The Antenna
NEWSLETTER FROM ANT INTERNATIONAL No.25 2014

## FOLLOW UP – ZIRAT & LCC SEMINARS

The annual ZIRAT and LCC Seminars were given during February and March 2014. The ZIRAT Seminar was held in Clearwater Beach, FL and in Bilbao, Spain. In all 60 participants from 25 organizations attended both ZIRAT Seminars. In Bilbao a total of 22 participants from 12 organizations took part in the European LCC Seminar.

CLEARWATER BEACH 2014
BILBAO 2014
FEBRUARY–MARCH 2014


Feedback

## Feedback from the ZIRAT Seminars:

*"ZIRAT continues to provide excellent review of latest information"*

DR AIDAN COLE-BAKER
Principal Core Materials Engineer,
Core Design and Performance at Rolls-Royce

*"Excellent meeting... as usual"*

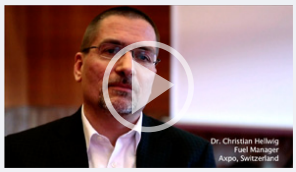
FRANK HOLZGREWE
Reactor Physics Division Manager at BKW

*"Well done, very good seminar. Excellent speakers."*

ARMANDO PAGANI & MARKUS AMMON
Fuel technology, Gösgen

*"The entire seminar was excellent"*

PABLO VIZCAINO
Head of Technology, Department of Zirconium Alloys at CNEA




Listen to Christian Hellwig, Fuel Manager at Axpo

## Feedback from the LCC Seminar:

*"Very insightful and varied presentations. Much appreciated."*

ROBIN ALDWORTH
Primary Chemistry Engineer


Listen to Niels van Dijke, Dep. Manager, Chemistry at EPZ

Listen to Ana Isabel Muñoz, Lab Chemist, and Carlos Arias, Head of Chemistry, at CNAT

# NEW HANDBOOKS SOON AVAILABLE

THE FUEL FABRICATION Process Handbook, Revision I, will become available during the Summer of 2014. The objective of this Handbook is to provide guidance for a cost effective audit which uses audit time on areas which are most likely to affect the performance of the PWR/VVER and BWR fuel. The Fuel Fabrication Process Handbook focuses on a "Process Audit" procedure, the audit of the fabrication process parameters for making high quality fuel. This Handbook is an updated and expanded version of the previous FFPH Handbook published in 2005. More than 35 organisations worldwide bought the earlier Handbook. The expansion in the revised version constitutes of two sections on Statistical Quality Control and Software Quality Assurance. Statistical QC is a vital part of process control, the establishment of sampling plans and the qualification of inspection methods. The QA of software is important for auditing thesoftware for the expanding automation of fabrication methods.


The authors of this revised Fuel Fabrication Process Handbooks are Mr. Al Strasser, Mr. Peter Rudling, Dr. Charles Patterson, Dr. Graham Walker and Mr. Kenny Epperson.

*More information*


A NEW HANDBOOK on Control Assembly Technology will become available during the Summer 2014. This Handbook constitutes Volume III in the series of Fuel Material Technology Reports (FMTRs) and it describes the designs, manufacturing, performance and issues related to BWR/PWR/VVER/CANDU Control Assemblies with Ag-In-Cd (AIC), B4C, Hf absorber materials and stainless steel structural materials. The author is Mr. Alfred Strasser.

*More information*

For further questions and inquiries, please contact Angela Olpretean; angela.olpretean@antinternational.com or phone; +46 (0)70-263 13 77.

# François Cattant

*Your name, title, where you live*

François Cattant, Consultant,
9 Trézélo, 56890-Plescop, France.

*How did you get started as an engineer?*

I graduated in chemical engineering in 1974. After one year in the Air Force (the military service was compulsory at that time in France!), I joined Electricity of France (EDF) in 1975 as chemist engineer in the chemical department of the corporate laboratories (Plants Operation Division).

*Your career history?*

My first job was related to water and steam conditioning, including chemical cleaning, of fossil fired power stations. However, this first job lasted only 8 months as in June 1976 I moved to the hot laboratory department, located at the Chinon nuclear power plant, as metallurgical section deputy manager. My new area of expertise was examining failures and do root cause analysis of gas-cooled reactors components, including fuel.

A few years later, in 1980, I moved to the northern part of France, as manager of the regional chemistry and non-destructive examination (NDE) section. I somehow stepped back to my first job as again being involved in water & steam chemistry, chemical cleaning and NDE for fossil fired stations.

