

SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION (SAARC)



SAARC ENERGY CENTRE  
ISLAMABAD

# THE REPORT

Programme Activity: PROMO-PRG-102/2016

The banner features the flags of SAARC member states: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. Below the flags, the text reads: "SAARC Workshop", "Geophysical Techniques in Oil & Gas Exploration", "8 - 12 August, 2016", "Islamabad, Pakistan", "Organized By", "SAARC Energy Centre, Islamabad", "In Collaboration With", "Oil & Gas Development Co. Ltd. Pakistan". Logos for the SAARC Energy Centre and Oil & Gas Development Company Limited are also present.

**August, 2016**

SAARC Energy Centre  
697, Street 43, Sector E-11/4, NPF,  
Islamabad, Pakistan  
[www.saarcenergy.org](http://www.saarcenergy.org)



SAARC Energy Centre

Programme Activity: PROMO-PRG-102/2016  
**Geophysical Techniques in Oil & Gas Exploration**  
Organized By  
**SAARC Energy Centre, Islamabad**  
**8 – 12 August, 2016**  
**Islamabad, Pakistan.**



In Collaboration with  
**Oil & Gas Development Co. Ltd.**  
Government of Pakistan

# The Report

## Introduction

SAARC Energy Centre, Islamabad under its approved programme activity for FY 2016 organized a five day **Workshop on Geophysical Techniques in Oil & Gas Exploration** in Islamabad, Pakistan on 08-12 August, 2016. The event was arranged in The Oil & Gas Training Institute (OGTI) Islamabad, a daughter organization of Oil & Gas Development Company Ltd. (OGDCL), Government of Pakistan. Copy of the Workshop Agenda is available at **Annexure I**.

SEC especially envisaged this Training workshop under its thematic programme area of “Minimize Oil Imports through Improvements in Energy Efficiency and Fuel Substitution (PROMO)” aiming to share and enhance the technical competence of the regional geophysicists in various skills applied in oil and gas exploration. The training was very useful for those Member States which are already engaged in Oil and Gas exploration, and others who are contemplating to launch exploration ventures in their respective Member States.

The main objectives of the training course was to facilitate transfer of 2D/3D Seismic Survey technology to all Member States; to provide training and capacity building of professionals in seismic data acquisition, processing and interpretation; to enhance expertise in exploration, resource evaluation and production planning. The training course facilitated to share know how on 2D/3D Seismic Survey technology and other techniques; and to enhance technical capability of Oil and Gas organizations engaged in exploration activities.

In view of the proactive participation by the resource persons and delegates, the workshop successfully managed to establish communication, facilitated professional exchange and initiate cooperation between policy makers, experts, government officials and other stakeholders from public and private sectors.

## 2. Participation

A total of 23 participants including the delegates from Member States participated in the workshop. The list of the participants is available at **Annexure II**. The workshop attracted an overwhelming participation from the host Member State Pakistan, dominated by SEC’s collaborating organization for this Workshop i.e. OGDCL and Ministry of petroleum & mineral resources. The resource persons delivered presentations on different techniques relevant to exploration of oil and gas. The participants had a very open and interactive discussion over the existing potential, the available opportunities in the oil & gas sector and other relevant aspects.

### 3. Workshop Agenda

The Workshop programme comprised of 11 Technical sessions comprising of 16 presentations delivered by the experts from the different national and international E&P companies working in Pakistan. The workshop agenda was divided into the following 11 major sessions:

- i. Inaugural Session
- ii. Country Presentations
- iii. Introduction to Geophysical Methods and Techniques
- iv. Seismic Data Acquisition & Processing
- v. Seismic Data Interpretation
- vi. Exploitation of Unconventional Resources
- vii. Reservoir Characterization
- viii. Frontier Exploration in Pakistan
- ix. Technical visits
- x. Valedictory Session

### 4. Inaugural Session

The workshop was inaugurated by **Mr. Muhammad Naeem Malik, Director SAARC Energy & Environment Centre Islamabad, Pakistan**. The session was graced by the presence of Dr. M. Saeed Khan Jadoon – Executive Director Exploration, OGDCL, Mr. Muhammad Tahir Qureshi - Director OGTI, Dr. Khalid Amin Khan – Chief Geophysicist OGDCL, Dr. Muhammad Nawaz Akhtar - Programme Leader (Technology Transfer), SEC, Delegates from Member States, Faculty Members of OGTI, SEC Professionals, local guests from different Ministries and Departments, students from Quaid e Azam University and Bahria University Islamabad.

