarbon spill incident of more than 15 barrel.

3.2. Gas Production Facilities and Gas Transmission (GPF)

The GPF construction activities are completed and the monitoring of the GPF area is part of the whole BP Operation activities as outlined in the previous section of LNG and its supporting facilities.

3.3. Drilling Activities

The Drilling activities are completed and the monitoring of the shorebase area is part of the whole BP Operation activities as outlined in the previous section of LNG and its supporting facilities.

4. Environmental Studies

During the reporting period of April and October 2010, no environmental related study is conducted. Flora and fauna and marine mammal monitoring update study is planned for the first half of 2011.

5. Health and Safety

Tangguh is now fully conformed to the BP Control of Work (CoW) Group Defined Practices (GDP) as confirmed by the May 2010 S&O audit and a final internal self assessment using the CoW GAT (Gap Analysis Tool). The operation has now moved into the continuous improvement stage of the BP COW GDP.

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

	2010 Apr	YTD Oct	Target	2009 Actual
Fatality [Number of incidents]	0	0	0	0
High Potential Incidents [Number of incidents]	0	0	Monitor	0
Day Away From Work Frequency [Frequency per 200,000 hours]	0	0	0	0
Recordable Injury Frequency [Frequency per 200,000 hours]	0	0.14 (5)	0.10 (6)	0.07 (4)

An impressive quarter on the personal safety front with no injuries recorded across the Tangguh in 2Q. There were two recordable injuries in Tangguh in Q3, the first incident happened in July, involved an incorrectly secured container door falling on the IP who received a hairline fracture to his foot. The latter occurred in September when the IP injured his back while dismantling a heavy pump casing. The risk and manual handling assessments were considered to be poor. Both incidents have been thoroughly investigated and lessons learned have been circulated internally.

As a lesson learned of VICO HIPO incident, a safety stand down focused on Driving Safety have been conducted across the Tangguh sites. Regular monthly and bi-monthly HSE meeting with Tangguh management and contractor management have also been conducted to ensure Tangguh How We Operate standard are well and thorough communicated and emphasized, thus ensure HSE targets are achieved. Various HSE training have also been established, to ensure that the workforce have proper and reliable skill and knowledge of every aspects of HSE of their daily activities.

6. Status of Non Compliances

6.1. Level-1 Non Compliances

There is no Level-1 non compliance during this reporting period. Previous Level-1 non compliance regarding Burma creek and solid waste management are closed in previous report.

6.2. Level-2 Non Compliances

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

7. Additional Information

Tangguh exports LNG and condensate load using tankers. Tangguh charters 7 LNG tankers for DES Buyers (Hiri, Jaya, Batur, Towuti, Sago, Foja & Palung), while Hence, Fujian FOB Buyer charters two tankers (Min Rong & Min Lu) to transport their cargoes so does the Condensate Buyer with their Oceanic Crimson and Oceanic Cyan. Once the tanker reaches the mouth of Bintuni Bay, security boat will guide the tanker into and from the jetty to maintain 'rolling' safety exclusion zone around the tanker. The purpose of the Safety Exclusion Zone around the moving ships is to prevent collisions with other vessels including small fishing boats.

With about 7-8 LNG tankers and 1-2 condensate tankers movement per month, coordination between Shipping Team and H&M Team has enabled the ships' movement around Bintuni/Berau Bay without any environment, safety nor security incident.

8. Evaluation Results

There were continuous improvements in the environmental management practices across the Tangguh LNG activities both start up and operation phase during the reporting period. The challenge is to maintain consistency and continuous implementation of the environmental management programs.

Tangguh LNG environmental team conducts regular discussions with other departments as well as with the operations' contractors to review any issues that potentially lead to a non-compliance to AMDAL and relevant regulations. Actions to prevent the non compliance incident is discussed, agreed and be followed up with the relevant team. A weekly Tangguh Compliance Tracking Matrix is maintained.

Management of non hazardous and hazardous waste is improving. An improved waste facility capacity including additional environmental resources have been provided.

Major concern during this reporting period related to wastewater is the management of produced water. The fluctuation of produced water quality from the plant during the end of the start up phase can now be minimized. As follow up action regarding concern on the performance of temporary facility, Tangguh proposed MP3 (Mekanisme Pembinaan Penaatan PROPER - PROPER Compliance Assistance Mechanism) to MoE to consider using the load-based factor COD, Phenol and NH₃-N standard of the temporary unit until the completion of permanent produced water treatment unit at the end of 2011. MoE has responded Tangguh's request by issuance of letter no B-7088/MENLH/09/2010, which permits the increase of COD, Phenol and NH₃ loading until the completion of the permanent treatment unit by end of 2011. It is expected that once the permanent produced water treatment facility in operation, the effluent will consistently meet the requirement as stipulated in the permit.

The ISO14001 Environmental Management System implementation is continuing. With the successful implementation of the certification audit in October 2010, the EMS



implementation is ahead of target to achieve ISO 14001 certification which was planned in Q1 2011 to 9 December 2010.