

CCOP-DANIDA
Institutional Capacity Building Project ICB-CCOP1
Sulu Sea—East Sabah Basin
& Yinggehai-Song Hong Basin Case Study Workshop
2-4 March 2007, Ho Chi Minh, Vietnam

Report on proceedings and discussions at the Workshop

Date and Venue:

The workshop was held in Ho Chi Minh, Vietnam from 2nd to 4th March 2007 at the Kimdo Royal City Hotel, Ho Chi Minh, Vietnam.

Kimdo Royal City Hotel

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Local Organizer: Vietnam Petroleum Institute (VPI)

Participants:

Thirty-nine (39) geoscientists from nine (9) CCOP Member Countries: Cambodia, China, Indonesia, Japan, Korea, Malaysia, The Philippines, Thailand and Vietnam attended the workshop.

The represented agencies/institutes were:

- ❖ Cambodian National Petroleum Authority (CNPA), Cambodia
- ❖ Qingdao Institute of Marine Geology (CGS, Qingdao), China
- ❖ Guangzhou Marine Geological Survey (CGS, Guangzhou), China
- ❖ China National Offshore Oil Corporation (CNOOC), China
- ❖ Research and Development Center for Oil and Gas Technology “LEMIGAS”, Indonesia
- ❖ Pertamina, Indonesia
- ❖ National Institute of Advanced Industrial Science and Technology “AIST”, Japan
- ❖ Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
- ❖ Petronas, Malaysia
- ❖ Department of Energy (DOE), Philippines
- ❖ Department of Mineral Fuels (DMF), Thailand
- ❖ Vietnam Petroleum Institute (VPI), Vietnam
- ❖ PetroVietnam, Vietnam
- ❖ Asean Council On Petroleum (ASCOPE)
- ❖ PTT Exploration and Production Plc., Thailand
- ❖ Geological Survey of Denmark & Greenland (GEUS), Denmark

❖ CCOP TS

The total participants of the workshop is 40, detailed list of participants is attached as Annex 1.

Program:

The detailed program of the workshop is provided as Annex 2.

Background and Purpose of the Workshop:

The ICB-CCOP1 1st Ho Chi Minh is a planned workshop approved in the Inception Phase Report. It is one of the big activities involved in all CCOP member countries during the ICB-CCOP1 Project case study implementation stage. The Vietnam Petroleum Institute (VPI), one of our partner institutions took the responsibility of the local organizer.

The workshop is combined with the thematic seminar on high temperature, high pressure and CO₂ issues which is based on the request from CCOP Member Countries. The workshop focused on the following objectives:

- Present the progress of joint case studies after the last activity and check the outputs together
- Merge the current outputs from the joint case studies together
- Discuss the current issues and make the proposal of solving them
- Setup the work plan for the final outputs and discuss the outline for the final case study report

Regarding the thematic seminar, the CCOP/ICB-PETRAD-CNOOC-MLR-CGS Seminar on CO₂ Issues in Petroleum E&P held in Guilin, China, November 2006 was successfully conducted, not only on technology and knowledge transfer but also on existing experience sharing. During the CO₂ Seminar mentioned above, both resource persons and participants were requested to hold the follow-up seminar discussion on high pressure and high temperature issues in E&P in this region. In this connection, we decided to organize the half-day seminar during the ICB-CCOP1 Project Workshop in Vietnam in March, 2007 to continue sharing the existing experience and knowledge. The CO₂ Issue and Relevant the High Pressure & High Temperature Issues in E&P were discussed during the seminar.

Proceedings and Discussions at the Workshop:

At the opening ceremony, *Dr. Nguyen Huy Quy*, Secretary of CCOP Vietnam, Deputy General Manager, Science & Technology Division of PetroVietnam, Vietnam Oil and Gas Corporation, on behalf of Dr. Tran Ngoc Canh, President and CEO of PetroVietnam and Permanent Representative of Vietnam to CCOP made the opening address (Annex 3). He extended warm welcome from local organizer, PetroVietnam and VPI to all participants from CCOP Member Countries. He also expressed his best wishes to the success of the workshop.

In the following, Mr. Chen Shick Pei, Director of CCOP TS gave his welcome speech on behalf of CCOP. He extended a warm welcome to all participants from CCOP Member Countries. He

deeply appreciated to the presence of Dr. Nguyen Huy Quy and Mr. Zainal Matassan, Secretary-in-Charge of ASCOPE. He highlighted that the implementation of the ICB-CCOP1 Project. Besides the geoscientific aspects of the project, it has great significance in promoting cross-border understanding and cooperation that can contribute to building trust and confidence, and promoting close cooperation among CCOP Member Countries. He believed that the project would be accomplished with fruitful outputs by the end of 2007. He also expressed his sincere thanks to the Royal Danish Government's generous support for this project, and extended his appreciation to Mr. Ioannis Abatzis, experts from GEUS, PetroVietnam, VPI, Project Coordinator and CCOP TS staff's hard work for carrying out this activity. Finally, he expressed his best wishes for the success of the workshop (Annex 4 Mr. Chen Shick Pei's speech).

After the opening ceremony, all the participants took the group photo together. The workshop continued with a presentation of updated information about the ICB-CCOP1 Project after two year implementation by Mr. Liu Liquan, who gave also a status on the current progress of the project. He also made a brief statement on the work plan of 2007 and the task of this workshop.

