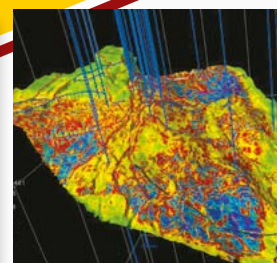
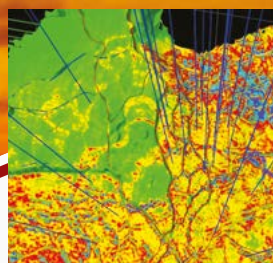


# SEISMIC DATA INTERPRETATION BASICS TO ADVANCED

6 days, 15-20 February, 2016



**GERMI**  
GUJARAT ENERGY RESEARCH  
AND MANAGEMENT INSTITUTE



Gujarat Energy Research and Management Institute Organizes a six day comprehensive course on Seismic Data Interpretation-Basics to Advanced

## ABOUT GERMI

Gujarat Energy Research and Management Institute (GERMI) an ISO 9001:2008 certified institute, is a Centre of Excellence in industry learning, research & development and education. It is set up to develop human resource assets to cater to both renewable and non-renewable energy sectors, improve knowledge base of policy makers and technologists, and provide a competitive edge to compete in the global arena.

GERMI was brought into existence and is promoted by Gujarat State Petroleum Corporation Limited (GSPC), a Government of Gujarat Undertaking. GERMI has already established specialized research, education, management and training institutes, and is continually expanding its horizons to cater to the allied energy sectors. GERMI is a registered Society and a Trust under the Societies Registration Act, 1860 and the Bombay Public Trust Act, 1950. GERMI is recognized as a Scientific and Industrial Research Organization (SIRO) by the Department of Scientific and Industrial Research (DSIR), Government of India.

## GERMI - R & D ACTIVITY

GERMI has established three research wings.

The **Petroleum Research Wing** concentrates on research and development of increasingly efficient, well adapted technologies to extract, upgrade, manage and commercialize the oil and gas resources and economic impacts of their production.

The results so generated will directly support the GERMI's mission of protecting and responsibly managing country's hydrocarbon resources by advancing the scientific understanding to plan for a balanced and secure energy future.

The **Solar Energy Research Wing** supports fundamental and applied research ranging from solar cell material and device designs to plant performance analysis. The Wing also provides technical and advisory services to government as well as the industry for deploying solar and related renewable energy initiatives. The wing has successful track record in setting up rooftop and megawatt-scale photovoltaic power plants, smart and micro-grids, social projects such as solar streetlights, as well as structuring public-private transactions to ensure sustainability. The rich experience also culminates into very successful and comprehensive professional and vocational training programmes.

The **Environment and Energy Efficiency Research Wing** conducts research on issues of National and International importance related to the science, technology and management of issues pertaining to environmental pollution, energy efficiency, bio-energy and optimization of conversions of waste to energy.

This research wing primarily focuses on research & services to help solve practical problems faced by industries & enable the integration of innovative need-based technologies and other holistic interventions.

### COURSE DATE

15 - 20 February, 2016

### COURSE FEE

INR 25,000/- per participant  
(plus 14% service tax)

### COURSE VENUE

**Gujarat Energy Research and Management Institute**  
1st Floor, Energy Building, PDPU Campus, Raisan Village,  
Gandhinagar - 382007 Gujarat, India.

## WHO SHOULD ATTEND?

The course is designed for Geophysicists, Geologists and Reservoir Engineers having a minimum experience of 2 years and is involved in G&G data analysis, Seismic data Acquisition and Processing in Oil & Gas Industry.

## INSTRUCTORS' PROFILE

### SHRI N. C. NANDA

Shri Niranjan Chandra Nanda post graduated in Geophysics from Benaras Hindu University. He was associated with Oil & Natural Gas Commission for more than 37 years and has made outstanding contributions in exploration and development of hydrocarbon resources in onshore &

## PREMISE OF THE COURSE

The course would help young Geoscientists to understand the elementary principles of Geology and Geophysics and to identify and meaningfully apply the concepts of depositional environments, stratigraphic systems, tectonic styles on seismic data and build Tectono -Stratigraphic framework throughout the history of evolution of geological basins. The course would help in building an understanding and modeling of a basin, then create a drive to test new concepts hitherto untried in generating prospects for exploration and production. The overall focus would be that the participant is able to understand the importance of difference between interpretation and evaluation of seismic data, which in turn would help them evaluate data and enable the management significantly in making crucial decisions.

offshore basins of India.

