Member Country Report of CAMBODIA

Submitted by

Cambodian Delegation

(For Agenda Item 3)
ANNUAL MEMBER COUNTRY REPORT

Country: CAMBODIA  Period: 1 July 2010 – 30 June 2012

GEO-RESOURCES SECTOR

1. MINERAL PROGRAMME

1.1. Annual Review of Individual Technical Activities

1.1.1. The JICA compiled 1:1000,000 mineral resource map is being updated using information from private companies' exploration work.

1.1.2. A mining policy is being set up with UNDP's assistance and cooperation.

1.1.3. A map of landslide prone area in eastern Cambodia is being compiled.

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2. ENERGY PROGRAMME

2.1. Summary

Petroleum exploration activities commenced in Cambodia in the early 1970’s and even though oil and gas discovery was apparent since middle 1990’s, the development phase has not yet started. During the reviewed period of 01 July 2010 to 30 June 2012 more petroleum activities in onshore Cambodia have been carried out and two wells were drilled in offshore Cambodia. A few oil companies have carried out geological and geophysical studies around the Tonle Sap Lake.

2.2. Annual Review of Individual Technical Activities

2.2.1 Declaration of Commercial Discovery

A Petroleum Agreement was made and entered into on 18th March 2002 between the Royal Government of Cambodia, represented by Cambodian National Petroleum Authority (CNPA), and the Contractor, Chevron Overseas Petroleum (Cambodia) Limited and partners.
With information from the existing wells, the oil pay sands are well defined and the properties have been assessed. Using analog data sets from existing Gulf of Thailand field operations, the in-place and recoverable oil reserves can be calculated with the accuracy necessary for field development. Production flow tests also have been carried out which flowed from 415 to 860 BOPD. Based on evaluation, the determination of commercial quantities of Petroleum within Block A was declared on 31st August 2010.

2.2.2 High Resolution Airborne Gravity and Magnetic Survey.

Block XV, onshore, was awarded to PetroVietnam Exploration Production (PVEP) Overseas Cambodia Corporation on 12th November 2009 covered an area of 6,900 sq.km and located in the Tonle Sap Basin. Due to airborne gravity and magnetic survey conducted by Japan National Oil Corporation roughly outlining possible troughs in the large area, the high resolution airborne gravity and magnetic survey was added.

The objective of this survey is to outline the preferred area for seismic acquisition in the next phase. The survey was flown using SGL’s airborne gravity system, an airborne inertial referenced gravimeter. Production flights commenced on October 10, 2010 and were completed on October 31, 2010. A total of 14 flights were flown during the survey to complete the planned 6,176 line kilometers. The traverse lines are oriented north-south and spaced at 1,500 m, while the control lines are oriented east-west and spaced at 5,000 m.

2.2.3 Application for a Production Permit

On 30 September 2010, Chevron Overseas Petroleum (Cambodia) Limited submitted a Production Permit Application to the CNPA in order to begin development activity in Block A offshore Cambodia.

This application includes: (1) the specification of the production area applied for and covered by development activities and future exploration, and (2) the description of a phased field development plan with a Development Work Programme. Specifically, a detailed plan of the initial Phase 1a development includes a production platform with 22 wells producing to a captive Floating Storage and Offloading vessel (FSO).

2.2.4 Geological Survey

CNPA and Japan Oil, Gas and Metals National Corporation (JOGMEC) signed a Basic Agreement for a study and survey programme in Block XVII onshore Cambodia on May 4, 2010.

The geological survey was carried out from December 4 to 19, 2010 and 70 rock samples in total were collected. The objective of this study is to clarify (1) the existence of any Mesozoic-Paleozoic sedimentary basins with the required thickness (2) the existence of reservoir rocks consisting of Carboniferous-Permian carbonates together with Paleozoic-Mesozoic source rock with sufficient maturity for hydrocarbon generation. All the samples were sent to laboratory for analysis as follows: age dating, source rock properties, reservoir rock properties, bulk rock composition and fluid inclusions.