Three years later, in 1983, I returned to the Chinon hot laboratory, as metallurgical and mechanical testing section manager where I continued to focus on failure root cause analysis of nuclear power plants irradiated or contaminated parts & components and Reactor Pressure Vessel (RPV) irradiation programs monitoring. I was especially involved in the analysis of steam generator tubes, control rod drive mechanisms guide tubes pins, pressurizer nozzles, valves, reactor cooling system cast elbows, piping, fuel bundle & rods, rod cluster control assemblies and much more.

In 1987, I was promoted to hot laboratory deputy manager and in 1991 promoted again as hot laboratory technical manager. In addition, my area of expertise extended to the examination of Dampierre 1 retired steam generator, to the examination of reactor pressure vessel head penetrations, to the study of thermal embrittlement, to the analysis of wear…

Between 1995 and 1998 I made a break in my career in France as I was assigned as an expatriate engineer to the Nuclear Maintenance Application Center of the Electric Power Research Institute (EPRI Charlotte, NC, USA). I worked there on nuclear plant maintenance issues. While at EPRI, I also participated as an outside expert on the examination of Ringhals 3 retired steam generator.

Returning back in France in 1998, I joined the R&D Materials and Mechanics of Components Department as scientific advisor and senior engineer. My work involved chemistry, corrosion, and metallurgy, with special attention to primary water chemistry, source term reduction, primary water corrosion, corrosion mitigation and repair, fuel cleaning and innovation strategy. I continued to serve as the EDF representative to the EPRI's Materials Reliability program. In this capacity, I participated in several destructive examinations such as North Anna 2 RPV head penetrations, South Texas Project 1 Bottom Mounted Instrumentation, Braidwood 1 pressurizer heater #52 and San Onofre 3 CEDM #64.

From 2004 to 2008, I was the President of the "Materials, Non-Destructive Testing and Chemistry" section of the "French Nuclear Energy Society" and from 2008 to 2009 I was in charge of the International Partnerships of the Materials Ageing Institute (MAI).

During my carrier, I made many presentations and papers in international conferences and Scientific's journals.

Subsequent to my retirement from EDF in 2009, I was commissioned by the Materials Ageing Institute to

collect details and produce summaries of destructive examinations performed on failures in light water reactor components in France, USA, Japan and Sweden. These extended summaries have been compiled in a unique "Handbook of Destructive Assays", a 1200 pages book which was published in February 2014.

*How did you get introduced to the ANT International LCC Programme?*

I was introduced to ANT International by Peter Scott with whom I've been in contact for many years when he was a former Areva employee. Peter is a very active member of the experts' team at ANT.

*How has the field of nuclear materials of the Nuclear Steam Supply Systems changed during your career?*

Except the 15% chromium alloys such as Alloys 600 and 182, the NSSSs' materials have behaved pretty well in the past. In terms of materials replacements, the big move has been replacing these 15% chromium alloys with 30% chromium alloys which are much more corrosion resistant. However, nickel base alloys are not the only class of materials having experienced field failures; there have been many stainless steels (austenitic and martensitic) failures too. The reason is not that stainless steels are inappropriate for nuclear reactors usage but rather because they have been exposed to conditions or situations which were not anticipated. A couple of examples are fatigue failure and corrosion in polluted environments. Fortunately, over the years, many materials issues have been solved. However, with plant ageing and life extension programs, we may have to face with new materials challenges down the road.

*What do you foresee the future of the nuclear industry and how does the LCC Programme fit in?*

This is a one million dollars question. I think the world nuclear community can be split into two categories. The first category contains the countries where the future of the nuclear industry is governed by technical issues and economical aspects; in these countries the nuclear industry has a rather fine perspective. The second category is composed of countries where the polls have a major impact on the fate of the nuclear industry. Most European countries fall in the second bin, the bin for which anticipating the future of the nuclear industry is a real challenge. However, there are many nuclear reactors operating in Europe and some may still operate for many years, thus room still exists for initiatives such as LCC programs.

*How do you spend your leisure time?*

By leisure time, I figure out when I'm not working for ANT International!

First, my property is very old: built around year 1500. It has been refurbished in 1982 and before that was a farm. So, as you can imagine, I'm very busy maintaining and improving it. I like also gardening, growing vegetables in summer.

Second, I take advantage of living a few kilometers from the shore (Atlantic ocean) to have a cruiser boat and sail as much as the weather allows me, and you know, Brittany is not the Caribbean's!

