

## Preface

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We are pleased to present a special issue of the Journal of the Indian Geophysical Union entitled "CO<sub>2</sub> injection for EOR & Geological Sequestration". This issue is based on the papers presented at the Indo-Norwegian conference on "CO<sub>2</sub> Injection for EOR & Geological Sequestration" held during November 26-28, 2013 at CSIR-National Geophysical Research Institute, Hyderabad, India. The conference was jointly organized by the CSIR-NGRI, Hyderabad and the SINTEF Petroleum Research, Trondheim, Norway under the aegis of the Norwegian Embassy in India.

CO<sub>2</sub> injection for EOR has received a great attention due to multifold benefits such as enhancing oil recovery, possibility of CO<sub>2</sub> sequestration in the hydrocarbon reservoir and high tax savings in some countries by earning carbon credits. In this method, supercritical CO<sub>2</sub> is injected into a reservoir through injection wells ideally at a pressure equal to or above the minimum miscibility pressure (MMP), so that the CO<sub>2</sub> and oil mix together to form a liquid that flows easily to the production well. CO<sub>2</sub> can also be injected at a pressure below the MMP to swell the oil and make it mobile, this method is known as immiscible injection.

Global data shows that the CO<sub>2</sub>-EOR techniques have a potential to increase the yield of depleting or heavy oil fields, but in India this method has not been applied to any oil field for commercial production because of several operational reasons. Laboratory studies carried out by the Oil & Natural Gas Corporation Limited (ONGC Ltd.), India, indicated that the recovery from depleting Ankleshwar oil field situated in Cambay basin of India could be increased by immiscible CO<sub>2</sub> injection as miscible injection required high MMP. Thus, a research project was formulated by CSIR-NGRI in collaboration with the SINTEF Petroleum Research, Trondheim, Norway to

estimate the CO<sub>2</sub>-EOR potential of the Ankleshwar field with due support from the ONGC Ltd., India. The project was sponsored by the Norwegian Embassy, India and the Council of Scientific and Industrial Research (CSIR), India. Major outcomes of this project were two PhDs; one from Academy of Scientific and Industrial Research (AcSIR) (Ganguli, 2016) and other from Osmania University (Vadapalli, 2016 (a)), a text book (Dimri et al., 2012) published by Elsevier and many papers in scientific journals (Vadapalli et al., 2014; Ganguli et al., 2016; Pandey et al., 2016; Vadapalli, 2016 (b)).

The conference was organized by the project team to disseminate the knowledge gained in this research project. Total 32 papers from industry and academia were presented during the conference; however, 10 full manuscripts, mainly from academia were submitted for the publication. These 10 manuscripts were initially reviewed by the conference organizing committee and later by external experts, hence it took a little longer than expected to bring out the special issue. In this regard, we sincerely appreciate the authors for contributing their work to this special issue and for patiently revising the manuscripts to meet the suggestions of the referees. We also thank our learned reviewers for their valuable time.

Since the theme of the conference was based on CO<sub>2</sub> injection, most of the papers published in this volume are related to the technical aspect of CO<sub>2</sub> sequestration and CO<sub>2</sub> Enhanced Oil Recovery; however, one paper is based on the policy related aspects of Carbon Capture and Storage (CCS). The topics covered in this special issue include basic concepts of CO<sub>2</sub> injection, injection related micro-seismicity, CO<sub>2</sub> sequestration in Deccan volcanics, study of leakage risks associated with the CO<sub>2</sub> sequestration and estimation of uncertainty in the migration of the CO<sub>2</sub> plume in the reservoir. We

have made an attempt to bring together some of the insightful papers, covering most of the aspects of the CO<sub>2</sub> injection.

During the United Nations Climate Change Conference held in Paris in 2015, Government of India committed to reduce green-house gas emissions to 33-35% per cent of 2005 levels by 2030. This implies that in near future, there is ample scope of research in this field. We hope that this special issue of the Journal of Indian Geophysical Union entitled "CO<sub>2</sub> Injection for EOR & Geological Sequestration" will make a good reference material on this topic and be of great use for Geophysicists.

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