Afterwards, Mr. Zulhaimi Bin Abdul Rahman from Petronas, as one of research team members of Sulu Sea-East Sabah basin case study, made the presentation on the current achievement of the case study from Malaysia side. The presentation covered regional geology, basin evolution, sequence stratigraphy analysis and preliminary 1D basin modeling results. The 2D basin modeling and play assessment with risking evaluation work plan will be setup during the workshop through the discussion with their Philippines partners.

Subsequently, Ms. Ma. Corazon Sta. Ana from Department of Energy, Philippines reported the case study progress in Philippines side. The presentation introduced the background of the Sulu Sea basin, seismic facies mapping and basin modeling results with some recommendations.

Dr. Cai Feng, from Qingdao Institute of Marine Geology, under his capacity of National Coordinator of China to ICB-CCOP1 Project, gave a report on the research progress of the project from Chinese side. He briefly reviewed the activities on the Yinggehai-Song Hong basin case study, he also showed the merged maps through the joint study between China and Vietnam. The basin modeling results from Chinese side was reported as well during the presentation.

After Dr. Cai's presentation, Mr. Vu Anh Tuan, joint case study research team member from Vietnam Petroleum Institute reported that the work on the Vietnamese side was conducted according to the work plan His presentation included a brief description of the exploration history within the Vietnamese sector of the case study area. He referred also to the structural set up, lithostratigraphy and potential petroleum system. The common velocity curve was carried out after joint case study, as well as common stratigraphic column. The proposal of the outline for the overall case study final report was presented.

After the presentation, the participants were divided into two groups based on the two case studies. The participants from Indonesia, Malaysia, Philippines and Japan worked together in one group on Sulu Sea-East Sabah basin case study. The participants from Cambodia, China, Korea,

Thailand and Vietnam composed another group discussed on Yinggehai-Song Hong basin case study.

During the discussions, the geoscientists from CCOP Member Countries exchanged a series of questions and answers and they initiated their efforts in accomplishing the joint case studies. The final outline of the case study was carried out (Annex 5). The work plans on the joint case studies were discussed respectively. The solid work plans with time frame were established as well as the proposal for ICB-CCOP Project Phase 2 (Annex 6.7.8.9.10).

From the comments of the participants from our CCOP Member Countries, we are happy to see the suggestions as followed:

- The Sulu Sea-Sabah case study groups from Malaysia and Philippines want to have an extra working meeting for them to work together closely so that they can catch up the progress of the Yinggehai-Song Hong case study.
- Regarding the inputs of the application of the ICB-CCOP Project Phase 2, several proposals have been made.
 1. Joint compiling the CO₂ distribution map in Southeast Asia region;
 2. Technology transfer in deepwater exploration and production;
 3. Meeting the challenge in high temperature and high pressure issues;
 4. Sharing the experience in fractured basement reservoir exploration and production;
 5. Several cross-border basins were proposed for the phase 2 case studies: the North and Central Sumatra, Penyu / West Natuna, West Sarawak / East Natuna and Tarakan basins (Annex 9).
- CCOP-DANIDA-Cambodia-Vietnam joint field study will be carried out after this ICB-CCOP1 Project activity. It will be conducted by following up the model of current cross-border case studies.

Proceedings and Discussions at the Seminar:

After the workshop, in the afternoon of the second day, the thematic seminar on the CO₂ Issue and Relevant the High Pressure & High Temperature Issues in E&P was carried though. Invited speakers' curriculum vitae is attached (Annex 11).

The first speaker is Dr. Huang Baojia, from CNOOC Ltd., China. His presentation topic is the "Generation and Distribution of CO₂ and Effects of Overpressure on the Petroleum Accumulation the Yinggehai Basin". Following aspects have been included in his presentation:

1. Introduction
2. Geological setting
3. Origin and distribution of CO₂
4. Mechanisms for generating Overpressure
5. Effects of overpressure on petroleum accumulation
6. Conclusions
 - In the Yinggehai Basin, most of the inorganic CO₂ gases originate from the lower Miocene calcareous shale as well as the pre-Cenozoic carbonates,

- volcanic-magmatic origin has possibly also made a small contribution;
- Distribution of CO₂ within the reservoirs is very complicated;
- CO₂ modeling prediction can help risk assessment on a basin scale and on a prospect scale in the Yinggehai basin;
- As a result of rapid loading and the resulting undercompaction, as well as hydrocarbon generation and thermal expansion of pore fluids, strong overpressures developed over a large part of the basin;
- Overpressure and overpressured fluid flow may have important influences on petroleum accumulation, including source rock maturation and hydrocarbon generation, petroleum and CO₂ migration and reservoir diagenesis in the Yinggehai basin.

Mr. Mansor Ahmad, PRAM PMU, PETRONAS, Malaysia made a presentation on the “Carbon Dioxide (CO₂) Concentration (%) Distribution in Malay Basin”. His presentation included the following aspect:

- Objective
- Current Understanding
- Possible controlling parameters
- Principal / Concept
- Conclusion

In his conclusion, based on his study, he shared his valuable experience on the CO₂ issues in this region:

- Structure relief or Hydrocarbon column < 150 m @ low CO₂
- Structure relief or Hydrocarbon column > 150 m @ high CO₂
- Drill low relief structure or closure for sweet gas

Mr. Pande Made Oka Iriana, PERTAMINA, Upstream, EPTC, Indonesia gave his presentation on the “High Pressure High Temperature Zone, Its Genetic and Potential Problems, Case study: Serang Structure, North Sumatera Basin”.

