

ANNEX 50

Evaluation Report on the use of GeoX in the CCOP Member Countries November 15, 2003

GeoX has been introduced to CCOP (Coordinating Committee for Geoscience Programmes in East and Southeast Asia) through three petroleum related projects sponsored by NORAD, organized through the CCOP Technical Secretariat in Bangkok and with technical support by the Norwegian Petroleum Directorate.

The first introduction to GeoX was through the project **Oil and Gas Resource Management (OGRM)** during which it was used for resource assessment.

After the Full Cycle Economic analysis toll was added, GeoX was used in the project **Resource Evaluation and Planning, phase II (REP II)** which started in 1996. 9 licenses of GeoX were purchased for Cambodia, China, Indonesia, Korea, Malaysia, Papua New Guinea, Philippines, Thailand and Vietnam. The GeoX software was proven to be efficient and structured in a pedagogic way. In contrast, installation of the software was found to be more complicated than expected. During the first months of the project, the Project Coordinator paid a visit to each participating country, installed the software and carried out introductory training. Because of problems encountered in installing the program, the training sometimes was ineffective. Most problems were encountered with program updates, but these were dealt with and solved within reasonable time. During the project period there was good communication between CCOP and GeoKnowledge. CCOP provided input to the GeoX User forum.

GeoX was used in several workshops where all the CCOP In this way the principles of Resource assessment, classification and risking was lectured to a broad audience. Special training session was arranged for Cambodia and Vietnam in the use of GeoX.

Through REP II, GeoX was updated from version 3.1 to 4.6, Oracle 7 was used as database.

GeoX was again selected as the tool for resource and economic modeling in the project **Petroleum Policy Management (PPM)**. In December 2002 the maintenance agreement was renewed for four individual licenses. GeoX v. 5.06 was given to CNPA in Cambodia, Sinopec in China, Lemigas in Indonesia and the CCOP Technical secretariat. One multi-client license of GeoX is used by DOE in the Philippines and maintained through other NORAD financed projects. With this setup, all the four Case Studies of PPM can use GeoX.

China

China, primarily through SINOPEC is using Geox in their assessment of the Western Depression in the Sichuan basin and has used it in the assessment of other basins, the results of which were presented to convince management to drill their prospects.

Following benefits for our organization can be expected:

- The way to do resources assessment and risk analysis
- Learning to do resources assessment and risk analysis by GeoX
- Economic analysis on a play, a prospect, a field
- Knowledge of fiscal regime in
- Management knowledge of petroleum resources

By attending the first workshop of Cambodia case study, we know that the Multisegement of GeoX may be useful to us.

We plan to do resources assessment and risk analysis of prospects by Multisegement module.

Since 1998, petroleum resource assessment have been conducted by using GeoX 4.1-4.6 versions in the 9 prospects and 3 plays in some Chinese petroliferous basins.

Prospect resource assessment

- Hexingchang prospect, Sichuan basin
- Shangdong -3 prospect, Tarim basin
- Yakenbei-1 prospect, Tarim basin
- Qinjiatun prospect, South Songliao basin
- North Taipingzhuang prospect, South Songliao basin
- Duanqiao prospect, East China Sea basin
- Chunxiao prospect, East China Sea basin
- Chanxue prospect, East China Sea basin
- Tianwaitian prospect, East China Sea basin

Play resource assessment

- Tertiary Huagang sandstone play, East China Sea basin
- Tertiary pinghu sandstone play, East China Sea basin
- Triassic Xu2 sandstone play, Sichuan basin

The main advantages of GeoX software

GeoX software is an easy-to-use decision support system for oil and gas exploration

- Evaluation of play and prospect resources using a volumetric approach
- Play-and prospect-level risk estimation
- Comprehensive prospect after-tax economics
- Petroleum resource aggregation
- Data quality control
- Relational database

Some suggestions on the improvement of GeoX software

- 1). play economic analysis should be included
 - probability of a field of minimum economic size
 - chance of economic play success
 - economic field-size distribution
 - projected distribution of economic play reserves
 - term of the E&P contract

- mean NPV of play
- capital planning

2) The output of gProspect aggregation tool should be directly used in gfullcycle tool

Philippines

The Philippines Department of Energy (DOE) is definitely the one CCOP Member Country that have used GeoX most extensively. A large effort to update the total resource figure for the Philippines was conducted through the PhilPRA (Philippine Petroleum Resource Assessment) Project in 2001-2002. The total analyzed database consisted of 16 sedimentary basins and over 300 mapped prospects. GeoX was updated from version 4.6 to version 5.0.3 during the project. Recently an attempt has been made to update to v. 5.2. DOE has repeatedly reported problems with access to the database every time an updated version is installed in their server. The numbers cannot be read after new features have been added to the software. So far, GeoX has only been used both for Resource assessment, Including play and prospect modeling and portfolio analysis, and Full Cycle analysis.

