The Antenna

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A.N.T. International
Academy

Information about upcoming
A.N.T. International Academy Seminars
in March 2019 in Palma de Mallorca, Spain.

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Structural Materials Degradation Seminar

(3-days, March 6-8, 2019)

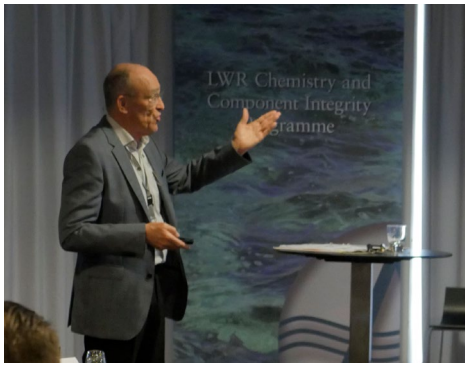
About the seminar

Structural materials degradation may be responsible for the loss of availability, high repair costs and safety related events. During the seminar, past experience of structural materials degradation is presented with the objective of providing materials/structural engineers the tools and knowledge to protect nuclear power plants against re-occurrence of similar degradations along with directions to avoid potential new materials failures.

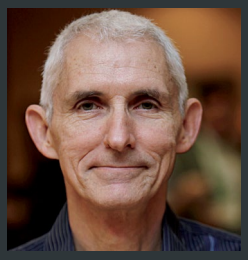
Download the Structural Materials Degradation Seminar PDF.

Content list

1. Brief Description of the Various Types of LWRs and of Their Main Components Relevant for Safety
2. Materials and Materials Properties
3. Review of Non Destructive Testing Technologies Used in LWRs
4. WENRA Safety Reference Levels, Issue I "Ageing Management"
5. Field Experience with PWR Components
6. Field Experience with BWR Components
7. Mitigating Concepts in Case of Degradation Incidents (BWR)
8. Degradation in LWR Components and Mitigation Techniques
9. Operational Surveillance and Measures to Maintain Component Performance or Reduction of Dose Rate
10. Brittle Fracture Analysis of RPV in Case of PTS (Pressurised Thermal Shock) in PWR
11. Integrity Concept for Piping Systems with Corresponding Leak and Break Postulates in LWR to Ensure Long Term Operation



The Lecturers



Mr. François Cattant

Mr. François Cattant graduated in chemical engineering in 1974 and joined Electricity of France (EDF) in 1975 as chemist engineer at the chemical department of the corporate laboratories (Plants Operation Division). At that time, he was involved in power plants water and steam conditioning.

Read full biography →

Dr. Ulf Ilg

Dr. Ulf Ilg received his first degree as "Diplom-Ingenieur" in Mechanical Engineering from the Technical University Karlsruhe (today KIT), Germany. His Ph.D was obtained at the same university after a scientific research period of 5 years in the field of microstructure and residual stress alteration due to rolling contact fatigue.

Read full biography →

Radiation Effects on Material Properties Seminar

(2 days, March 7-8, 2019)

About the seminar

This course is directed at engineers, physicists and materials scientists with an interest in component behaviour in nuclear reactor cores. The primary aim is to give a practical understanding of how material properties are affected by irradiation and how this impacts the reactor operation and the useful life of a given component in the reactor. The course will provide reactor design engineers and reactor operations staff an appreciation for materials selection in reactor construction and also provide some of the tools needed to predict material property changes that occur over the life of the reactor. The focus will be on radiation effects on material properties; corrosion and other reactions with the coolant will not be addressed

Content list

1. Physical Metallurgy of Metal Alloys Used in Nuclear Reactor Cores
2. Evolution of Microstructure and Effect on Mechanical Properties
3. Tensors and Material Properties
4. Radiation Damage — Spectral Effects
5. Irradiation Creep and Growth of Zr-Alloys
6. Applied Rate Theory
7. Microstructure Analysis Using Diffraction
8. Everything a Reactor Engineer Needs to Know — Zr-Alloys
9. Everything a Reactor Engineer Needs to Know — Ni-Alloys
10. Everything a Reactor Engineer Needs to Know — Steels
11. R&D in Support of CANDU Refurbishment

The Lecturer

Dr. Malcolm Griffiths

Malcolm obtained his PhD in Physical Metallurgy from the University of Birmingham in 1981. After a three-year post-doctoral term working on radiation damage in Zr and Ti-alloys he joined AECL at the Chalk River Laboratories in 1984. He has worked on various aspects of materials performance in nuclear reactor cores during his 32 years with AECL. From 2003-2013 he was on the editorial advisory board for the Journal of Nuclear Materials and was an editor from 2013-2016. In 2007 he was recipient of the Kroll medal from the American Society for Testing and Materials for his pioneering work on microstructure evolution in zirconium alloys during irradiation.