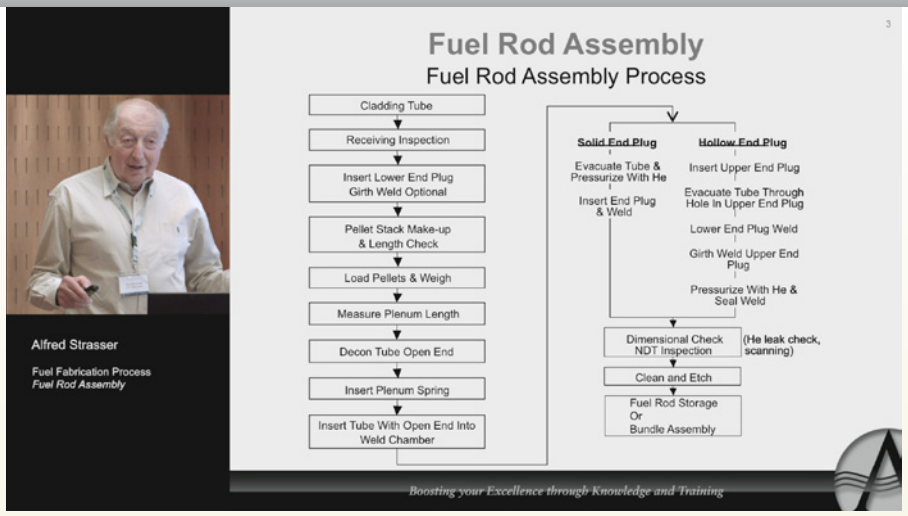
Third, I bought a couple of years ago a vintage sport car. This car, made in 1977, requires a lot of attention and I had to develop some skills in mechanics and electricity to take care of it.

Note that since January the 8th (2014), I'm a grandfather and this could add another line to this series of hobbies.

## ANT INTERNATIONAL WEBINARS

The following webinars will become available through streaming during the latter part of 2014.

- Fuel Material related Webinars
  - Fuel Fabrication Process
  - Fuel material performance during normal operation and anticipated operational occurrences
  - Zirconium Alloy Technology (ZIRAT18) / Information on Zirconium Alloys (IZNA13)
- Webinar on Material Degradation in LWRs
- Webinar on PWR/VVER Plant Chemistry and Corrosion
- Webinar on LWR Chemistry and Component Integrity (LCC9)




***More information***

For further questions and inquiries, please contact Angela Olpretean; angela.olpretean@antinternational.com or phone; +46 (0)70-263 13 77.

# FOLLOW UP – ANTIA SEMINARS

The ANTIA SEMINARS were held this year in Bilbao. They were highly appreciated. In total 50 participants from 20 organizations attended the five ANTIA Seminars from March 4th–7th and March 13th–14th , 2014.

In total 11 Seminars will be offered in 2015 at the interesting location Mallorca, Spain. More information will follow during fall.

ANT International Academy

***Upcoming Seminars***

**Feedback from the ANTIA Seminars:**

***Fuel material performance***

*"This Seminar has provided me with an extremely valuable overview of materials behaviour in-reactor"*

PETER HONNIBALL
Metallurgist at Rolls-Royce

*"The Seminar provided excellent balance between coverage and depth, with detailed information and useful data that you can work with on a professional level"*

TINA KLASEN
Nuclear Fuel Technology Specialist at Axpo

Listen to Pablo Vizcaino,
Head of Technology, Department of Zirconium Alloys at CNEA

Listen to Tim Delorme,
Section Head, Reactor Physics at EPZ

***Interim Storage***

*"I think that the background provided by the seminar is excellent. Scientific and engineering level is outstanding."*

JUAN GARCIA DE LA INFANTA
Spent Fuel Specialist at ENUSA

*"Very interesting seminar"*

FRANCISCO FERIA
Researcher at CIEMAT

***Materials Degradation***

*"Very good seminar, keep on organising it!"*

VIOLETA CALIC
System Engineer at NEK


Listen to Raymond van Beusekom,
Principal Engineer at EPZ


Listen to Laura Taivalaho,
Inspector, Manufacturing Technology

***PWR/VVER Plant Coolant Chemistry and Corrosion***

*"Lecturers are very good and professional"*

JARI VAITTINEN
Chemist at TVO


Listen to Gido Goulooze,
Senior Engineer, Monitoring at EPZ

***Fuel Fabrication Process***

*"Very good seminar"*

GÖRAN BERGSHEM
Nuclear Engineer at Vattenfall

*"An excellent seminar, it was very useful for me"*

JOLANDA CAPPAERT-DE VOS
Reactor Physicist at EPZ

*"The seminar approach was very practical and well put together. The summaries, priorities and useful tips were very good"*

JENNI LAINE
STUK

*"The seminar topics were so interesting that I would have liked the seminar to be longer"*

KAISA PELLINEN
Design Engineer at Fortum

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