Three wells have been drilled in Serang Structure and almost every well encountered some problems such as overpressure, high temperature zone. Several methods have been implemented to solve these problems and the results are listed below. And also study had been carried out prior to drilling approval. The study reveal genetic of overpressure and high temperature.

Knowing overpressure and high temperature in objective zone is very important. There are several constraints during the operation such as pump vailing, valve leakage, top drive failure, drilling anomaly (bit direction), and sub-surface problems such as mud loss, gas kick.

During the operation, there are several measures have been taken to the solve the problems, such as drilling program design, casing design, QC while pre-spud & drilling, effective communication. And in sub surface, optimizing mud properties and drilling parameter. Several methods were used to identify the abnormal pressure zone from seismic data and d'exponent

shale density.

Ms. Tran Chau Giang, VPI, Vietnam, gave her presentation on the “CO₂ Issues in Petroleum E&P in Song Hong Basin”. She expatiated on the following aspects:

- CO₂ occurrences
- CO₂ origin
- High pressure and high temperature related to CO₂ polluted in petroleum reservoirs
- Conclusion

In her conclusion, she mentioned several achievements based on her study:

- The greatest CO₂ risk appears to occur when vertical intrusion cut carbonates and structural closure
- Proximity to shallow igneous intrusive activity appears to be the main controlling factor on CO₂ pollution
- In all cases, there is carbonate within the sediment section which may have contributed some or most of the CO₂ via contact metamorphism
- It is possible to avoid significant CO₂ pollution if no vertical intrusion cut the structure closer.

During the above mentioned presentation, the participants from CCOP Member Countries interactively involved in the discussion with the speakers. The knowledge, experience and expertise have been shared during the seminar. The participants expressed sincere thanks for the excellent seminar. This was an opportunity for participants to get an overview of CO₂ and related High Pressure and High Temperature Issues in Petroleum Exploration and Production, and get the networking in the future development.

The cooperation between CCOP and ASCOPE Members in the petroleum sector is continuously improving, and the door is further opened through this seminar. Dr. Khajohn Bhasavanija, Chairman of ASCOPE E&P BDC, made his comments on this seminar. He mentioned that in this half-day seminar, participants were informed of the current situation of technology and engineering on CO₂ and related High Pressure and High Temperature Issues Exploration and Production in southeast Asia region. Participants learnt a lot and felt that it was urgently needed and necessary to import and share such technologies, analyze the key points, strengthen basic technology system to support CO₂ and related High Pressure and High Temperature Issues in Petroleum Exploration and Production and technology development. He would like to continually support the cooperation on technology transfer between ASCOPE and CCOP in E&P sector.



**INSTITUTIONAL CAPACITY BUILDING IN CCOP COUNTRIES,
PHASE 1 (ICB-CCOP1)**



Group photo of all the ICB-CCOP1, 1st Ho Chi Minh Workshop participants



The opening ceremony of the workshop was held at Kimdo Royal City Hotel 2nd March, 2007.



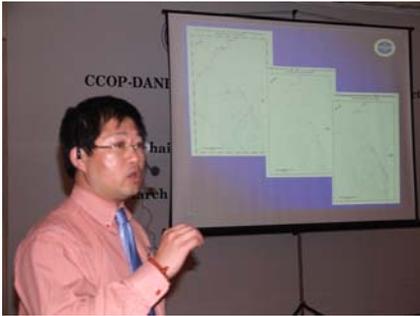
Dr. Nguyen Huy Quy, made an opening statement at the opening ceremony



ICB-CCOP1 Project Progress Introduction



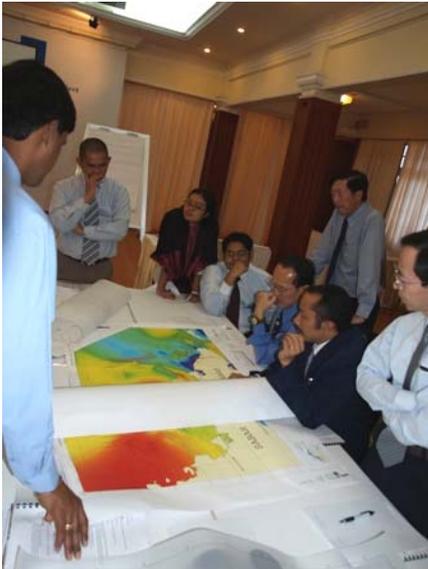
Presentations



Presentation



Discussion
During the
Workshop



Presentations
of High
Pressure &
High
Temperature
and CO2
Issues





**Tokens of
Appreciation
to the
Speakers
and
Workshop
Wrapup**



**Welcome
Dinner**



**Excursion to
the Cu Chi
Tunnels**



Annex 1

**CCOP-DANIDA Institutional Capacity Building Project ICB-CCOP1
Sulu Sea—East Sabah Basin & Yinggehai-Song Hong Basin Case Study Workshop
2-4 March 2007, Ho Chi Minh, Vietnam**

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Annex 2

CCOP-DANIDA
Institutional Capacity Building Project ICB-CCOP1
Sulu Sea—East Sabah Basin & Yinggehai-Song Hong Basin
Case Study Workshop
2-4 March 2007, Ho Chi Minh, Vietnam

