

At the Core of Nuclear Safety

The graphite core of an advanced gas-cooled reactor (AGR) is subject to a number of ageing mechanisms and must be regularly monitored to assure continuity. The core's geometry must be within acceptable limits, its structural integrity must be preserved and the optimum reactor performance must be maintained.

Specialist Graphite Trepanning equipment is used to retrieve small graphite samples from the wall of a fuel channel for analysis. The retrieval must be accurate, efficient and safe and not compromise the integrity of the core.

Risktec Solutions recently assisted British Energy in a detailed safety analysis of the existing fleet of Graphite Trepanning equipment against modern assessment criteria.

By starting from first principles, Risktec unambiguously determined the precise safety functions of the equipment and identified the degree of reliance placed upon each function to manage nuclear

safety. As a result, a range of essential modifications, covering electrical, mechanical and procedural aspects of the equipment, could be developed.

The successfully modified equipment provided both dose reductions and availability improvements when used at the Hunterston B and Hinkley Point B nuclear power stations. Further trepanning campaigns at other British Energy stations are now planned.

Contact Andy Reynolds



Some recent projects

Nuclear and Defence

- Safety case and design integration framework for major defence project.
- Weapons handling authorisation conditions.
- Hydrogen fuel cell risk assessments.
- Independent peer review of nuclear safety reports.

Rail

- Safety manager for national railway radio communications system.
- Safety manager for voice radio system for regional railway system.
- Risk assessment of railway signaller's use of telephone handsets.
- Safety manager for railway infrastructure maintenance provider.

Oil & Gas & Chemical

- Onshore COMAH safety report for gas facilities.
- Health and safety legislative framework, Kazakhstan.
- Offshore safety case support, Aberdeen.
- Safety critical system performance standards, Aberdeen.

Manufacturing

- Environmental risk assessment training.
- OHSAS 18001 safety management system support, Europe.
- Business continuity planning for manufacturing facilities, Worldwide.

What is Authorisation in the Ministry of Defence?

In 1999, the UK MoD's regulatory handbook for nuclear submarines at sites (BR3018 Volume 2) was revised significantly and became mandatory for new contracts. Included were 36 Authorisation Conditions (ACs), derived from the Licence Conditions of the civil nuclear regulator, the NII. This marked the beginning of a substantial overhaul of MoD nuclear regulation, which has now seen:

- BR3018(2) replaced by JSP 518, which also introduces separate ACs for nuclear submarines at sea.
- The development of a similar regulatory regime for nuclear weapons (JSP 538).

How is Authorisation achieved?

For activities involving nuclear material the process of Authorisation mirrors that of licensing by the NII, with each "Authorisee" required to produce Compliance Statements detailing the

arrangements against each AC, for subsequent confirmation by regulatory audit.

Who are the Regulators?

There are two MoD Nuclear Regulators: the Nuclear Weapons Regulator and, for the Naval Nuclear Propulsion Programme, the Chairman Naval Nuclear Regulatory Panel.

Who are the Authorisees?

There are separate Authorisees for:

- Authorised sites for nuclear submarines, such as naval bases.
- Submarine reactor plant.
- Authorised sites for nuclear weapons.
- Nuclear weapon transportation.
- Deployed nuclear weapons.

What are the benefits of Authorisation?

The top-level regulatory framework provided by Authorisation draws heavily upon the strengths of Licence Conditions, which have been

implemented to great effect by the NII, while also taking advantage of the many good practices associated with the regime it succeeds.

Contact Greg Davidson



Authorisation applies to nuclear submarines as well as sites