



A.N.T. International Academy

ONLINE EDUCATION

PWR Chemistry Introduction

COURSE DESCRIPTION

This course gives an overview of topics relevant to PWR plant chemists with little experience, but also engineers working on fuel and structural material as well as high level chemistry managers.

The course involves reading technical reports, watching lectures and participating in online assessments (tests). The course material, including the online content, can be accessed at times convenient for practicing engineers and managers.

Assessments are done online, with an understanding of the current material (i.e., 70% required correct answers) needed to proceed to the next part of the course. After passing the final online test, a certificate will be issued to the student.

The content is described more in the [Appendix](#).



COURSE MATERIAL

The course material was developed by A.N.T. International and consists of modified/edited earlier recorded A.N.T. International Seminar.

AUTHORS/LECTURERS

The authors/lecturers of the reports and lectures, World Class Experts in their fields, are as follows:

Francis Nordmann, Dewey Rochester and Suat Odar.

[Read more about the Experts](#)

COURSE DURATION

- Lectures: 24 h
- 1 Test: 1 h

The listed time for the lectures is the actual running time. More time may be needed to digest the information provided in this course.

CERTIFICATE

You will automatically receive an email with your certificate that you can print or share on social media. If you need a printed certificate, please don't hesitate to contact us and we can send it to you via regular mail. You reach us at support@antinternational.com.

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Appendix: Course outline and topics covered

1) RADIOCHEMISTRY

- 1.1 Introduction, main radioelement in presence
- 1.2 Corrosion products. Properties, origin, consequences, mitigation
- 1.3 Fission products. Properties, origin, consequences, mitigation
- 1.4 ORE mitigation

2) PRIMARY COOLANT SYSTEM

- 2.1 General design and purpose of main systems and components in relation with chemistry and corrosion
- 2.2 Materials in presence. Simple explanations on various types of materials (stainless steels, nickel base alloys and carbon steel, Zircaloy) that are used and why (e.g stainless steel for low generalised corrosion)
- 2.3 Chemical added in primary coolant (purpose, properties). Introduction on objectives of RCS chemistry
- 2.4 Fuel options and behaviour

3) AUXILIARY SYSTEMS

- 3.1 1 CVCS: Description, use, purification
- 3.2 Liquid wastes treatment and recycling options, consequences (releases, silica)
- 3.3 Gas treatment, risk of explosion

4) SECONDARY SYSTEM

- 4.1 General design and purpose of main systems and components, chemistry relation; SG
- 4.2 Steam generator
- 4.3 Materials in presence. Simple explanations on various materials (SS, Cu alloys, Ni base, low alloys and CS) that are used and why (e.g CS for costs)
- 4.4 Chemical added in secondary system (purpose, properties)
- 4.5 Various types of corrosion and impurities
- 4.6 Impurities behaviour

5) CHEMICAL CONTROL

- 5.1 Control of chemistry quality. Generalities
- 5.2 On line monitoring and grab sampling
- 5.3 Conductivity and cation conductivity, main analytical methods
- 5.4 Main chemistry specifications
- 5.5 Make up water. Demineralised water preparation, various technologies



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