PROGRAM

Day 1: Thursday 1 March

Arrival of Participants / Check-in Hotel in Ho Chi Minh City

Day 2: Friday 2 March

08:30-09:00	Registration	CCOPTS
09:00-09:30	Opening Ceremony: <i>Opening Address by</i>	<i>Dr. Nguyen Huy Quy</i> , Secretary of CCOP Vietnam Deputy General Manager, Science & Technology Division of PetroVietnam on behalf of Dr. Tran Ngoc Canh, President and CEO of PetroVietnam and Permanent Representative of Vietnam to CCOP
	<i>Welcome Remarks by</i>	<i>Mr. Chen Shick Pei</i> , Director of CCOP Technical Secretariat <i>Mr. Ioannis Abatzis</i> , Representative of Denmark to CCOP
09:30-09:45	Group Photo	
09:45-10:00	Coffee/tea break	
10:00-10:10	Introduction	
10:10-10:30	Briefing on ICB Project, Progress and Work Plan 2007 by Mr. Liu Liquan	
10:30-12:00	Presentations by the Malaysia, Philippines, China and Vietnam delegations Outputs of the case study during the basin analysis and basin modeling period	
	Sulu Sea-East Sabah Basin	<i>Mr. Zulhaimi Bin Abdul Rahman</i>
	Sulu Sea-East Sabah Basin	<i>Ms. Ma. Corazon Sta. Ana</i>
	Yinggehai-Song Hong Basin	<i>Dr. Cai Feng</i>
	Yinggehai-Song Hong Basin	<i>Mr. Vu Anh Tuan</i>
	(20 minutes each)	
12:00-13:30	Lunch Break	
13:30-15:00	Divided into two groups for preliminary basin modeling results correlation	
15:00-15:15	Coffee/tea break	
15:15-17:30	Continue discussions / follow up work plan	
17:30	End of Day 2	
18:30	Welcome Dinner	

Day 3: Saturday 3 March

- 08:30-09:45 Discussions on play assessment and overall basin evaluation
- 09:45-10:00 Coffee/tea break
- 10:00-12:00 Discussions on work plan to complete the Project
- 12:00-13:30 Lunch Break
- 13:30-15:00 Advanced presentation and discussion, follow up the CO₂ Seminar 23-25 November 2006 in Guilin, China
Presentation on CO₂ Issue and Relevant the High Pressure & High Temperature Issue in E&P in the Song Hong-Yinggehai, the Malay and the NW Java basins/ adjacent region.
“Generation and Distribution of CO₂ and Effects of Overpressure on the Petroleum Accumulation the Yinggehai Basin”
Dr. Huang Baojia, CNOOC Ltd., Zhanjiang
“Carbon Dioxide (CO₂) Concentration (%) Distribution in Malay Basin”
Mr. Mansor Ahmad, PRAM PMU, PETRONAS
- 15:00-15:15 Coffee/tea break
- 15:15-16:40 “HPHT Zone, Its Genetic and Potential Problems (Case study: Serang Structure, North Sumatera Basin)”
Mr. Pande Made Oka Iriana, PERTAMINA, Upstream, EPTC
“CO₂ Issues in Petroleum E&P in Song Hong Basin”
Mrs. Tran Chau Giang, VPI
- 16:40-17:30 Summary and Minutes of Workshop
- 17:30 End of Day Workshop

Day 4: Sunday 4 March

Excursion to Cu Chi Tunnels and the War Museum in Ho Chi Minh City

Annex 3

OPENING ADDRESS BY SECRETARY OF CCOP VIETNAM DEPUTY GENERAL MANAGER OF SCIENCE & TECHNOLOGY, PETROVIETNAM

BY DR. NGUYEN HUY QUY

**At the opening of the ICB-CCOP1
Sulu Sea—East Sabah Basin & Yinggehai-Song Hong Basin
Case Study Workshop
2-4 March 2007, Ho Chi Minh, Vietnam**

**Mr. Chen Shick Pei, Director of CCOP Technical Secretariat
Mr. Ioannis Abatzis, Representative of Denmark to CCOP**

**Distinguished delegates,
Ladies and Gentlemen,**

I would like to thank the Workshop organizer for inviting me to attend the opening of the ICB-CCOP1 Project Sulu Sea- East Sabah Basin and Yinggehai- Song Hong Basin Case Study Workshop. First of all, let me on behalf of CCOP Vietnam and Petrovietnam's leaders extend warm welcome to all distinguished guests and participants at this workshop held in Ho Chi Minh City. This event is a symbol of the effective cooperation between CCOP Member Countries.

In follow-up of last workshop in Hanoi, I have very high expectations of today workshop. We are indeed very fortunate to be able to bring together such a distinguished body of experts to discuss the important subject of this workshop.

As a source for economic prosperity, Vietnam has placed great importance and interests in determining oil and gas potentials and increasing hydrocarbon reserves to meet the energy security of the nation. Petrovietnam, recently became Vietnam Oil and Gas Group, attaches great attention to cooperate with CCOP, DANIDA and CCOP Member Countries in the project ICB-CCOP1. As such, this event provides an excellent opportunity for key players in this area to look at those elements of cross-border integration of geoscientific knowledge that contribute to a better understanding of the regional geology. These are important information for determining petroleum potentials.

Let me on behalf of Petrovietnam convey our sincere gratitude to Royal Danish Government, our high appreciation to Danish partners for the cooperation and assistance. I would like to offer my congratulation to the organizing committee of the workshop for their successful performance. I would like to conclude by encouraging all the participants to seize this opportunity for open discussion, where we not only share our good experiences but also dare to share our problems. Follow-up this workshop, you will conduct a training and field trip in Phu Quoc Island-one very nice island in Vietnam. I hope you have very nice time in this island.

Last word, I wish every success for the workshop and wish you all very good health and happiness.

