Department of Chemical Engineering, IIT Hyderabad
CH5036-Industry Lecture Series
Jan-April 2026

Date: 18-02-2026
Time: 04:00 PM (IST)
Speaker: **Chithira Purayil**
Affiliation: Principal Engineer, AtkinsRéalis
Title: **Understanding Nuclear Power Plants: An Indian Industry Perspective for Chemical Engineers**
Venue: **LHC-10**

Abstract

Nuclear power remains an important component of India's long-term energy strategy, offering reliable baseload electricity with low carbon emissions. While nuclear engineering is often associated primarily with reactor physics and mechanical systems, the design, operation, and sustainability of nuclear power plants rely heavily on core chemical engineering principles.

This lecture provides a structured overview of how nuclear power plants function, beginning with fundamental reactor concepts and major reactor types in operation globally and in India. It will then outline key elements of the nuclear fuel cycle—including fuel preparation, waste management, and reprocessing—highlighting where chemical engineering knowledge is applied in real plant environments. The session will also briefly situate India's nuclear program within the global context.

Biography

Chithira is a Nuclear Safety Engineer with over 15 years of experience in the nuclear industry. She holds a B.Tech in Chemical Engineering from the University of Calicut and has built her career across fabrication, installation, project management, and probabilistic safety assessment (PSA) of advanced nuclear power projects.

She began her career as a Scientific Officer with the Prototype Fast Breeder Reactor (PFBR) Project under the Department of Atomic Energy, India. During her tenure,

she was closely involved in the construction and execution of multiple systems of the 500 MWe Fast Breeder Reactor. She led major engineering and construction activities, including the fabrication and installation of stainless-steel sodium coolant piping systems, pressure vessels, and ventilation systems for nuclear facilities. She has managed large EPC packages, coordinated with regulatory bodies, and led multidisciplinary teams to deliver complex nuclear projects safely and efficiently.

In addition to project execution, Chithira played a key role in nuclear safety assessment activities for PFBR, particularly in probabilistic safety assessment. Her work provided critical insights into reactor safety, system reliability, and regulatory clearances, contributing to safety evaluation and compliance with national and international standards.

After gaining extensive exposure to plant systems, construction, and safety analysis within India's fast breeder reactor programme, she moved to the corporate nuclear sector. She is working with AtkinsRéalis as a Principal Engineer, where her expertise in PSA, project execution, and nuclear safety is being leveraged for nuclear projects across the world.