This training course is offered under the **Alliance4Training** brand

Training - Hydrogen Production Unit

VAPOREF-EN-P | **Face-to-face only** | **2 days**

This course provides a deeper understanding of the operating and monitoring of steam reformers

Level
Skilled

Public
Engineers, supervisors and staff interested or involved in the operation of a SMR unit

Objectives
Attendees will be able to implement the following skills:
- Describe the steps of the process

Pedagogical & technical resources
- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Case studies handled in groups, based on typical situations of the sections studied
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis

Assessment of achievements
- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ANALYSIS OF SMR OPERATING CONDITIONS — 1 day

Main hydrogen manufacturing processes.
Objective of the successive steps: desulfurization, steam reforming, CO shift, hydrogen purification.
Process flow scheme.
Material balance, conversion, yields at various steps.
Feedstock and product quality: natural gas, demineralized water, hydrogen quality.
Operating conditions and control loops.
Characteristics of the chemical reactions involved: thermodynamic and kinetic aspects, their consequences on the operation, side reactions and optimum operating conditions to limit their evolution.
Role and mechanism of a catalyst: chemical and physical characteristics, effect of poisoning and ageing.

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Influence of operating conditions on hydrogen production and on downstream steps.
Hydrogen purification:

- Adsorption (PSA) and methanation: comparison of performances.
- Influence of operating parameters on hydrogen purity, CO2 absorption and amine regeneration.
- PSA unit characteristics and operation.

STEAM REFORMER FURNACE OPERATION 0.5 day

Different types of furnaces: technology, furnace efficiency, operating parameters, control and safety loops.
Catalyst loading procedure.
Behavior of the tube bundle. Mechanical and thermal stress.
Routine operation and main operating constraints.

STEAM PRODUCTION 0.25 day

Water preparation: drawbacks arising from impurities in water, water quality measurement, characteristics of feed water, thermal degassing, chemical conditioning of water.

OPERATION & START-UP - DISTURBANCES & TROUBLESHOOTING 0.25 day

Key operating parameters and overall process optimization, interactions between process steps, catalyst cycles management.
Principles of start-up procedure: preparation, ignition, temperature build-up, feed in.
Disturbances: modification of the steam/HC ratio, decrease of feed flowrate, change in feed composition.
Incidents: pretreatment reactor runaway, tube rupture in the furnace, absorption section bypassing.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com

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