

The Antenna

NEWSLETTER FROM A.N.T. INTERNATIONAL No.60 2024

THE MOST ENVIRONMENTALLY FRIENDLY ENERGY SOURCE

Nuclear power is by far the most environmentally friendly electrical energy source since it uses the least amount of resources (including the earth's surface area). The amount of energy released in nuclear fission of an atom is 50 million times larger than is released by combustion of one coal atom (that occurs e.g. in a coal fired plant). Twelve, 6 gram, fuel pellets produce sufficient energy for an entire household for 6 years!

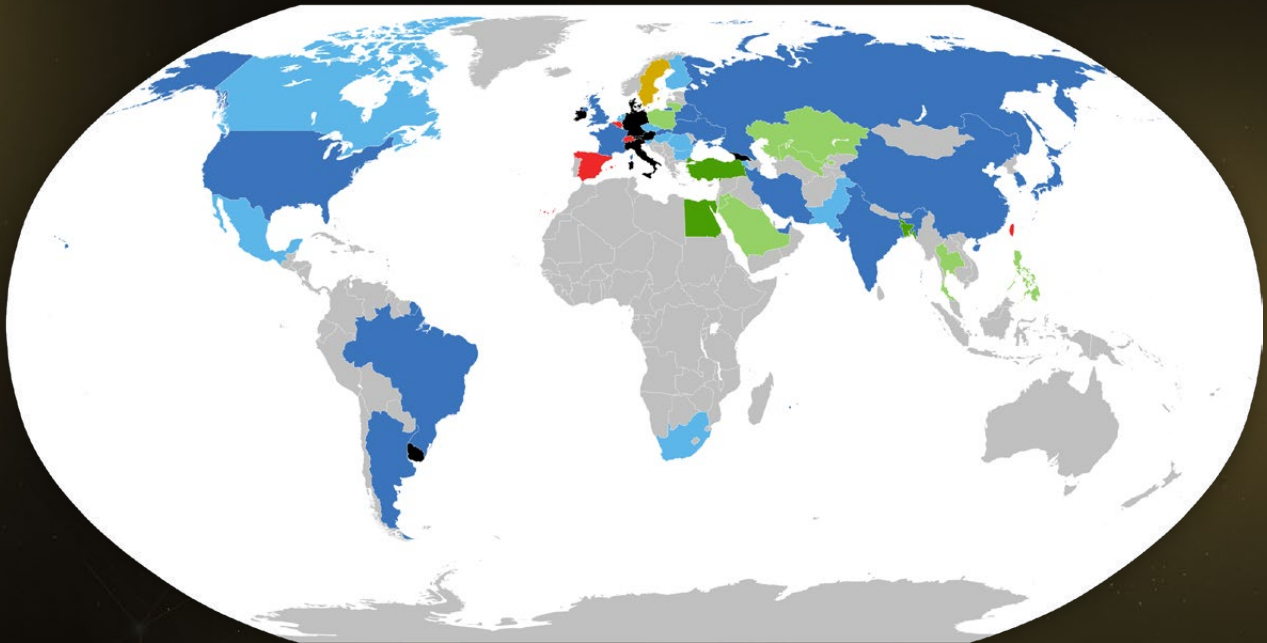


A.N.T. INTERNATIONAL®

*Boosting your Excellence through
Knowledge and Training*

THE INTEREST FOR NUCLEAR POWER IS BOOMING AROUND THE WORLD

The figure below shows the status of nuclear deployment as of April 2023



- Operating reactors, building new reactors
- Operating reactors, planning new build
- No reactors, building new reactors
- No reactors, planning new build
- Operating reactors, stable
- Operating, but may phase out
- Civil nuclear power is illegal
- No reactors

Ref: Nuclear power station - Nuclear power by country - Wikipedia

To ensure the continued growth of the nuclear industry it is crucial to ensure that no major nuclear accident like Three Mile Island (1979), Chernobyl (1986) and Fukushima (2011) happens again.

THE KEY TO KEEPING NUCLEAR ENERGY PRODUCTION SAFE IS TRAINING AND EDUCATION OF THE NUCLEAR ENGINEERS

A.N.T. International will be very happy to provide the following training/education and consultation services to the nuclear industry worldwide through the A.N.T. International 40 + World Class Experts.