Thank you.

Annex 4

SPEECH BY DIRECTOR OF CCOP TECHNICAL SECRETARIAT

MR. CHEN SHICK PEI

**At the opening of the ICB-CCOP1
Sulu Sea—East Sabah Basin & Yinggehai-Song Hong Basin
Case Study Workshop
2-4 March 2007, Ho Chi Minh, Vietnam**

**Dr Nguyen Huy Quy, Secretary of CCOP Vietnam, Deputy General Manager
Science & Technology Division of PetroVietnam, representing Dr Tran Ngoc Canh,
President and CEO, PetroVietnam, Permanent Representative of Vietnam to CCOP
Mr Zainal Matassan, Secretary-in-Charge, ASCOPE
Mr Ioannis Abatzis, Representative of Denmark to CCOP
Mr Liu Liqun, ICB-CCOP 1 Coordinator**

**Distinguished Resource Persons and Participants
Ladies and Gentlemen**

Good Morning and Cin Cao (Chao)

On behalf of CCOP, I would like to extend a very warm welcome to everybody to this second ICB-CCOP 1 Workshop, organized back-to-back with training and expert visit. In this august gathering this morning, we would like to express our deep appreciation to Dr Nguyen Huy Quy, Secretary of CCOP Vietnam, Deputy General Manager, Science & Technology Division of PetroVietnam for giving us his valuable time to grace this opening ceremony and to deliver a speech. I would also welcome all our distinguished guests, from Vietnam, and an old friend of mine Mr Zainal Matassan, Secretary-in-Charge of ASCOPE, as well as the Resources Persons and Participants to this important ICB-CCOP 1 activity.

Most of you who are here today are already closely associated with and strongly supported the implementation of the ICB-CCOP 1 project activity. I am pleased to let you know that we are already seeing the tremendous impact that this project has made in promoting understanding and bringing different countries in the region to cooperate and work together under the ICB-CCOP 1 project. The very significant achievement made to-date in the implementation of the Song Hong-Yinggehai Basin case study between Vietnam and China, and the Sulu Sea-East Sabah case study between Malaysia and the Philippines showcased the success in attaining the original core objective of the Project, that is, promotion of cooperation between different countries in the region.

Recognizing the extreme sensitivity of petroleum data, the initial idea was to use available public information for the conduct of the 2 case studies. CCOP is indeed feeling very honored and proud that under the Project, we were able to build the confidence and the trust whereby the partners of the 2 case studies agreed to present and use their latest and best

quality petroleum data, which in other circumstance are often considered strategic and proprietary with very restricted access. This will no doubt makes the results of the studies much more useful in contributing to the understanding of the regional geology and the petroleum resources of the areas. Additionally, other non-case study CCOP Member Countries also have the opportunity to join. This Workshop, the second in the series is a case in point where the information and details of the studies will be shared. This is indeed a historic achievement for CCOP in proving that cross border case study in the sensitive area of petroleum can be cooperatively and successfully carried out. We are very confident that this will be one of the important models for the planning and implementation of CCOP projects in the future. I am also pleased to learn that under the CCOP cooperation, Mr. Abatzis is facilitating a joint field study by Vietnam and Cambodia experts in the border area between southwestern Vietnam and Cambodia immediately after this Workshop, Training and Expert Visit Program. This is yet another fine example of close cooperation and sharing and we are proud that this opportunity can be made available under the ICB-CCOP 1 project.

We are now at the final year of the 3-year Project. With the capable and effective coordination of the project by Mr Liu Liqun and the full support of the Member Countries, the project is progressing well despite its inherent complex nature. Progress for both the Song Hong – Yinggehai and the Sulu Sea – East Sabah Basin case studies are on track according to plan. I believe that the partners in both the case studies have already successfully completed the cross border study and integration of petroleum information and a series of important maps of the study areas that can significantly contribute to the greater understanding of the petroleum resources have been prepared. Besides the technical and scientific work on the case studies, other activities such as workshops, training courses on topics specifically needed by the Member Countries, expert visits, technology transfer and the award of post graduate research grants have also been accomplished. We can confidently look forward to a successful conclusion of the project at the end of 2007.

On behalf of CCOP, we would like to thank the Royal Danish Government through the Royal Danish Embassy in Bangkok for the generous support for this Project. Denmark, one of the top donor countries that support development assistance, has been very active in bilateral programmes in this region and several of our CCOP Member Countries are benefiting from them. However, I believe this is the first time that Denmark has given its support directly to CCOP, a multilateral regional intergovernmental organization and we deeply appreciate this kind consideration.

We would like to say a big thank you to PETROVIETNAM and VPI for hosting this Workshop, Training and Expert Visit in Ho Chi Minh City and Phu Quoc. We thank Dr Nguyen Trong Tin, National Project Coordinator and his colleagues from PETROVIETNAM and VPI for their hard work in making the meticulous preparations and arrangements for this activity. I would also like to thank Mr Liu Liqun, the ICB-CCOP 1 Project Coordinator and the staff of the CCOP Technical Secretariat for their hard work in the overall arrangement for this event. Our special appreciation goes to Mr. Ioannis Abatzis, Representative of Denmark to CCOP, Senior Advisor of the Geological Survey of Denmark and Greenland (GEUS) for

his close interest and guidance given to the Project, and his continued rendering of useful advice and expertise in the project's planning, implementation and management. I would also like to share with you the fact that Mr. Abatzis has shown to be one of the strong and committed champions for the cause of CCOP.

