

1. Name : Dr. Harendra Singh
2. Date of Birth : 30<sup>th</sup> June, 1962
3. Current Position and Address: Chief Scientist and HORG  
Nonconventional Gases Group  
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4. Education Qualifications:

Sl. No.	Degree	Year	University/ Institute	Subject
1	B.Sc. (Hons.)	1984	B.B.R.A. Bihar University, Muzaffarpur	Physics, Chemistry and Mathematics
2	M.Sc.	1987	B.B.R.A. Bihar University, Muzaffarpur	Mathematics
3	Ph. D.	2002	IIT (Indian School of Mines), Dhanbad	Applied Mathematics

5. Work Experience:

Designation	Institute/ Company	From	To	Natural of work
Jr. Scientist	CMRI, Dhanbad	23.04.1990	22.04.1995	R &D for coal mining industry
Scientist	CMRI, Dhanbad	23.04.1995	22.04.2000	R &D for coal mining industry
Sr. Scientist	CMRI, Dhanbad	23.04.2000	22.04.2005	R &D for coal mining industry
Pr. Scientist	CSIR-CIMFR, Dhanbad	23.04.2005	22.04.2010	R &D for coal mining industry
Sr. Pr. Scientist	CSIR-CIMFR, Dhanbad	23.04.2010	22.04.2017	R &D for coal mining industry
Chief Scientist	CSIR-CIMFR, Dhanbad	23.04.2017	continued	R &D for coal mining industry

6. Work Area/Specialization under which activities have been carried out:

- Safety in underground coal mines from methane emission
- Coalbed methane/shale gas resource potential evaluation in virgin coal blocks

- Fugitive methane emission in the atmosphere from coal mining and handling activities
- Reservoir simulation of coalbed methane production wells
- Modelling of Air Pollution with removal mechanism

## 7. Major Contribution

Investigation on methane emission from coal seam was carried out in more than 200 underground coal mines for classification of degree of gassiness in India. A mathematical model is developed for prediction of specific emission from seam being worked and enclosing strata in underground workings. Developed methodology and national emission factors for estimation of fugitive methane emission from coal mining and handling activities. Prepared estimates of fugitive methane emission from coal, oil and natural gas systems for India's Initial and Second National Communications and Biennial Update Report to the United Nations Framework Convention on Climate Change (UNFCCC). A set up has been developed for determination of in-situ gas content of coal/lignite/shale core samples by the "Direct Method" and is consisted of desorption apparatus, desorption canister and grinding apparatus. An excel based software is developed for computation of desorbed gas volume at NTP or STP, desorption curves and sorption time and in-situ gas content on ash free basis and dry ash free basis. In-situ gas content was estimated by collecting coal core samples in more than 250 slim boreholes and about 20 CBM wells. On the basis our investigation, 33 CBM blocks have been awarded to gas producing companies in four round bidding process by Directorate General of Hydrocarbon (DGH), New Delhi. Scientific assistance for commercial development of CBM projects have been rendered to almost all CBM producing companies such as ONGC, GEECL and Essar Oil Limited and 1.5 MMSCM per day is being produced by these four gas companies.

## 8. No. of Research Publication:

Papers in journal: 10

In conference Proceedings: 30

Invited lecture delivered: 11

Lists of best 05 publications:

- (i). Kumar, J., Mendhe, V. A., Kamble, A. D., Banerjee, M., Mishra, S, Mishra, V. K., Singh, P. K. & **Singh, H.** (2018). Coalbed methane reservoir characteristics of coal seams of South Karanpura Coalfield, Jharkhand, India, International Journal of Coal Geology (Elsevier), 196, 185–200.
- (ii). Vinod Atmaram Mendhe, Subhashree Mishra, Ranjit G. Khangar, Alka Damodhar Kamble, Durgesh Kumar, Atul Kumar Varma, **H. Singh**, Sujeet Kumar and Mollika Bannerjee, (2017). "Organo-Petrographic and Pore Facets of Permian Shale Beds of Jharia Basin with Implications to Shale Gas Reservoir", Journal of Earth Science, Springer
- (iii). Vinod A. Mendhe, M. Bannerjee, Alka D. Kamble, S. Mishra, A.K. Varma, **H. Singh**, S. Sharma, Anil M. Pophare and Abhay M. Varade (2017) Influence of Thermal Maturity and Maceral Content of Coal Seams on In-situ Gas and its Composition at East Bokaro CBM Block, Jharkhand, India, Journal of Geosciences Research, Special Volume No.1, 2017, pp. 173-182.
- (iv). **Singh H.** and Mallick John, (2015). Utilization of Ventilation Air Methane in Indian Coal Mines: Prospects and Challenges, published In Science Direct, Procedia Earth and Planetary Science 11 pp.56-62. [www.sciencedirect.com](http://www.sciencedirect.com)

- (v). Singh A.K., Prusty B.K., **Singh H.**, Mendhe V.A., Sinha A. (2007). Coalbed Methane: New Initiative in India, The Indian Mining and Engineering Journal, Vol. 47, No.11, pp.182-187.

Books/Chapters authored/edited: Two

9. Lists of 5 Major Contract R&D projects
- (i) Shale gas potentiality evaluation of Damodar Basin of India (MOC, GOI).
  - (ii) Feasibility study for recovery and utilization of coal mine methane (CMM) in Jharia, Bokaro and Raniganj Coalfields in India (UNDP)
  - (iii) Evaluation of shale gas resource potential in different oil and gas bearing basins of India (ONGC, Dehradun)
  - (iv) Development of country emission factors due to venting and flaring of natural gas and preparation of GHG emission estimates for the period 2010 to 2015 associated to fugitive emissions from coal and oil and natural gas systems. (MOEFCC, GOI)
  - (v) Fugitive methane and carbon dioxide emission from coal mining industry and abandon coal mines. (MOEFCC, GOI)
10. (a) Name of Patents/Copyrights applied/granted/commercialized: NIL
- (b) Technology/products/Knowhow/Services developed:
- (i) A set up has been developed for determination of in-situ gas content of coal/lignite/shale core samples by the "Direct Method".
  - (ii) An excel based software has been developed for computation of desorbed gas volume at NTP or STP, desorption curves, sorption time and in-situ gas content on ash free and dry ash free basis.
11. Honors/Awards/Recognitions/Fellowship/Scholarships/Professional Memberships:
- (i) Indian Science Congress Association, Kolkata-Life Member
  - (ii) Mining, Geological and Metallurgical Institute, (MGMI), Kolkata – Life member
  - (iii) Indian Mathematical Society (IMS) New Delhi-Life Member
  - (iv) ETD 10 Sectional Committee of Bureau of Indian Standard, New Delhi- Member
  - (v) EC22.5 Sub Sectional Committee of Bureau of Indian Standard, New Delhi-Member

12. Societal Contributions:

Students of different technical institutes and university of B.Tech. (Mining Engineering and Environmental Science and Technology Engg.), M.Sc./M.Tech (Geology) and M.Sc. (Geophysics) courses were guided for their project work.

Methane is a potent greenhouse gas whose global warming potential is more than 21 times than carbon dioxide, drainage of methane from underground mine workings and virgin coal blocks would help to reduce methane concentration in the atmosphere and ultimately would help to reduce global warming potential.