The workshop was commenced with a Welcome Speech by **Mr. Muhammad Naeem Malik, Director SAARC Energy & Environment Centre Islamabad, Pakistan**. **Mr. Muhammad Naeem** Malik welcomed the resource persons and all the delegates from SAARC Member States for attending the workshop. He especially thanked Dr. M. Saeed Khan Jadoon – Executive Director Exploration, OGDCL, and Mr. Muhammad Tahir Qureshi - Director OGTI for putting invaluable efforts for the successful conduct of this workshop and Dr. Khalid Amin Khan – Chief Geophysicist OGDCL for designing and coordinating the course contents of this workshop as well

as contributing as the key resource person for this workshop.

**Mr. Muhammad Naeem Malik** made some introductory remarks about SAARC Energy Centre Islamabad and after that he stated that South Asia region is one of the fastest growing regions in the world with economic growth forecasted to gradually increase from 7.1 percent in 2016 to 7.3 percent in 2017. The demand for infrastructure, and particularly energy, is growing rapidly. Thus, improved energy supply is a key to sustaining economic growth and improving social services.

He added that the region is blessed with abundant natural resources of conventional and unconventional energy yet all its Member States are facing acute shortage of energy. Each Member State of SAARC Region is pursuing all available measures to counter the energy deficit problem which has hampered the economic growth in their respective country. The Member States have taken various initiatives in the past to increase the development of all energy resources out of which Oil and Gas are the primary resources of energy.

He highlighted that no individual SAARC Member State is in a position to cater, the rapidly growing energy demand. Energy insecurity could bring large scale instability in South Asia, both in terms of political and development advancements. Optimal utilization of indigenous resources of the South Asia region needs to be prioritized, since it would ensure and endure energy security and maximize, socio-economic benefits, for the people of this region.

Mr. Malik explained that realizing the importance of oil & gas sector, in meeting the energy needs of the SAARC member States, it was recommended by the first meeting of the SAARC Expert Group on Oil and Gas, held in Dhaka in 2011 to conduct a training programme on “Geophysical Techniques” in Oil & Gas exploration. It was also proposed to be held in Islamabad. Government of Pakistan came forward & committed with the Member States to undertake this training in Pakistan & SEC was asked to organize a 5 days training workshop in collaboration with Pakistan’s biggest Oil & Gas Company, OGDCL and other world renowned companies for the benefit of professionals of Member States for affectively pursuing their exploration efforts.

He mentioned that despite continued increasing dependence on the fossil fuels for energy supply, and being net importer, South Asian region is one of the less explored regions around the globe, in terms of fossil fuels. The Member States of SAARC region must make concerted efforts to increase their own resource basis through aggressive exploration in order to enhance energy security.



He again highlighted that the identification of underground hydrocarbon bearing structures is necessary before undertaking expensive drilling project(s). Identification of structure increases possibility of success and reduces the overall exploration costs. The goal of Oil and Gas exploration is to find hydrocarbon accumulations in commercial quantities. It is important to use the latest Geophysical techniques for better success in exploration of hydrocarbons especially in the wake of lower pricing regime. Although some Member States in the region have been able to acquire the international level of expertise in the field of petroleum exploration, others are lacking adequate exposure & experience to the state-of-the-art technologies.

In the end Mr. Malik acknowledged the great cooperation extended by the M.D OGDCL Mr. Zahid Mir, Executive Director Exploration Dr. Saeed Ahmad Khan Jadoon, Director OGTI Mr. Tahir Qureshi and all staff members, experts from PPL, Schlumberger, LMKR, ENI, and especially Dr. Khalid Amin Khan, the focal person in facilitating to organize this workshop. He wished all the delegates a very pleasant and happy stay in Islamabad and also wished that the Training workshop ends with a great success and meets its objectives. Photographs of the training workshop are available at Annexure-III.