Read full biography →

PWR Reactor Design and Operation

(1 ½ days, March 14-15, 2019)

About the seminar

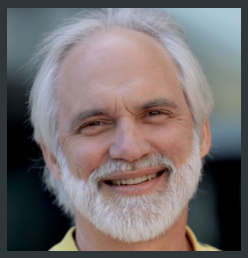
This course provides an overview of all aspects of PWR plant and fuel design including normal operation, accident mitigation, the fuel reload analysis process, operating experience issues, and computer codes used for PWR analyses. The generic characteristics of a PWR are considered followed by an overview of the major plant systems and normal core operation. Details of the three US PWR vendor designs are examined. Major PWR accident mitigation systems are reviewed as well as characteristics of significant accident scenarios analysed. Next, PWR fuel component design and function are described in detail, including material selection. Significant analysis requirements, such as critical heat flux and reactivity control, are discussed as well as the cycle reload analysis process. Lastly, operating experience challenges and current state codes for PWR analysis are reviewed.

The primary aim of the course is to give a practical understanding of PWR plant and fuel design and operation. This course is directed at engineers and engineering support personnel that support PWR plant operation, PWR fuel design, or any facet of PWR fuel analyses.

Content list

1. Overview of PWR Design, Operation
2. PWR Designs and Unique Characteristics
3. PWR Accident Mitigation Systems
4. PWR Fuel Component Functions
5. PWR Normal Operation and AOO
6. Tools/Codes for PWR Design

The Lecturer



Mr. Kenneth Epperson

Mr. Kenny Epperson has been working in the commercial nuclear industry since 1984. He began his career with Virginia Power at North Anna Power Station as a reactor engineer and then a licensed Senior Reactor Operator (SRO) shift technical advisor (STA). In 1989, he began a career with Duke Energy in the corporate office supporting fuel design and analyses. The work involved development, approval, and implementation of NRC licensed methodology for thermal-hydraulic and fuel rod mechanical analyses of reload fuel cycles for seven PWRs. He coauthored two topical reports on statistical DNB analysis methodology and fuel assembly reconstitution. In addition, he assisted two vendors in the development and initial Duke analyses of four new fuel assembly designs and managed the implementation of two Lead Test Assembly (LTA) programs.

Read full biography →

Zr Alloy Corrosion and Hydrogen Pickup Mechanisms

(2-days, March 14-15, 2019)

About the seminar

This course is directed at engineers, and materials scientists interested in fuel performance in general and specifically in Zr alloy corrosion and hydrogen pickup mechanisms and performance. The focus will be on explaining the very complicated corrosion and hydrogen pickup mechanisms in an understandable manner. Also, the various parameters impacting corrosion and hydrogen pickup will be covered as well as discuss specific in-reactor cases with abnormal corrosion and hydrogen pickup behaviours and the possible reasons behind the behaviours.

Content list

1. Zr Alloy Corrosion and HPU — Introduction
2. Irradiation, Types and Effects
3. Design Criteria (Oxide Thickness and Hydrogen Content)
4. Out-of-Reactor Corrosion and HPU, Testing and Relevance
5. In-reactor Corrosion and HPU (PWR, VVER, CANDU and BWR)
6. Current Scientific Understanding of the Corrosion and HPU Mechanisms
7. Parameters Impacting Corrosion and HPU
8. Modelling the Corrosion Kinetics
9. Comparison of Current Alloy Experience
10. CRUD and AOA
11. Cases of Accelerated Corrosion and HPU in the Industry

The Lecturers

Mr. Friedrich Garzarolli

Mr. Friedrich Garzarolli retired from Framatome ANP in March 2002, where he held various managerial and research positions.

Read full biography →

Dr. Clément Lemaignan

Dr. Clément Lemaignan worked during his entire carrier at the Grenoble Nuclear Center in the field of Nuclear Metallurgy.

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Mr. Peter Rudling

Mr. Peter Rudling was a senior consulting scientist at Vattenfall, the largest Swedish power company.

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