

**Workshop on**  
**Carbon Dioxide (CO<sub>2</sub>) Management**  
**For Enhanced Oil Recovery (EOR)**  
*Theme*  
***Building Capacity for Sustainable Energy Developmen.***

Kuwait, May 14-15, 2007

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Chairman of the Organizing committee

Honorable Guests, ladies and gentlemen,

It gives me great pleasure to be with you today and to have the opportunity to address such a distinguished audience.

On behalf of the organizing committee, I would like to welcome our distinguished presenters and guests to this Carbon Dioxide management Workshop here in KISR.

The world's population is growing by about 90 million a year; which means that enough people are born by the end of this workshop to populate a city the size of Washington DC.

Every one of these people is going to need energy. At present, only 15% of the global population consumes some 60% of the world's current oil production. But the remaining 85% are entitled to the benefits of energy, too.

For the foreseeable future, oil and gas will continue to satisfy the bulk of the world's energy needs. It is neither realistic nor desirable to believe that energy demand can be arrested - to do so would condemn millions of people to poverty and to deny them the amenities, which we all take for granted.

As you see, we in this hydrocarbon rich region of the world have a major dilemma: First, meeting demand for energy; second, addressing our large carbon footprint and climate change; and third, maximizing the longevity of our oil fields. Claude Mandil, Executive Director of the IEA, recently stated: the inviolable pillars of a sustainable future are the three Es (energy security, environment protection, and economic growth).

Whilst we understand that energy is essential for sustainable development in the developing world; and while it is impossible to achieve sustainable economic growth without access to cost-effective, reliable and affordable energy - meeting such energy demand while addressing potential climate change issues presents challenges and opportunities for the oil industry.

The IEA estimates that current releases from fossil fuels of about 25bn tons annually, could approach 40bn tons in 2030, if current practices are followed. This is a major challenge requiring true partnership of all stakeholders involved in greenhouse gas emissions mitigation.

Climate change as an issue has rarely had the kind of attention from the press and public that it has received over the last few months. Perhaps this is because of worsening weather conditions or the growing consensus that human emissions of greenhouse gases are a cause.

Currently, oil and gas supply 65% of the world's daily needs. Over the next two decades at least, that proportion will increase. The world is on a completely unsustainable path—with a projected 85% of energy coming from fossil fuels in 2050. But, if the world dedicates more resources, research, and commitment to new

technologies and policies, emission levels in 2050 would be the same as they were in 2003.

Therefore, we have three choices.

1. Either we choke energy demand, which is not popular or practical.
2. or we can work on reducing significantly the environmental disadvantages of using current fossil fuels.
3. And the third choice is to develop substitutes for fossil fuels.

We need to work on all three !!

For the purpose of this workshop, however, I will focus on the capture and storage of  $CO_2$ , which is becoming internationally recognized as a critical component of the long-term transition towards more sustainable energy development.

The use of carbon dioxide ( $CO_2$ ) for enhanced oil recovery (EOR) offers a unique opportunity to extend the use of existing oil and gas infrastructures while providing solutions to increasing fossil fuel demand, climate change and commitments to reduce greenhouse gas (GHG) emissions.

There is an opportunity for Kuwait and KPC to join the growing number of companies and agencies engaged in projects that are bringing  $CO_2$  capture and storage to reality.

Exploring the potential for  $CO_2$  capture and geological storage and application for EOR purposes in Kuwait will be considered in two phases:

- Phase 1: Assessment of the geological storage potential of CO<sub>2</sub> in Kuwait region
  - Although KOC is currently producing oil through primary method, and to some extent secondary recovery using water injection; EOR techniques can achieve an additional 4%-9% oil recovery.
  - Various EOR techniques are being attempted including miscible gas injection, CO<sub>2</sub>, improved water injection and thermal methods
  - EOR screening studies have been undertaken by all assets within KOC
  - Studies related to use of CO<sub>2</sub> for EOR application in KOC reservoirs have been undertaken by KISR/JNOC as a Joint Research Project.
  
- Phase 2: Development and delivery of training modules and technical workshop, such as this one, in order to raise awareness of carbon management challenges, and viable carbon dioxide mitigation options; especially the capture and injection of CO<sub>2</sub> into oil reservoirs for storage and EOR purposes.

This workshop provides a unique opportunity to gain practical insights into developing successful CO<sub>2</sub> management projects and learn from internationally renowned experts on the topic . It is imperative that we seek to learn from one another,

In the next two days there will be presentations of 16 papers on varying aspects of CO<sub>2</sub> from capturing, processing, and transporting to subsurface injection for storage or EOR application. The presentations discuss the latest technologies and scientific issues in five sessions.

After each presentation there will be a 10 minute **Q&A** session. At the end of each session there will be a **group discussion** and a **conclusion**. This morning we are honored to have two key note speakers from BP and Shell to present their Case study findings on Carbon Capture & Sequestration (CCS); as well as IOR technologies using CO<sub>2</sub> round the world. In today's sessions 1 and 2, the presentations will cover:

1. Environmental impact of CO<sub>2</sub> Emission and Kyoto Protocol
2. CO<sub>2</sub> Capture, Transport, Storage and Technologies

Tomorrow's presentations and discussions will focus on reservoir engineering aspects of EOR by CO<sub>2</sub> flooding, followed by Geological, geotechnical and simulation studies. The presentations will conclude with the economic implications of CCS and EOR projects.

The conference will close with a group discussion which should result in formulating a strategic plan on "where do we go from here "

Experts will be available at the expert panels and discussion tables; to respond to queries on developing and implementing CO<sub>2</sub> capture and storage projects.

Ladies and gentlemen,

Kuwait and KISR are proud to host this important workshop, and thank our sponsors for their generous contributions. I also thank you for your attendance and interest, and wish you a successful workshop and an enjoyable time in Kuwait.

Thank you.