## **5 Technical Proceedings**

The Workshop proceedings were initiated with Technical sessions, designed on specific areas and started with country presentations by each of the participating Member States. The Workshop program comprised of 11 technical sessions comprising of 16 presentations by the experts from different national and international companies engaged in the exploration and production of Oil & Gas. All the available presentations made in the following technical sessions were distributed to all the participants through USB and are available at the SEC website ([www.saarcenergy.org](http://www.saarcenergy.org)):

## **6 Country Presentations**

This first technical session started with the introductory presentation by Mr. Abid Hussain, Senior Geologist, Pakistan Petroleum Limited (PPL). In his presentation, he shed light on the background, objectives and present status of oil & gas exploration in Pakistan. He also informed the audience about the future plans in this regard. In the end, he gave brief introduction of capabilities of PPL in the exploration of Oil & Gas.

This was then followed by the country presentations by the delegates from the member states. The countries Bangladesh, Bhutan, Nepal and Maldives presented the status of Oil & Gas exploration in their respective country.

### **1st Technical Session**

- *Introduction to Geophysical Methods*
- *Gravity Techniques for Basin Mapping*

[Dr. Khalid Amin Khan, Chief Geophysicist, Instructor: Geophysics, Geodesy & Geoinformatics, OGDCL, Pakistan.]

Dr. Khalid Amin Khan started his presentation by refreshing the basics of physical laws, physical measurements and concepts of geophysical measurements. Then he introduced the different Geophysical Methods used for the exploration of oil & Gas. Later on he explained the *Gravity Techniques for Basin Mapping* and discussed the limitations, advantages and ease of utilization etc.

### **2<sup>nd</sup> Technical Session**

In this session a visit was organized by the OGTI to its Geological & Reservoir Research Labs, I-9 Islamabad. In this visit following labs were visited;

- Core analysis Laboratory
- Sedimentology ``
- Biostratigraphy ``
- Geochemistry ``
- Analytical chemistry ``

During the above-mentioned visit a brief introduction was given to the workshop participants regarding respective laboratory and highlighted the equipments, facilities, samples, sample preparation techniques, limitations, results and interpretations etc., for each laboratory, accordingly. All of the participants took interest, especially the delegates from Bangladesh and Pakistan about the specific equipments and samples etc.

### **3<sup>rd</sup> Technical Session**

In the third technical session following 3 lectures were delivered by Dr. Khalid Amin Khan.

- Seismic Refraction & Near Surface Geophysical Engineering
  - Seismic Reflection Data Acquisition
  - Seismic Data Processing: DE convolution, Velocity Analysis, Migration
- [Dr. Khalid Amin Khan, Chief Geophysicist, Instructor: Geophysics, Geodesy & Geoinformatics, OGDCL, Pakistan.]

Dr. Khalid Amin Khan, presented the introduction of Seismic Refraction & Near Surface Geophysical Engineering Technique being used for the exploration of oil and gas. He explained very beautifully the whole process involved. Then he shared with the participants how the Seismic Reflection Data Acquisition can be managed. Then he explained the procedures required for the Seismic Data Processing like DE convolution, Velocity Analysis, Migration etc.

#### **4<sup>th</sup> Technical Session**

In the fourth technical session following 6 lectures were delivered by Dr. Khalid Amin Khan.

- Seismic Interpretation
- 3D Seismic Volume Interpretation
- Wireline Logs & Synthetic Seismogram
- Velocity Model Building
- Seismic Attributes
- Quantitative Interpretation and Rock Physics

[Dr. Khalid Amin Khan, Chief Geophysicist, Instructor: Geophysics, Geodesy & Geoinformatics, OGDCL, Pakistan]

Dr. Khalid Amin Khan, in his first lecture explained how the Seismic Interpretation is made. He discussed about the 3D Seismic Volume Interpretation, Wire line Logs & Synthetic Seismogram, Velocity Model Building, Seismic Attributes, Quantitative Interpretation and Rock Physics and compared the ease of use, benefits, accuracy level and limitations of all above mentioned Seismic Interpretation methods.