DESIGN REVIEW AND FUEL MANUFACTURING SURVEILLANCE

PWR Reactor Design Review - The design of a NPP must consider as ultimate goals safe operation, maximum production of electricity and minimum side effects, as for example amount of spent fuels (back end costs, reprocessing), out of core radiation fields and low and intermediate level radioactive wastes. The design review requires a holistic evaluation of the interplay chemistry/process chemistry/structural materials (specially fuel element cladding, in core materials and steam generator tubing) and its influence on the performance of the NPP, always looking for the alternative which can be included in the SFAIRP (so far as is reasonably practicable) category.

Fuel Design Review Support of BWR/PWR/VVER fuel - A.N.T. International provides a guide to the items that have the greatest influence on the mechanical, T/H and neutronic fuel performance and prioritize the audits and recommends the audits that are prioritized. A review of all aspects of the fuel design is not feasible or necessary within the time constraints of the utility and the vendor. The objective is to do the most effective audit in the shortest time period. These services includes:

- **MECHANICAL DESIGN REVIEW INCLUDING LICENSING ANALYSIS FOR SEISMIC DESIGN BASIS ACCIDENT (DBA)**
- **THERMAL-HYDRAULIC DESIGN REVIEW**
- **FUEL ROD THERMAL-MECHANICAL DESIGN REVIEW**
- **CLADDING PERFORMANCE DURING ACCIDENT CONDITIONS (LOSS OF COOLANT ACCIDENT, LOCA AND REACTIVITY INITIATED ACCIDENT, RIA)**

Fuel Manufacturing Surveillance Support of BWR/PWR/VVER fuel - A.N.T. International can provide follow up and licensing (mechanical design and geometrical compatibility) of fuel starting from Zirconium alloys (e.g. sponge material and billets), to Zirconium and Inconel material (coil, bars) to fuel assembly components (pellets, cladding, end plugs, fuel rod springs, guide tubes, spacer grid straps, hold down springs, cast and machined top and bottom nozzle components) to component assembly and manufacturing (fuel rods, spacer grids guide thimbles, top and bottom nozzles, fuel assembly skeleton and fuel channels) to final assembling and final inspection.

LONG TERM SPENT FUEL CONSULTATION SERVICES



A.N.T. International also provides Consultation services on all aspects of long term spent fuel behavior in a deep repository - This includes the identification of the long-term release mechanism, the assessment of rates by which radionuclides are released from different locations of a fuel assembly in contact with groundwater, quantification of the Instant Release Fraction (IRF) for key radionuclides based on available data, assessment of release rates from cladding and structure material, influence of intrinsic fuel properties (e.g. burnup) and environmental conditions on fuel matrix dissolution rates, behavior of less common fuels (e.g. Cr-doped fuels), impact of helium generation and alpha decay damage on fuel stability, long-term criticality aspects etc.

CONSULTATION AND PROVIDING ON-SITE OR ON-LINE SEMINARS

A.N.T. International will be very happy to provide an independent analysis of operation issues and evaluation of reports or analysis to provide a second opinion of suggestions or recommendations made by others and, provide technical support services (reports, seminars, workshops), education and training in the following areas:

- *Basic knowledge of Zr Alloys, Stainless Steels and Nickel Base Alloys*
- *Fuel Design and Manufacturing*
- *Licensing of Nuclear Fuel*
- *In-reactor fuel performance during normal operation, anticipated operational occurrences and design basis accidents*
- *Fuel performance during interim dry/wet storage as well as final storage*
- *Testing and Examinations of claddings and fuel materials*
- *Thermal – Hydraulic and Nuclear analyses*
- *BWR/PWR/VVER coolant chemistry/corrosion*
- *Radiochemistry*
- *Nuclear decommissioning and dismantling*



Through interaction with the customer, A.N.T. International will tailor the Seminar scope and duration based upon customer input. The Seminar can be provided either on-site or remotely. Providing the Seminar remotely is a great option since more Experts can be involved in the Seminar and there will be no travel cost for the Experts giving the Seminar.

THE MOST RECENT A.N.T. INTERNATIONAL EXPERT



MR. BERTIL JOSEFSSON

Mr. Bertil Josefsson can provide a full scope of nuclear fuel manufacturing surveillance and licensing (mechanical design and geometrical compatibility), starting with the manufacturing of the nuclear fuel components to final fuel assembling and final inspection.



A.N.T. INTERNATIONAL®

CONTACT

For more information and/or an offer, welcome to contact us at sales@antinternational.com

Please also visit our website for the latest updated information www.antinternational.com