Before I end, I would like to once again thank Dr Nguyen Huy Quy for his interest and his gracious presence. I sincerely thank our CCOP Member Countries, particularly the national project coordinators and their colleagues for their cooperation, support and participation in the project activities and the case studies. Thank you also to the case study countries, China, Indonesia, Malaysia, the Philippines, and Vietnam for having so generously offered the case study areas, and to host the studies.

I wish you a successful Workshop, Training and Expert Visit.

Thank you and Cam Muen

Annex 5

CCOP-DANIDA Institutional Capacity Building Project ICB-CCOP1 Agreed outline of final report

OUTLINE OF THE CASE STUDY

1. Basin Overview
 - 1.1. Basin Background
 - 1.2. Exploration History
 - 1.3. Production Status

2. Regional Geology
 - 2.1. Tectonic and Basin Evolution
 - 2.2. Structure Style and Framework
 - 2.3. Stratigraphy and Sedimentary Sequence

3. Seismic Interpretation and Well correlations
 - 3.1. Background
 - 3.2. Regional Seismic Section
 - 3.3. Time Structure Maps & Depth Structure Maps
 - 3.4. Isopach Maps
 - 3.5. Well Correlation
 - 3.6. Seismic Facies Maps & Geoseismic Section

4. Petroleum System Analysis
 - 4.1. Source Rocks
 - 4.2. Reservoir
 - 4.3. Seals
 - 4.4. Traps
 - 4.5. Timing
 - 4.6. Basin Modeling
 - 4.6.1. Modeling Method
 - 4.6.2. Parameter Preparation
 - 4.6.3. Modeling Results

5. Play Fairway
 - 1.1 Play Types
 - 1.2 Play Assessment
 - 1.3 Hydrocarbon Potential

6. Conclusion
 - E&P Strategy

Draft to be Finished By 15 June 2007

Annex 6

OUTLINE OF THE SULU SEA—EAST SABAH BASIN CASE STUDY

1. Basin Overview (Petronas to consolidate & write, info given by Philippines)
 - 1.1. Basin Background
 - 1.2. Exploration History
 - 1.3. Production Status
2. Regional Geology (Petronas to consolidate & write, info given by Philippines)
 - 2.1. Tectonic and Basin Evolution
 - 2.2. Structure Style and Framework
 - 2.3. Stratigraphy and Sedimentary Sequence
3. Seismic Interpretation and Well correlations (Philippines to consolidate & write, info given by Petronas)
 - 3.1. Background
 - 3.2. Regional Seismic Section
 - 3.3. Time Structure Maps & Depth Structure Maps
 - 3.4. Isopach Maps
 - 3.5. Well Correlation
 - 3.6. Seismic Facies Maps & Geoseismic Section
4. Petroleum System Analysis (Philippines & Petronas will have separate reports)
 - 4.1. Source Rocks Philippines
 - 4.2. Reservoir Philippines
 - 4.3. Seals Philippines
 - 4.4. Traps Philippines
 - 4.5. Timing Philippines
 - 4.6. Basin Modeling
 - 4.6.1. Modeling Method Philippines / Malaysia
 - 4.6.2. Parameter Preparation Philippines / Malaysia
 - 4.6.3. Modeling Results Philippines / Malaysia
5. Play Fairway (To be discussed in KL)
 - 1.4 Play Types
 - 1.5 Play Assessment
 - 1.6 Hydrocarbon Potential
6. Conclusion (To be discussed in KL)
 - E&P Strategy

***Draft to be Finished By 15 June 2007**

Annex 7

AGREED OUTLINE OF WORK PLAN ON THE SULU SEA—EAST SABAH BASIN CASE STUDY

- **Map Merging**
 - Cleaning up (fault symbols, gridding to be confined to areas with data only, update well locations, well's TD, index map etc) - **Malaysia**
 - Map scale to be 1:500000 at CI of 200ms - **Malaysia**
 - Depth conversion - **Malaysia**
 - Depth structure map - **Malaysia**
 - Isopach maps – 3 maps - **Malaysia**
 - Seismic facies maps (15.5 – Basement, 15.5 – 8.6) – **Philippines / Malaysia**
 - Onshore geological map to be integrated in merged maps – **Philippines / Malaysia**

- **Well correlation**
 - Zebra-1 is not included,(409-1 Sulu Sea, Hippo-1 & Wildebeest-1 are the only ones used) - **Philippines**
 - 1 geological seismic section (in depth) – AP174-29 – **Philippines**
 - To be merged with Malaysian side in KL (22-23 May 07) - **Philippines / Malaysia**