#### **5<sup>th</sup> Technical Session**

In the 5th Technical session a visit was arranged for the workshop participants to the Seismic Data Processing Center, OGDCL Head Office. In this visit Dr. Khalid Amin Khan was the coordinator who described the salient features of this data center and it was briefed that how the data is received, compiled, processed and interpreted accordingly.

#### **6<sup>th</sup> Technical Session**



In this session Mr. Hamid Ali Shahid delivered his lecture on the topic “Harness the power of Seismic Attributes”. He defined the Classification of Seismic Attributes: as Geometric Attributes and Physical Attributes. He explained how seismic attributes help in the interpretation and mapping geologic features or characterize reservoir properties. He also highlighted how Seismic Attributes reveal features, relationships, and patterns in seismic data that otherwise might not be noticed. He presented the role of attributes in interpretation which followed major breakthroughs in computing and acquisition technology recommended applications like Digital Recording, Color Printing, Complex Trace Attributes, Workstation Interpretation, 3D Seismic Neural Networks etc.

### **7<sup>th</sup> Technical Session**

In the 7th Technical session a visit was arranged for the workshop participants to the Hydrocarbon Development Institute of Pakistan (HDIP). Dr. Pervez, Principal Scientific Officer coordinated this visit and explained the functions of each analytical and basic laboratory used for the different services regarding hydrocarbon fuels development and testing activities. He also briefed about the training activities going on in specific areas.

### **8<sup>th</sup> Technical Session**

In this session, a comprehensive and informative lecture on Unconventional Hydrocarbon Potential of Pakistan – Resource Assessment and Exploration Efforts was delivered by Mr. M. Ajaz Sarwar, Manager OGDCL on behalf of Dr. M. Saeed Khan Jadoon. The out-lines of lecture were focused on Workflow to Identify, Qualify, Quantify & Develop Gas Shales of Pakistan. A brief history about conventional and unconventional petroleum exploration was told to the audience. Potential of unconventional hydrocarbons of region in general, and shale gas potential of Pakistan in particular was focused. Valuable arguments on assessment of resource potential and its operational viability were presented. Explanations on reservoir characterization, inventory building of prospective shale reservoirs and delineation of sweet spots are done. Availability of expertise, technology, services, supplies (tubulars, completions, materials and water), Infrastructure, logistics, drilling and hydraulic fracturing strategy (length of laterals, number of stages and clusters, geometric or engineering design), environmental impact assessment, applying ranking criteria to prioritize prospects for selecting Pilot Projects, public awareness to get community support and execution of the Pilot Project were discussed.

### **9<sup>th</sup> Technical Session**

In this session, Mr. Nasir Ahmad from ENI delivered his lecture on the topic “Reservoir Characterization by using Seismic Amplitude”. He described that the reservoir characterization by seismic amplitude is a technique used to find reservoir

properties by using seismic data. In this talk initially basics were discussed then the factors which affect the seismic amplitude and then the outline of the technique were explained. Then 3 case studies were discussed in which porosity and net sand thickness was calculated by using seismic data. At the end the conclusions were shared with the workshop participants.

### **10<sup>th</sup> Technical Session**

In this session, Mr. Abid Hussain Senior Geologist from PPL delivered his lecture on the topic “Frontier Exploration in Pakistan”. He started his lecture by discussing the geological settings of Pakistan. Then he highlighted the importance of frontier exploration of Pakistan. Then he mentioned the frontier exploration areas of Pakistan. Then he mentioned the useful tools and his experiences like low velocity zones in the core of anticline zones, wide line techniques for complex structures, stress field detector for air bourn survey, geological data to resolve steeply dipping dips on seismic, geochemical surveys, and importance of analogues to explore new plays etc. At the end of his lecture he beautifully mentioned the take home messages;

- To explore geological complex frontier basins, artistic technologies are required.
- Maximum tools should be utilized during prospect generation/evaluation in order to avoid surprises and not to miss the true potential.
- Analogous are the key leads toward effective exploration of new areas.
- Analogous are the key leads toward effective exploration of new areas.