2.2.5 Field Geological Survey

As the Block XV and surrounding area is virgin territory, one of the key elements that should be considered as a first priority is the study of the source rock and reservoir rock by conventional means.
The geological team of PVEP Overseas and CNPA geologists together carried out field survey of the northern and eastern part of onshore Cambodia on **12-21 December 2010**. The main objective of this survey was to (1) understand lithological and deformational characteristics of sedimentary strata and (2) preliminarily identify and assess the relationship between lithologies and regional structures for hydrocarbon system, particularly source and reservoir rocks.

In relation with this survey, collecting, analyzing and generalizing all available geological and geophysical data in block XV and adjacent areas are used. The formation sections, rock characteristics, fossil investigation, sample collection for further analysis and storage, deformation characteristics will be described in detail.

### 2.2.6 Shore Base Survey

On **28-30 June 2011**, a Chevron Overseas Petroleum (Cambodia) Limited project team in collaboration with CNPA officials has conducted the shore base survey in Preah Sihanouk Province. The purpose of the survey is to understand the available capabilities in Preah Sihanouk Province and the logistics plan for the project.

### 2.2.7 Rong1-1 Well Drilling

Block F is located dominantly in offshore Cambodia and was awarded to CNOOC in 2007. CNOOC has conducted 522 Km. of 2D seismic and drill one well to date. Rong1-1 well was the first exploration well in Block F, which geologically located in Kampong Som Basin as well. The main objective of Rong1-1 well drilling was to evaluate the hydrocarbon potential of petroleum system in Basin.

Rong1-1 well was a vertical well and drilled to total depth of 2800 m (as planned 2875 m.) on **06 December 2011-30 January 2012** with plug and abandon as a dry hole.

### 2.2.8 BPS-1 well Drilling

The Baphoun Sireymongkol-1 well (BPS-1) was the third exploration well drilled in Block B by PTTEPI, operator of the consortium contractors. The well location was selected based on 3D seismic data to evaluate the hydrocarbon potential of a significant structural feature with seismic anomalies not seen in the previous two exploration wells drilled by PTTEPI.

BPS-1 was a deviated well drilled **on 01-09 March 2012** with the total depth of 3004 m. true vertical depth using oil base mud. The main objective was to explore hydrocarbon potential of 4-way and 3-way dip closure of Oligocene syn-rift play as primary target and Miocene play as secondary target.

Three poor oil shows were recorded in the interval from 1000 m. to 1300 m. The well was plugged and abandoned as a dry hole.

### 2.2.9 2D Seismic Survey in Block XVII

Japan Oil, Gas and Metals National Corporation carried out 299.75 km. of 2D seismic survey in block XVII onshore of Cambodia. Operation was commenced **on early April and completed on the early of September 2012**.

The objective of this survey is to (i) clarify basin and main geological feature (ii) better understand of HC system with focus on Mesozoic-Paleozoic sedimentary sections for reservoir and source rocks-Permian limestone and Triassic clastic sediments and (iii) identify and clarify the existence of potential hydrocarbon structures and leads (iv) evaluate and select the most prospective structure for the next seismic acquisition.
The 2D-seismic survey was done using 1-3 kg/shot point explosives at maximum, which act as a vibration source or an acoustic wave source. Nearly 6,000 holes with 50 meter interval were drilled up to 20 meter depth and 60 meter depth for upholes. Receiving points for each receiver/geophone line were located at 25 meter from one to another. The explosives and detonators used in the survey were Emulex E700-type explosives and Deveydet SR-type detonators.

2.3. Proposed Future Activities

- Onshore Geological Cross-border Study
- Geological Study in Onshore Cambodia

2.4. Assistance Required from CCOP in Support of Future Activities

Require both technical and financial support for these proposed future activities.