- **Seismic Lines**
 - DOE to send SEG-Y to KL to merge with Petronas lines

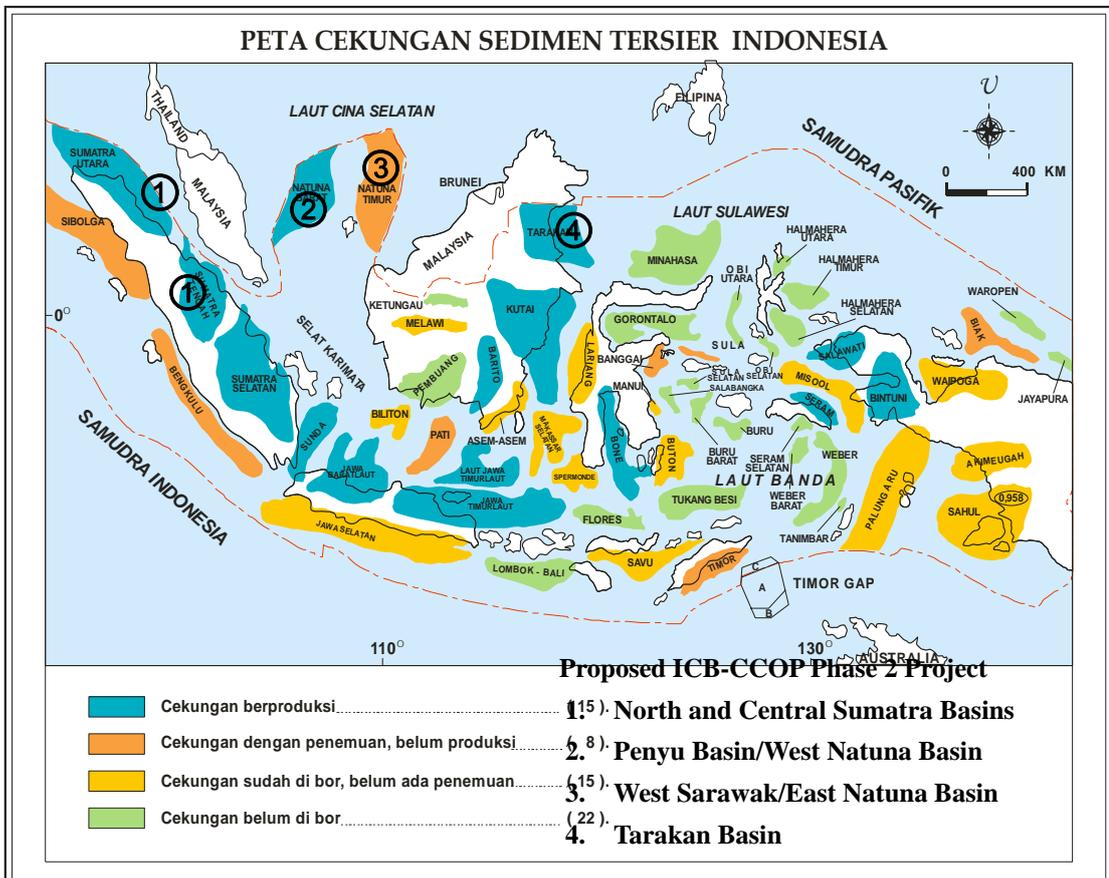
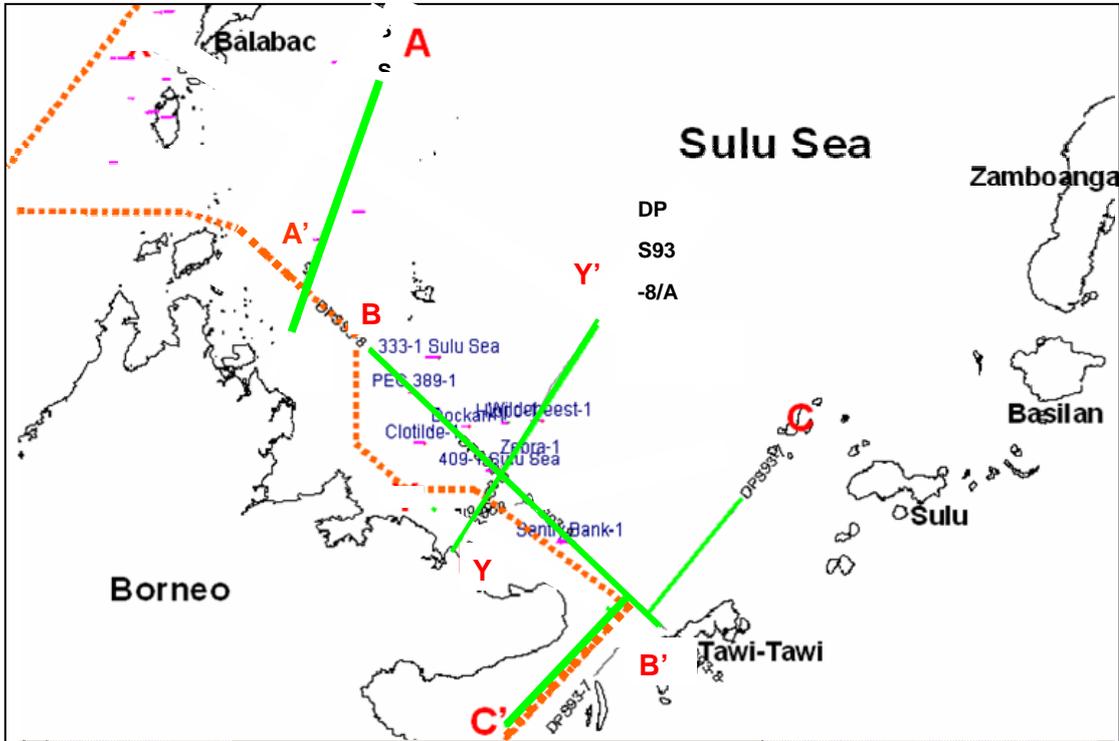
- **Basin Modelling**
 - Agreed on 2D Modelling - AP194 - **Philippines**
– SB30604 - **Malaysia**
 - 5 wells used by Philippines.(409-1 Sulu Sea, Hippo-1, Wildebeest-1, Sentry Bank-1 & 389-1) - **Philippines**
 - Malaysians using 11 wells - **Malaysia**
 - Petroleum system **Philippines / Malaysia**