### **11<sup>th</sup> Technical Session**

In this session Dr. Nadeem Ahmad, Director Exploration & Business Development, MOL Oil& Gas Co. B.V. (Pakistan), delivered his lecture on the topic “Exploration Strategies for Frontier Hydrocarbon Plays in the Western basins of South Asia in low price environment”. He described that since the advent of new E&P technologies and workflows in last two decades, majority of the oil & gas exploration campaigns have remained focused on accessible and doable parts of the onshore western basins of the South Asia. Little has been done in the remote western parts due to rugged terrain, geopolitical and security issues, and sparse to no seismic coverage with poorly understood subsurface and petroleum systems. Technology breakthroughs of the last 2 decades and attractive economics of the projects at high oil price of over \$70 per barrel (bbl) for over seven (7) long years, mostly in the range of \$80-\$100 per barrels of oil equivalent (boe), provided E&P companies an access to the previously inaccessible geographic settings and deep-seated previously unseen geological Plays. Like other parts of the world, in Pakistan too, the exploration performance of basins

has significantly improved over the past two decades. He mentioned that five (5) strategic options may be considered for the exploration entities in Pakistan to prioritize their exploration capex and the tax benefit for drilling exploration wells in the current low oil price scenario.

- Technology selection and timely deployment,
- Brownfield and greenfield infrastructure-led exploration of smaller prospects,
- As next strategic option to exploring frontier basins & plays, the public sector companies may engage IOCs for exploring the remote and unproven basins like interior fold belts and Kharan basin by defining new play concepts and using innovative approaches.
- Add Unconventional play types to the portfolio,
- IOCs having Giant fields in their portfolios continuously add new countries and basins to their portfolios in order to access new emergent basins with larger field sizes. Recent examples are: Petrochina, Petronas, ONGC Videsh. Accessing E&P projects in the neighboring oil & gas rich countries helps secure energy at the source (the “Profit oil concept”).

## **7 Dinner Reception**

SAARC Energy Centre hosted dinner on Monday, 8<sup>th</sup> August 2016 for the workshop delegates providing an informal opportunity for close interaction and networking. A number of dignitaries from Government of Pakistan along with personals from OGTI senior management also joined on this occasion.

## **8 Valedictory Session**

Dr. Muhammad Nawaz Akhtar shared the report of the Workshop with the participants. While thanking Ministry of Petroleum & Natural Resources, OGDCL, OGTI, and HDIP for their contribution in successful culmination of the workshop, he read out the following recommendations emerging from the deliberations of the workshop:

- Similar training workshops may be conducted in future by SEC on hydrocarbon explorations.
- Experts of SAARC member states in the Petroleum Industry should meet frequently to formulate a joint venture to explore huge shale gas/tight gas resource.
- Expertise and experiences in the field of Unconventional Hydrocarbon Resources may be shared within the SAARC countries.

- Human Resource Management/Training in the field of Unconventional Hydrocarbons Resources may be focused and jointly pursued.
- Modern Labs that can fulfill the requirements of analysis for unconventional hydrocarbons are need of the day.

Dr. Muhammad Akhtar Nawaz thanked the Chief Guest, Mr. Muhammad Naeem Malik, Director SAARC Energy Centre Islamabad, Pakistan for joining this invaluable event. He informed the participants that it is increasingly important for key stakeholders to examine existing regional dynamics and develop synergies for enhancing knowledge sharing and technology transfer in Oil & Gas Sector. He expressed his hope that each one of us have learnt a lot during the course of the five days training workshop and will be able to contribute in exploration and development of Oil and Gas sector of their countries and in SAARC region in future.

He stated that the workshop has helped to establish communication, facilitate professional exchange and initiate cooperation between policy makers, experts, project developers and other stakeholders from public and private sectors. Dr. Nawaz concluded by extending his special appreciation to all the delegates, resource persons who had travelled to Islamabad and to the local delegates as well as students from Universities for participation in the workshop.

## **9 Vote of Thanks**

Mr. Tarikul Islam, Manager Geophysics from Member State Bangladesh, Mr. Phub Tshering from Bhutan, Mr. Tirtha Aryal from Nepal and Engr. Ibrahim Afrah, STELCO from Maldives offered vote of thanks on behalf of all the delegates to the Chief Guest, Resource Persons, Ministry of Petroleum & Natural Resources, OGDCL and OGTI staff for successful organizing of the workshop and managing high enthusiasm and involvement on the part of delegates throughout the process. They also greatly appreciated the efforts taken by SAARC Energy Centre in conducting this Training workshop.