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3. GROUNDWATER PROGRAMME

Nothing to report

GEO-ENVIRONMENT SECTOR

4. COASTAL ZONE PROGRAMME

Nothing to report

5. GEO-HAZARDS PROGRAMME

Nothing to report
6. ENVIRONMENTAL GEOLOGY PROGRAMME

6.1. Summary

Environmental issues present major challenges major for oil and gas development in Cambodia. As required under the Cambodian Law on Environment Protection and natural Resource Management (1996) and the Sub-Decree on Environmental Impact Assessment (1999), all contractors have to conduct an environmental impact assessment before the petroleum operation commences.

The purpose of this EIA is to identify and, to the extent possible, quantify the potential negative and positive impacts of the proposed operation within the contracted blocks with respect to the environment, values of human use of resources, quality of life, and health. Once these impacts have been identified, prevention, mitigation, and monitoring measures will be proposed to minimize the negative impacts.

The scope of environmental impact assessment includes:
- An evaluation of the existing environmental and social conditions in the project area;
- An assessment of positive and negative impacts during the operation period;
- Proposed mitigation measures to prevent and/or reduce the potential harmful impacts to the nearby environment; and
- Proposed monitoring programme to record compliance with regulatory commitments and to determine if the local environment quality is affected by the project.

The EIA methodology and the main components of the report are as following:
- **Data and Information Collection**: Primary data on site characteristics were collected within the vicinity of the proposed project area and at the reference stations outside. Secondary data on human use of resources, socio-economic conditions and quality of life values, were collected from literature, government agencies and independent studies.
- **Project Description**: Describe the relevant activities of the project from the preparation to the completion.
- **Environment Setting**: Environmental data and information that were collected and assessed in order to understand the physical and biological resources, values of human use of resources, quality of life, health and safety.
- **Impact Assessment and Risk Assessment**: All aspects of the planned project activities were assessed in terms of their potential impacts.
- **Impact Mitigation and Monitoring**: The monitoring plan was prepared to gather data and information on the actual environment and changes to it during project implementation and to provide a basis upon which to evaluate the effectiveness of the mitigation measures put in place.
- **Environmental Management Plan (EMP)**: The plan covers all impacts that were identified and the corresponding mitigation measures and procedures. The EMP will be used for managing and monitoring the impacts that could occur during the operation.
- **EIA Process in Cambodia**: The Cambodian EIA process administered by the Ministry of environment.
6.2. Annual Review of Individual Technical Activities

6.2.1 Environment Impact Assessment for 2D Seismic Block XVII

Moeco Cambodia Oil and Gas Co., Ltd. (MCOG) received the right as operator from JOGMEC and has contracted International Environmental Management Co., Ltd. (IEM) to complete the environmental impact assessment for the 2D seismic survey in block XVII. Block XVII covers a surface area of 6,500 km² and is located in a hilly area generally at a height of 200m-300m in Kampong Thom, Preah Vihear and Siem Reap Provinces, approximately 200 km north of Phnom Penh.

The EIA survey was carried out from March and ended in mid July 2011 to collect the field data and then a report was prepared which was approved by the ministry of environment in January 2012.

6.2.2 Environmental impact Assessment for Exploration Drilling Block F

Block F contractor, CNOOC, has also contracted IEM to prepare the EIA report for the CNOOC offshore exploratory drilling project 2011. The well is named Rong1-1 and targeted to drill to 2800 m. The location of the well is about 37km from the Sihanouk Ville port and approximately 160km from Phnom Penh.

The EIA survey was started from April 20th, 2011 and completed with the approval from the ministry of environment on November 30th, 2011.

6.2.3 Impact on Small Scale Mining

In the effort to alleviate people’s poverty and the impact from small scale mining on the environment, the Ministry of Industry, Mines and Energy (MIME) in collaboration with UNDP, is setting up a project on the Management of small scale gold miners that will ensure the legal status of the small scale and artisanal miners and provide them with awareness training on safe mining and processing methods.

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GEO-INFORMATION SECTOR

7 GEO-DATA AND INFORMATION MANAGEMENT PROGRAMME

The establishment of a mineral database and cadastre was completed early this year thanks to the assistance of JICA.

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