His involvement in the Petroleum upstream industry continues even to date, building more than five decades of varied experience in diversified geological basins, both in India and abroad. Especially, his conceptual understanding of Reservoir Models

from Seismic data has brought him recognition. He has several awards to his credit. In 1987, he was honoured with the National Mineral Award by the Government of India and lifetime achievement award at an SPG annual function, recently held at Kochi. Currently, he is a freelance Petroleum

Geophysicist, and consultant to several E&P companies in India. He was a visiting faculty to Universities wherein he taught seismic data interpretation and evaluation. He also conducts training courses and workshops in seismic interpretation for geoscientists in E&P companies.

### MR. S. B. RAO NAIK

Mr. Naik is having more than three decades of experience in exploration for oil and natural gas and last served in ONGC as General Manager. He was associated at various levels with exploration in Cambay, KG & Cauvery, Assam-Arkan, and Mumbai off shore basins. He bears a rich work experience of Oil exploration which includes key techniques like Seismic Data Acquisition, Seismic 2D/3D Data Interpretation for Exploration and Development. Mr. Naik is also having good knowledge of several Softwares

like Landmark, Petral, Hampson-Russell and reservoir simulation softwares. Mr. Naik also has experience in Training and Development of geoscientists, having worked as nodal officer for knowledge Management of ONGC and was also designated as a Mentor for seismic Interactive Interpretation and a subject matter expert in E-Learning initiatives. He is professionally connected to different learning forums of Geophysics and credits to his name a series of papers published in this field.

## TECHNICAL COURSE COORDINATOR

Shri P. H. Rao is presently heading Data Interpretation Centre of Petroleum Research Wing of GERM. He is Ex General Manager (Geophysics), ONGC He has thirty-three years of rich experience in oil industry as a seismic data acquisition manager, exploration and development geoscientist with strong multidisciplinary integration skills and proven record of oil and gas discoveries. He has vast experience as an effective and successful project and team leader as well as team member involving

complex geological studies. He possesses excellent communication skills, and has great knowledge on the latest state-of-art technologies. He has sound knowledge of G&G data interpretation on workstations using LandMark, Hampson Russell softwares and lead G&G teams at various levels for interpretation of 3D and 2D Seismic data for prospect delineation and evaluation. Shri Rao is well versed with all other types of Seismic interpretation softwares.

## COURSE OUTLINE

### DAY 1 Seismic wave propagation & rock-fluid parameters (rock physics)

- Seismic wave propagation losses and geological significance
- Rock - fluid properties and seismic responses

#### P- Seismic reflection principles - Basics

- P-wave elementary, S/N ratio, resolution & Fresnel zone
- Interference of reflections; types of reflectors
- Attributes of reflection signal, seismic display modes and scales.

#### Seismic interpretation methods (2D)

- Interpretation types and evaluation - Structural, stratigraphic, seismic stratigraphy & sequence stratigraphy
- Groundwork - horizon correlation, contouring, well calibration, velocity estimation, depth maps & Seismogeological sections.

#### Coordinate Reference Systems (CRS)

- Importance of CRS in seismic data interpretation
- Introduction to Datum (WGS-84, Everest etc.)
- Importance of Projection System (UTM, Lambert etc.)
- Introduction to project data base

### DAY 2 Seismic interpretation methods (2D), contd...Workouts - art of contouring

#### Seismic stratigraphy & Seismic sequence stratigraphy

- Sequence analysis, facies analysis and RSL change analysis, System tracts & growth of sequence, seismic manifestation

#### Workouts - Seismic sequence & facies analysis.

### DAY 3 I Seismic Attribute Analysis

- Physical attributes • Geometrical attributes

#### II Reservoir characterization using Geo statistical methods

- Introduction to GeoStatistics
- Difference between classical statistics and geostatistics
- Geospatial Analysis (variograms)
- Krigging Methods
- Conditional Simulation

### DAY 4 Seismo-tectonic

- Tectonic stress regimes - associated structures & their seismic manifestation
- Significance of tectonics in seismic data interpretation & evaluation

#### Workouts-seismo-tectonics (I &II)

### DAY 5 Seismic stratigraphy & Seismo-tectonics applications in Exploration

- Basin evaluation for hydrocarbon - source, reservoir, trap, migration and preservation potentials
- Petroleum system modeling (BPSM)
- Prospect appraisal for risk analysis
- Role of faults in Exploration & production - study of fault attributes

#### Workouts-prospect evaluation

#### Direct Hydrocarbon Indicators (DHI)

- Understanding Bright spots, Dim spots & Flat spots
- Corroborative evidences of DHI anomalies - Polarity, velocity, 'sags', shadows and geological setups
- Limitations of DHI

### DAY 6 Bore-hole seismic techniques

- Check-shot surveys & Vertical seismic profiling (VSP)
- Well velocity & sonic velocity ; limitations
- Cross-well seismic - an introduction

#### Seismic limitations & pitfalls

- Geological
- Geophysical
- Interpreter

#### Wrap up & discussions

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