## **10 Distribution of Shields and Certificates**

At the end of the last session the Chief Guest, Mr. Muhammad Naeem Malik, Director SAARC Energy Centre Islamabad, Pakistan distributed the shields to the experts and workshop participation certificates were distributed to all of the workshop participants.

## Annexure I

### OIL & GAS TRAINING INSTITUTE OIL & GAS DEVELOPMENT COMPANY LTD

#### SAARC Workshop: Geophysical Techniques in Oil & Gas Exploration Contents / Schedule, 8-12 August 2016

Day-1: 8 August 2016	
09:00 - 09:30	Registration
09:30 - 10:15	<b><i>Opening Ceremony</i></b>
09:30 - 09:40	Guests and delegates to be seated
09:40 - 09:45	Arrival of Chief Guest
09:45 - 09:50	Tilawat e Qalam e Pak/Recitation from The Holy Quraan
09:50 - 10:00	Address By <b><i>Director, SAARC Energy Centre Islamabad</i></b>
10:00 - 10:15	Group Photo with the Chief Guest
10:15 - 10:45	Tea Break
10:45 - 11:45	Introduction of delegates and their country presentations
11:45 - 13:00	<b><i>Dr. Khalid Amin Khan - OGDCL</i></b> Introduction to Geophysical Methods Gravity Techniques for Basin Mapping
13:00 - 14:00	Prayer / Lunch Break
14:00 - 16:00	Visit to Geological Research Labs, I-9 Islamabad
17:30 - 20:30	Welcome Dinner at Manal Restaurant, Islamabad

Day-2: 9 August 2016	
09:30 - 11:00	<b><i>Dr. Khalid Amin Khan - OGDCL</i></b> Seismic Refraction & Near Surface Geophysical Engineering Seismic Reflection Data Acquisition Seismic Data Processing: DE convolution, Velocity Analysis, Migration
11:00 - 11:30	Tea Break
11:30 - 13:00	<b><i>Dr. Khalid Amin Khan - OGDCL</i></b> Seismic Interpretation 3D Seismic Volume Interpretation Wire line Logs & Synthetic Seismogram Velocity Model Building Seismic Attributes Quantitative Interpretation and Rock Physics
13:00 - 14:00	Prayer / Lunch Break
14:00 - 16:00	Visit to Seismic Data Processing Center, OGDCL Head Office



Day-3: 10 August 2016	
09:30 - 11:00	<b>Mr. Hamid Ali Shahid - LMKR</b>
	Harness the Power of Seismic Attributes
11:00 – 11:30	Tea Break
11:30 – 13:00	<b>Mr. Ammar Ahmad - Schlumberger</b>
	An Integrated Workflow for Exploitation of Unconventional Resources
13:00 – 14:00	Prayer / Lunch Break
14:00 – 16:00	Visit o Hydrocarbon Development Institute of Pakistan (HDIP) Facilities

Day-4: 11 August 2016	
09:30 - 11:00	<b>Mr. M. Ajaz Sarwar, Manager OGDCL</b>
	Unconventional Reserves Studies in Pakistan
11:00 – 11:30	Tea Break
11:30 – 13:00	<b>Mr. Nasir Ahmad - ENI</b>
	Reservoir Characterization by using Seismic Amplitude
13:00 – 14:00	Prayer / Lunch Break

Day-5: 12 August 2016	
09:30 - 13:00	<b>Mr. Abid Hussain - PPL</b>
	Frontier Exploration in Pakistan
11:00 – 11:30	Tea Break
11:30 – 13:00	<b>Dr. Nadeem Ahmed - MOL</b>
	Exploration Strategies for Frontier Hydrocarbon Plays in the Western basins of South Asia in low price environment
13:00 – 14:00	Prayer / Lunch Break
15:00 - 16:30	<b>CLOSING CEREMONY</b>
15: 00 - 15:15	<b>Sum up and the way forward: Dr. M. Nawaz Akhtar,</b>
	Program Leader (Technology Transfer) SAARC Energy Centre
	Vote of Thanks: Mr. Moinul Islam (Bangla Desh), Mr. Ibrahim Afrah (Maldives), Mr. Phub Tshering (Bhutan), Mr. Tirtha Aryal (Nepal)
15:15 - 15:20	
15:20 - 15:45	Distribution of Shields and Certificates
15:45 - 16:15	Refreshments