GeoX Setup in DOE

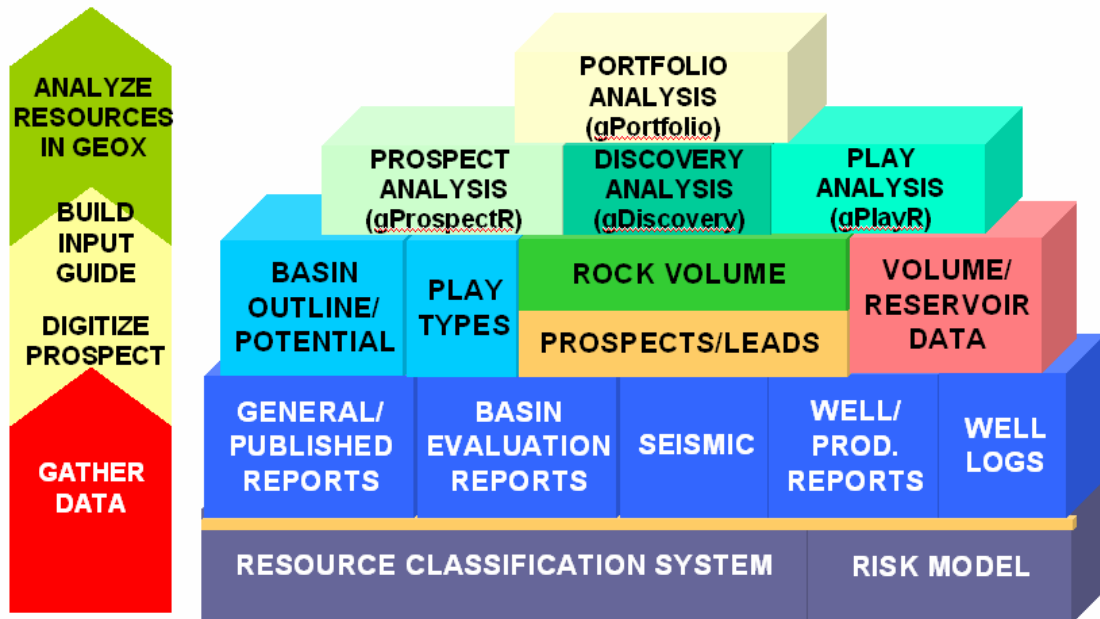
System:

- Client/server version, GeoX5.0.3
- 3 simultaneous licenses

Manpower:

- System Administrator
- 3 users (GeoX assessment team in PhilPRA)

Work flow (PhilPRA)



Summary of the PhilPRA results

- 16 sedimentary basins representing an area of over 700,000 sq km
- The study shows hydrocarbon resource potential larger than previously projected - much of the Philippine hydrocarbon potential remains unexplored
- While natural gas represents the bulk of the resources, significant oil deposits also remain to be found
- Total risked recoverable resources of over 8.9 billion BFOE

13-18 March 2003



Cambodia

The Cambodia National Petroleum Authority needs more training in the Geox usage. The PPM project has arranged for a 2-day special training in the Philippine DOE scheduled after the 2nd Workshop in Manila. DOE staff with experience in Geox will train and share their experience on the usage of the software.

Thailand

Most of the staff in Thailand Department of Miner Fuels that knows how to use Geox have moved to private companies. The new team is very eager to learn Geox and CCOP will soon coordinate a basic training on the usage of the software in Bangkok.

Indonesia

In Indonesia, the installation of the software was completed just recently due mainly to absence of a good systems administrator in Lemigas.. Also, upon the request of Lemigas, the PPM Project will purchase a new oracle software. Usage of the previous version was limited only to very few individuals.

Vietnam

PetroVietnam has used the Geox during their VITRA project and simultaneously using also other tools (such as PRISS and internally developed softwares).

Papua New Guinea

PNG has not been using Geox, no one among the current participants to the PPM project has any experience on the software.

Malaysia

Malaysia's Petronas has seldom used Geox since it developed their own resource assessment tool.

Korea

A small team in Korea's KIGAM is still using the version 4.6 in their prospect analysis.

KIGAM is also using their own and other softwares for their analysis.