

Institute Lecture

Nuclear Fission Energy, a Sustainable and Environmental friendly option for electricity - Challenges

Dr. Chaitanyamoy Ganguly, Retired Distinguished Scientist, Dept of Atomic Energy, Govt. of India & Former Head, Nuclear Fuel Cycle & Materials Section, IAEA, Vienna

Friday, 1st February 2013, Time: 5.00 PM, Venue: L-1, Lecture Hall Complex

Abstract

Nuclear power is a viable and proven option to meet the ever increasing demand of electricity in an economic, safe and sustainable manner without degrading the environment. Presently, 437 nuclear power reactors with total installed capacity of ~ 371 GWe, are in operation in 30 countries, generating some 14% of global electricity. Currently, nearly all operating nuclear power reactors in the world use zirconium alloy clad uranium oxide pellets, with 0.7 to < 5% U235, as fuel and derive energy from the fission of U235, the only 'fissile' material in nature. The basic raw materials for nuclear fuels are natural uranium and thorium. Nuclear fuel cycle is a series of physical and chemical steps for processing natural uranium and thorium ores and making them suitable for use as fuel assemblies in reactor. In the back end of fuel cycle, the highly radiotoxic 'used fuel', containing actinides and fission products, is stored under water for a few years in a pool adjoining the reactor. Next, the used fuel is either transported to long term interim dry or wet storage facilities and then directly disposed in deep geologically stable repository in an 'open' fuel cycle or in 'closed' fuel cycle, subjected to reprocessing for recovery and recycling of actinides and separating and vitrifying fission products for final disposal in repository. India is pursuing a 3 stage nuclear power program linking the fuel cycles of water cooled reactors and FBRs for judicious utilization of limited uranium but vast thorium resources. The targets are to install 20,000 MWe and 62,000 MWe by 2020 and 2032 respectively by constructing PHWR 700 MWe and FBR 500 MWe units indigenously and LWRs of 1000-1600 MWe in collaboration with Russia, France and the USA. The presentation will discuss the operation of nuclear power reactors and nuclear fuel cycle facilities, highlighting the safety, security and other unique features of nuclear fuels, the status of uranium resources worldwide and the need for public awareness and corporate social responsibility to harness the peaceful applications of nuclear energy for generation of electricity.

About the speaker

Dr. Chaitanyamoy Ganguly retired as a Distinguished Scientist from Department of Atomic Energy (DAE), Govt of India. He served at Bhabha Atomic Research Centre, Mumbai as Head, Radiometallurgy Division and at Nuclear Fuel Complex Hyderabad as Chairman and Chief Executive. He was also the Director of CSIR- Central Glass and Ceramic Research Institute (CGCRI), Kolkata and was the Head, Nuclear Fuel Cycle and Materials Section at the IAEA in Vienna.

Dr Ganguly did his graduation and PhD in Metallurgical Engineering from Bengal Engineering College, Shibpur. He did his pre - and post doctoral research at the Nuclear Research Centres at Karlsruhe and Juelich in Germany. He is a recipient of IAEA and Humboldt fellowship. Dr Ganguly has published more than 250 research papers and has guided several PhD and M Tech thesis

Dr Ganguly was conferred Padmashri in 2002. He received National Metallurgist Award of the Ministry of Steel and Mines, the Tata Gold medal, the Kamani Gold Medal and Binani Gold Medal of the Indian Institute of Metals, the MRSI medal and Vasvik Award. He is a Fellow of the Indian National Science Academy, Indian Academy of Science, Indian National Academy of Engineering, Indian National Academy of Science, Institution of Engineers, Indian Institute of Metals and Indian Institute of Ceramics.

Tea at 4.45 PM

All interested are welcome.

Ajit Kumar Chaturvedi
Dean of Research and Development
IIT Kanpur