Nuclear Fuel Training Courses

Background

Over the past 40 years, Westinghouse educational specialists and subject matter experts have provided training in fuel, services, technology, plant design and equipment to utility and industrial customers in the worldwide commercial nuclear electric power industry. Our passion for the nuclear industry, its plants and its people allow Westinghouse to leverage learning for global success by developing relationships that allow a better understanding of utility cultures which, in turn, results in nuclear safety and performance improvement.

Nuclear Fuel FESA Training Courses

- BCN100 – Introduction to BEACON^{TM} Core Monitoring System Virtual Training

- FEFT – Fuel Engineering Foundations Training

- FR200 – Fuel Rod Design – PWR Training

- ND200 – Focused RSAC/NDR Training

- TH200 – Thermal-Hydraulics Design Methods Training

- TW100 – TracWorks® Fuel Data Management System Fundamentals Training

- SA – Safety Analysis Training

BCN100 - Introduction to BEACON Core Monitoring System – Virtual Training

Course Duration – 10 days

The BEACON Core Monitoring System is a three-dimensional, on-line core monitor that allows surveillance of core power distributions and thermal margins. The BEACON Core Monitoring System can be used to predict core behavior, to analyze reactor core operations data and measured information, and to provide core operational guidance based on the current core conditions. BCN100 is an onsite course covering all aspects of the BEACON 7 System. Concepts will be reinforced through use of hands-on workshops using the latest released version of BEACON 7 using a moveable, in-core detector demonstration model.

The course topics include:

- Theory Overview

- Predictive Function Usage

- Flux Map Analysis

- System Calibration & Online Monitoring

- Special Material Reporting

- BEACON User Procedure Guidelines

FEFT – Fuel Engineering Foundations Training

Course Duration – 10 days

The course is a foundations class for engineers entering the nuclear fuel industry and interested in engaging in the Westinghouse Foundations Qualification Training program. This course provides an excellent opportunity for professionals new to the industry to network with other engineers from Westinghouse facilities in the U.S. and Sweden, other U.S. utilities, as well as industry experts. Technical experts instruct a broad overview of the Westinghouse Pressurized Water Reactor (PWR) and Boiling Water Reactor (BWR) nuclear design processes.

The course topics include:

- General Reactor Theory and Operations

- Nuclear design reload process overview

- Nuclear design computer code overview

- Peaking Factors (F_Q, $F_{\Delta H}$, F_Z, AO, F_{XY}, W(Z), P(Z), etc.)

- Nuclear Design Fuel Management

- Techniques and Methods

- Safety Calculations

- Systems training

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FR200 - Fuel Rod Design – PWR Training

Course Duration – 5 days

This course provides an overview of PWR fuel rod design. Criteria addressed as part of the fuel rod design process include rod internal pressure, cladding stress and strain, cladding corrosion, and fuel temperatures. The fuel rod design process establishes parameters such as pellet size and density, cladding-pellet diametral gap, plenum size, helium pressurization levels and fuel burnup capabilities.

The course topics include:

- Detailed description of the fuel rod design process

- Fuel rod design criteria

- Process to perform fuel rod design related calculations including rod internal pressure calculations, clad stress calculations, and fuel rod temperature calculations

- Understand the 3D FAC analysis from a Fuel Rod Design perspective

- ALFRED training

- (Optional) tour of the Westinghouse Specialty Metals Plant

ND200 - Focused RSAC/NDR Training

Course Duration – 10 days

This course covers the Westinghouse reload process and provides step-by-step instructions on the various analyses which make up the reload process with a focus on Nuclear Design. The training will be performed with the current Westinghouse Neutronics code suite, NEXUS/ANC9, and cover introductory and advanced usage of the code system.

The course topics include:

- Core Modeling and Fuel management

- Reload Safety Analysis Checklist (RSAC)

- Nuclear Design Report (NDR)

- Low Power Physics Testing (LPPT)

TH200 - Thermal-Hydraulic Design Methods – PWR Training

Course Duration – 5 days

This course provides thorough understanding of methods applied to the entire thermal-hydraulic (T/H) design process. each course segment includes a complete discussion of the design requirements, codes, procedures, interfaces and analytical methods used for thermal-hydraulic design.

The course topics include:

- Core hydraulics

- Core component analysis

- Departure from Nucleate Boiling Ratio (DNBR) correlations and methods

- Setting and verifying core operational DNBR limits

- T/H computer models

- Accident analysis

- Reload methodology

TW100 - TracWorks® Fuel Data Management System Fundamentals Training

Course Duration – 3 days

This course will provide an overview of the TracWorks® Fuel Data Management System. This course will focus on providing the necessary training to use the TracWorks system for inventory tracking and reporting functions for managing inventory and reporting SNM safeguards information to the appropriate regulatory authorities

The course topics include:

- Inventory Management - receipt of new fuel, and movement of fuel throughout the plant, including dry storage, etc.

- Fuel Properties Tracking - isotopic updates, burnups, obligations, etc.

- Reporting - NMMSS required reporting and other Miscellaneous reports

- Administrative Functions - Security features, System Maintenance, Item Characterization, Cask Management, etc.

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SA – Safety Analysis Training

Course Duration – 5 days

This course introduces the safety analyses areas, specifically the Condition I, II, III and IV events. The training will be focused upon providing a better understanding of the plant equipment and systems that have the largest impact on the safety analyses. It will also emphasize the modes of operation and the pertinent inputs that impact the safety analyses, including a range of discussion regarding inputs and various modeling functions. The training will also include discussion of the plant responses and consequences of the safety analysis events. The presented material will be applicable to the Westinghouse nuclear steam supply system (NSSS) design but many of the generic topics would also be applicable to other NSSS designs.

The course topics include:

- Introduction to Accident Analysis

- Loss-of-Coolant Accident (LOCA) Analysis

- Transient/Non-LOCA Analysis

- Containment and Radiological Analysis

- Procedures and Control Systems in Safety Analysis

- Setpoints and Uncertainty Analysis

Experience

Westinghouse will continue to be a positive influence on the direction the nuclear industry is taking with respect to training and learning. The goal is to lead and to work with the global nuclear industry to facilitate the production of well designed, well facilitated learning programs that will prepare the industry to meet the future demands of energy production.

More information on Nuclear Fuel Training Courses can be found at:

https://training.westinghousenuclear.com

Courses covering topics not found on the training website can also be provided. Please contact your account team representative or reload project engineer for support on additional training opportunities.