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## **SHEBERGHAN GAS FIELD DEVELOPMENT PROJECT (SGFDP)**

# **Gas Measurement, Quality and Safety Workshops**

May 28, 2011

Sheberghan Gas Field Development Project (SGFDP)  
USAID Contractor



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## I. Executive Summary

AEAI was originally contracted to provide a gas measurement, quality and safety training workshop to employees of the Ministry of Mines, including the Hydrocarbon Unit, Afghan Gas Enterprise and the Northern Hydrocarbon Unit. AEAJ had anticipated purchasing several items of equipment, including a gas chromatograph that could be used to measure gas composition in various wells in the Sheberghan gas fields. The training workshop would have included hands on training of this equipment. However, due to a number of factors, the project determined that it was not feasible to purchase the equipment.

Despite the unavailability of the gas chromatograph and other equipment, AEAJ went ahead with the key aspect of the deliverable: providing training to employees of the Ministry of Mines on gas measurement, quality and safety. AEAJ also included students from the Geosciences and Sciences Faculties at Kabul University and the Oil and Gas Department and Faculty of Mines at Kabul Polytechnic University. Between December 2010 and May 2011, AEAJ conducted more than a dozen training workshops in which more than 500 professionals and future experts in Afghanistan's hydrocarbon sector participated.

The final training seminar included faculty members of the Geosciences Faculty from Kabul University and the Oil and Gas Department and Faculty of Mines at Kabul Polytechnic University and was designed to facilitate interaction between the Ministry of Mines employees and the academic community. During the discussion, both sides were able to offer and discuss their perspectives on the future of the hydrocarbon sector in Afghanistan and explore opportunities for potential collaboration and cooperation. The university representatives, in particular, were very interested in the opportunity to work with professionals from the Ministry on issues facing the hydrocarbon sector in Afghanistan. The discussion was very successful and resulted in an agreement between the participants to continue exploring opportunities for collaboration and cooperation.

These sessions reinforced several conclusions of the SGFDP Capacity Building Deliverable (submitted in December of 2010) such as:

- The most effective use of capacity building efforts is in the institutions of higher learning (Kabul University & Kabul Polytechnic University)
- Participants from the Ministry were generally active in the discussion workshops, though they lack the equipment necessary for practical application of the capacity building topics
- A comprehensive, long-term training program is needed to bring the skill levels of Ministry officials to a level where they can be effective in major hydrocarbon projects

There have been discussions between MoM and donors about the development of a hydrocarbon and mining institute in Kabul. Such an institute could meet the challenges described above by:

- Providing students, teachers and professors with a centralized location and curriculum for the study of hydrocarbon sciences
- Providing an opportunity for research and development designed to address unique problems in Afghanistan's hydrocarbon sector and advance the use of technology in hydrocarbon development
- Providing long-term, institutional capacity building opportunities to Ministry employees that would allow them to develop their skills and knowledge in hydrocarbon operations
- Providing a centralized licensing and professional certification process to encourage professional development of Afghan petroleum engineers, geologists, chemists, and other professionals associated with the hydrocarbon sector.

The development of an institute could be initially funded using international donor organization money, but would be structured to become fully self-sustaining as development takes place in the fields. In many similarly situated developing countries, these institutions are funded using proceeds from oil and gas resource development and have become self-sustaining without the need for further donor involvement or funding. This institute could have substantial benefits for Afghanistan and the SGFDP team recommends that work to establish such an institute proceed with all deliberate speed.

## II. Introduction

The development of Sheberghan gas fields and the construction of a gas-fired power plant in the form of an independent power producer (IPP) would provide sustainable, long-term energy for Afghanistan. The required infrastructure both on the gas field development side as well as the power plant side necessitates increased capacity building efforts to ensure that the appropriate Afghan energy professionals are adequately trained to handle the support needed for the construction and installation of the required infrastructure as well as operations and maintenance needs of the commissioned infrastructure.

The second round of capacity building efforts was focused on seven entities: the Ministry of Mines' Hydrocarbon Unit, Ministry of Mines' Investment Promotion Department, Afghan Gas Enterprise, the Northern Directorate of the Hydrocarbon Unit, Kabul University, and Kabul Polytechnic University. The training modules were customized to meet the needs of the individuals at three levels - basic, intermediate, and advanced. In order to initiate dialogue between the Ministry of Mines and academia, a seminar was held at the Afghan Geological survey entitled *Hydrocarbon Development in Afghanistan*. Details about the seminar and the training modules for each entity are described in the sections that follow.

### III. Seminar on the Hydrocarbon Sector in Afghanistan

The SGFDP team arranged a three day seminar on the hydrocarbon sector in Afghanistan. The seminar took place between May 22, 2011, and May 24, 2011. The goal was to bring the policy makers from the Hydrocarbon Unit at the Ministry of Mines together with representatives of higher education from Kabul Polytechnic University and Kabul University. Approximately 40 individuals participated in the seminar, including the three discussion workshops. A list of participants and the schedule are attached in Appendix A.