## Annexure II

### SAARC Training Workshop on Geophysical Techniques in Oil & Gas Exploration

08-12 August, 2016, OGTI Islamabad, Pakistan

#### List of Participants

#	Name	Designation	Department	Country	Contact	Email
Delegates						
1.	Mr. Moinul Hossain	DGM Geophysical	BAPEX	Bangladesh	008801755599425	<a href="mailto:gadmin@babex.com.bd">gadmin@babex.com.bd</a>
2.	Mr. Tarikul Islam	Manager Geophysical	BAPEX	Bangladesh	00881713109259	<a href="mailto:gadmin@babex.com.bd">gadmin@babex.com.bd</a>
3.	Mr. Phub Tshering	Sr. Trade Inspector	Ministry of Economic Affairs	Bhutan	00975 17821895	<a href="mailto:Phubtwang2003@gmail.com">Phubtwang2003@gmail.com</a>
4.	Mr. Phub Dorji	Trade Inspector	RTI Thimphu Ministry of Economic Affairs	Bhutan	0097 517613023	<a href="mailto:shapdorjee@gmail.com">shapdorjee@gmail.com</a>
5.	Mr. Ibrahim Afrah	Assistant Engineer	STELCO	Maldives	0096 07900595	<a href="mailto:ibrahim.afrah@stelco.com.mv">ibrahim.afrah@stelco.com.mv</a>
6.	Mr. Tirtha Raj Aryal	Deputy Chief of Mission	Embassy of Nepal, Islamabad	Nepal	0092 512 610 317-19 0092 333 505 380 1	<a href="mailto:taryal@gmail.com">taryal@gmail.com</a>
7.	Mr. Abid Hussain	S. Geologist	Pakistan Petroleum Limited	Pakistan	0092-333-4190286	<a href="mailto:h_abid@ppl.com.pk">h_abid@ppl.com.pk</a>
8.	Mr. Iqbal Javed	Geologist	OGDCL	Pakistan	0092-333-920023078	<a href="mailto:Javed_awan@ogdcl.com">Javed_awan@ogdcl.com</a>

#	Name	Designation	Department	Country	Contact	Email
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11.	Nasir Saleem	M. Sc Geophysics	QAU Islamabad	Pakistan	0311-9557041	<a href="mailto:Nasir.saleem228@gmail.com">Nasir.saleem228@gmail.com</a>
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13.	Mudassar Ahmad	M.Phil. Geophysics	QAU Islamabad	Pakistan	03004135454	<a href="mailto:geophysicist.qau@gmail.com">geophysicist.qau@gmail.com</a>
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15.	Hassan Tariq	M.Sc Geophysics	Bahria University Islamabad	Pakistan	0313-520-5262	<a href="mailto:hassan_geophysics@yahoo.com">hassan_geophysics@yahoo.com</a>
16.	Adeeb Ahmed	M.Sc Geology	Bahria University Islamabad	Pakistan	0313-575-7111	<a href="mailto:adeeb.ahmed136@gmail.com">adeeb.ahmed136@gmail.com</a>
17.	Bilal Ahmed Malik	M.Sc Geology	Bahria University Islamabad	Pakistan	0334-517-8430	<a href="mailto:bilalmalik4300@gmail.com">bilalmalik4300@gmail.com</a>
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#	Name	Designation	Department	Country	Contact	Email
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23.	Mr. Muhammad Saeed	Protocol Officer	SAARC Energy Centre	Pakistan	0092 512 228 802-4/117 0092 345 5066550	<a href="mailto:m.saeed@saarcenergy.org">m.saeed@saarcenergy.org</a>

## Annexure II

