- **Play Assessment**
 - Using seismic facies maps – KL meeting
 - Play map

- **Report Writing**
 - Word document

* 22-23 May 2007 – Meeting in Kuala Lumpur

Annex 8
THE SULU SEA—EAST SABAH BASIN CASE STUDY AREA



Annex 10

EXECUTIVE SUMMARY OF SONG HONG- YINGGEHAI BASIN CASE STUDY

1. Overview of final outputs of the ICB-CCOP1 Project phase 1
2. Final decisions of seismic – stratigraphy correlation between both two sides
3. Input data of basin modeling approved
4. Further works to finish phase I of the project

<i>No.</i>	<i>Job description</i>	<i>Contact person</i>	<i>Time</i>	<i>Note</i>
1	Mapping accuracy	Dr. Cai Feng Dr. Ng. The Hung	15 th March 07	
2	Geological stratigraphy correlation	Dr. Hung Mr. Tong	15 th March 07	
3	Input data of Basin Modeling	Dr. Cai Feng Mrs. Ng. Thi Dau	15 th March 07	
4	Exchange results of items 1,2, 3	All groups	30 th March 07	

5. Final products

<i>No.</i>	<i>Job description</i>	<i>Responsibility</i>	<i>Time</i>	<i>Notes</i>
1	10 Color Maps (Map-info; digital files)	Chinese group	30 th April 07	Dr. Cai Feng as contact person
2	Basin modeling by section AA'; BB'	Chinese group	30 th April 07	Dr. Cai Feng as contact person
3	3 cross sections :AA'; BB'; CC' (Corel 12)	Vietnamese group	30 th April 07	Dr. Hung as contact person
4	General stratigraphic-column	Vietnamese group	30 th April 07	Mr. Tuan and Dr. Wang as contact persons
5	Time-Depth curves	Vietnamese group	30 th April 07	Dr. Hung as contact person
6	Basin modeling by section CC'	Vietnamese group	30 th April 07	Mrs. Dau

6. Other works
 - ✓ Finish play assessment and final report of chapters 3-4 before seminar in Hanoi in May 2007
 - ✓ Exchange the final results of all above during the mapping training course
 - ✓ By June 2007, exchange the final report (of both sides individually) at time of training course in Indonesia
 - ✓ By July 2007 merge of reports from two sides in the workshop in Bangkok

Annex 11 Invited Speakers' Curriculum Vitae

China National Offshore Oil Corporation (CNOOC): Dr. Huang Baojia

Huang Baojia is a senior geologist and manager of Geochemistry and Accumulation Section, Technology Department, CNOOC Ltd.-Zhanjiang. He received his Ph.D. in petroleum geology from Guangzhou Institute of Geochemistry, Chinese Academy of Sciences in 2002. He has worked on applications organic geochemistry in understanding petroleum systems and exploration problems of the South China Sea Basins since 1990. His work focused on the origins and occurrence of inorganic CO₂ in the Yinggehai Basin from 1995 to 1996, and visited Chevron technology service company for the CNOOC-Chevron joint study project on CO₂ of the Yinggehai-Qiongdongnan Basins from December, 1995 to March, 1996. His main research interests are oil and gas geochemistry, reservoir geochemistry, and petroleum systems.

PERTAMINA: Mr. Pande Made Oka Iriana

Mr. Pande Made Oka Iriana was born in 1962 in Gianyar-Bali, Indonesia. He graduated from ITB (Institute of Technology Bandung) – Geological Technical Department. He started his professional career in a private company, PT. Gondwana – Bandung (Geological Consultant), as a field geologist. In 1990, he began working with PERTAMINA in Exploration Division-Upstream Directorate. At present, Mr. Pande Made Oka Iriana is a Stratigraphy Specialist at PERTAMINA's Exploration & Production Technology Centre. His involvements in exploration and GGR studies range from a Study of CO₂ Distribution in North West Java Basin (2002) to GGR Study in Pondok Tengah Structure (Pre POD Pondok Tengah-Tambun Field), North West Java Basin (2004) and Acceleration Gas Project in NAD (Nangroe Aceh Darussalam) - North Sumatera Area (2005) and a number of other related topics.

PETRONAS: Mr. Mansor Bin Ahmad

BSc (Geology) from University of Malaya, Malaysia in 1982. He joined PETRONAS the next year. He has been working as an operation geologist, field geologist and exploration geologist in Malaysia, Vietnam and Myanmar. Currently, Mr. Ahmad works as a staff geologist with PETRONAS, Petroleum Management Unit in the Basin Study Group, looking at Malaysian Basins. His recent expertise is in evaluating the CO₂ Distribution in Malay and Sarawak Basins. He also plans to study CO₂ in Saba Basin to search for possible geological parameters that control CO₂ Distribution in the basins.

Vietnam Petroleum Institute (VPI): Ms. Tran Chau Giang

Ms. Tran Chau Giang was born in 1973. She obtained her Bachelor Degree from Hanoi University of Mining and Geology and her Master's Degree from The Norwegian University of Science and Technology. She joined the Vietnam Petroleum Exploration and Production Company in 1995. She moved to the Vietnam Petroleum Institute in 1997. Now, she is the Manager of Basin analysis Department, E&P Center, Vietnam Petroleum Institute. She has been involved in many research projects of PetroVietnam as a petroleum geologist and reservoir engineer. During her career as a research scientist, she published several papers on

her field such as “Overpressure in Vietnamese sedimentary basins”, “The most important parameters in basement rock simulation.”