Dr. Atiq Sediqi, Director General of the Afghan Geological Survey, presented Kabul Polytechnic University and Kabul University with copies of the GIS software and gave opening remarks on the importance of students of both institutions working with the software and becoming familiar with it. He also provided opening remarks on his perspectives on the future of the hydrocarbon sector in Afghanistan.



Following the presentation by Dr. Sediqi, several participants from the Universities and the Hydrocarbon Department offered their perspectives on the hydrocarbon sector in Afghanistan and the role that institutions of higher learning could play in support of the Ministry of Mines' mission to develop Afghanistan's hydrocarbon resources. Participants discussed the creation of a technical board that would include representatives from the Universities. The technical board would participate in policy formation, evaluation of tender opportunities and assist with resolving technical challenges in the development of Afghanistan's resources. The discussion resulted in an agreement between the participants to continue exploring opportunities for collaboration and cooperation.

Following the roundtable discussion, the SGFDP team presented three discussion workshops in the afternoons. The SGFDP team also provided some participants with a guided tour through the geological museum at the Afghan Geological Survey. The discussion workshops included topical presentations related to current activities in the Sheberghan gas fields.

## Major Topics

The seminar included discussions with participants on the following topics:

- Modern drilling and well completion techniques
- Advanced natural gas sweetening and processing techniques
- Natural gas transmission systems (including design, construction and operations and maintenance)
- Definition and applicability of the Wobbe Index
- Use and applications of a gas chromatograph for gas quality analysis

#### **IV. Training Workshops at Ministry of Mines – Investment Promotion Department**

The SGFDP team conducted two training workshops for the Ministry of Mines – Investment Promotion Department at the Afghan Geological Survey in May 2011. A total of 6 participants, including the head of the department participated in these training workshops. The workshops consisted of detailed discussions on gas utilization and treatment.

##### **Major Topics**

The Ministry of Mines – Investment Promotion workshops included discussions with line professionals on the following topics:

- Gas utilization including setting up CNG stations
- Natural gas treatment

## **V. Training Workshops at the Ministry of Mines – Hydrocarbon Unit**

The SGFDP team conducted a special training workshop for the Ministry of Mines – Hydrocarbon Unit at the Afghan Geological Survey on December 29, 2010. A total of 25 participants, including five top performing students of Kabul University, participated in this special training program. The workshops consisted of detailed discussions on several topics related to natural gas measurement, quality and safety.

### **Major Topics**

The Ministry of Mines – Hydrocarbon Unit workshops included discussions with line professionals on the following topics:

- Modern drilling and well completion techniques
- Use and applications of a gas chromatograph for gas quality analysis
- Pipeline quality gas
- Definition and applicability of the Wobbe Index

## **VI. Training Workshops at Afghan Gas Enterprise / N. Directorate of the Hydrocarbon Unit**

The SGFDP team made a site visit to Sheberghan between February 19, 2011, and February 26, 2011. During this site visit, the SGFDP team conducted two training sessions in Sheberghan, one each for Afghan Gas Enterprise and the Northern Directorate of the Hydrocarbon Unit. A total of 60 line professionals from these two entities were trained during these sessions. The workshops consisted of a morning lecture on specific topics related to their respective areas of responsibility. In the afternoon, participants were taken to the fields for hands on training and practical application of the morning discussions.

### **Major Topics**

The Afghan Gas Enterprise workshops included discussions with line professionals on the following topics:

- Design and construction of gas transmission systems
- Design of gas pressure regulating and metering stations
- Use and applications of a gas chromatograph for gas quality analysis
- Pipeline quality gas
- Definition and applicability of the Wobbe Index

The Northern Directorate of the Hydrocarbon Unit workshops included discussions with line professionals on the following topics:

- Design and construction of gas transmission systems
- Use and applications of a gas chromatograph for gas quality analysis
- Pipeline quality gas
- Definition and applicability of the Wobbe Index

## VII. Training Workshops at Kabul University

The SGFDP team conducted a second round of discussion workshops at Kabul University between April 16, 2011, and April 18, 2011. Approximately 45 students and teachers from the Kabul University, Faculty of Geosciences participated in the training workshop.

### Major Topics

The Kabul University, Faculty of Geosciences workshops included discussions with students and professors on the following topics:

- Engineering and design of natural gas treatment plants with specific discussion of natural gas sweetening plants
- Natural gas transmission system design and materials selection
- Natural gas transmission system construction

## VIII. Training Workshops at Kabul Polytechnic University

The SGFDP team conducted a series of discussion workshops at Kabul Polytechnic University between May 3, 2011, and May 14, 2011. Attendance at the four workshops averaged 75 students, teachers and professors and was presented at the Kabul Polytechnic University Computer Science Auditorium.

### Major Topics

The Kabul Polytechnic University workshops included discussions with students and professors on the following topics:

- Engineering and design of natural gas treatment plants with specific discussion of natural gas sweetening plants
- Natural gas transmission system design and materials selection
- Natural gas transmission system construction
- Utilization of natural gas including compressed natural gas (CNG) liquefied petroleum gas (LPG) and liquefied natural gas (LNG).

## IX. Recommendations

Capacity building opportunities have been, and will continue to be, a major part of the overall USAID mission in Afghanistan. The SGFDP team conducted a second round of capacity building with many of our targeted entities, including institutions of higher learning.

We recommend that capacity building efforts continue to be an integral part of the PMU in as many ways as possible. This includes requiring consultants working on Sheberghan gas and related activities to host training sessions with MoM employees, including Afghan Gas and NHU on their areas of expertise, such as natural gas field development, legal and regulatory requirements, and other aspects of natural gas systems. In addition, the SGFDP team recommends that foreign consultants take on an Afghan counterpart to provide one-on-one capacity building. This recommendation is consistent with the USAID and Ministry of Mines philosophy that Afghans should be trained to take over the responsibility of the PMU as soon as practicable.

Another major recommendation, based on the experience of the SGFDP team at Kabul University, is the integration of institutions of higher learning with the government ministries and businesses that will be supporting natural resource development projects in the future. The SGFDP's recommendation in this area is two-fold:

- First, the SGFDP team recommends that capacity building programs with Kabul University and Kabul Polytechnic University be continued and expanded. Efforts should also be made to continue the dialogue between the Ministry and institutions of higher education in order to better coordinate training and professional development opportunities for both the Ministry employees and the students.
- Second, the SGFDP team recommends that capacity building be integrated into the Project Management Unit structure through internship opportunities for students and periodic training programs held by Project Management Unit consultants at institutions of higher learning, particularly Kabul University and Kabul Polytechnic University.

## **X. Appendix A--Seminar Agenda**

# Hydrocarbon Development in Afghanistan Seminar

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<i>Seminar Title:</i>	<i>The Future of the Hydrocarbon Sector in Afghanistan</i>
<i>Keynote Speaker:</i>	<i>Atiq Sediqi, Ph.D., MPH, PG, Director General of the Afghan Geological Survey and Deputy Director of the Project Management Unit</i>
<i>Seminar Target Audience:</i>	<i>Representatives from the Ministry of Mines &amp; Ministry of Mines Hydrocarbon Unit (17)</i>  <i>Distinguished Professors and Invited Guests of Kabul Polytechnic University (10)</i>  <i>Distinguished Professors and Invited Guests of Kabul University (10)</i>
<i>Venue:</i>	<i>Afghan Geological Survey – Ministry of Mines</i>
<i>Duration:</i>	<i>May 22<sup>nd</sup>, 2011 – May 24<sup>th</sup>, 2011, 9:30 a.m. to 3:30 p.m. on May 22<sup>nd</sup>, 1:30 p.m. to 3:30 p.m. May 23<sup>rd</sup> &amp; 24<sup>th</sup></i>
<i>Topics Covered:</i>	<i>Perspectives on Hydrocarbon Development in Afghanistan from Afghan Government Officials and Leading Academic Scholars; Opportunities for Collaboration between Government and Academic Institutions in the Hydrocarbon Sector; Topical Workshops on Issues in Afghanistan’s Hydrocarbon Sector</i>

# Hydrocarbon Development in Afghanistan Seminar

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## Day 1: Sunday, May 22<sup>nd</sup>, 2011

10:00 a.m. – 10:15 a.m.      Keynote Address: *A Vision for the Future of the Hydrocarbon Sector in Afghanistan*

Atiq Sediqi, PhD, MPH, PG, Director General of the Afghan Geological Survey and Deputy Director of the Project Management Unit

10:15 a.m. – 11:30 a.m.      Panel Discussion: *Perspectives on Hydrocarbon Development in Afghanistan*

Moderator: Professor Ahmed Shah, KPU

### Panel Participants

Representative from Ministry of Mines Hydrocarbon Unit

Representative from Kabul Polytechnic University

Representative from Kabul University

Student Representative from Kabul Polytechnic University

Student Representative from Kabul University

11:30 a.m. – 1:00 p.m.      Lunch

1:00 p.m. – 3:00 p.m.      Discussion Workshop: *Modern Drilling and Well Construction Techniques*

3:00 p.m. – 3:30 p.m.      Group Discussion: *Drilling Techniques*

## Day 2: Monday, May 23<sup>rd</sup>, 2011

1:30 p.m. – 3:30 p.m.      Discussion Workshop: *Advanced Natural Gas Sweetening and Processing Techniques*

## Day 3: Tuesday, May 24<sup>th</sup>, 2011

1:30 p.m. – 3:30 p.m.      Discussion Workshop: *Natural Gas Transmission System Operations and Maintenance*