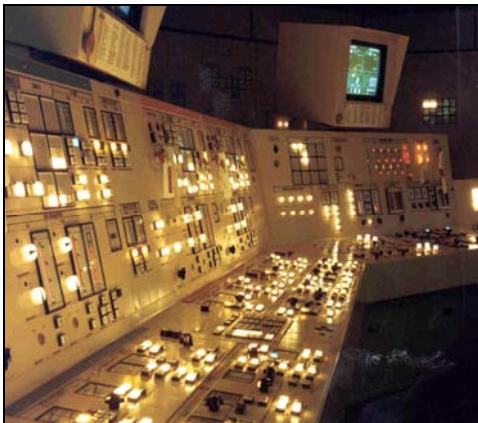




## SERVING THE NUCLEAR INDUSTRY

*Our mission is to be the premier risk management consultancy of the 21<sup>st</sup> century and beyond*



### The CRA Team

Founded in 2000, CRA has grown into a mature consultancy which has developed a major reputation for supplying high quality and value-for-money services to the Nuclear Industry. The company is ISO9001:2008 certified and the CRA team offers state-of-the-art Nuclear Risk Management experience unmatched by any other consultancy in the UK.

### Probabilistic Risk Analysis

CRA team members are some of the UK's leading practitioners in the field of Probabilistic Risk/Safety Analysis (PSA) with extensive experience of industry techniques including: Fault Tree Analysis; Event Tree Analysis; Failure Modes and Effects Analysis; Reliability Block Diagrams; Cause-Consequence Analysis; Monte-Carlo simulation; and Uncertainty Analysis. Our team has developed and managed the PSAs for most of the UK's Nuclear Power Stations and has supported the utilities in the maintenance of these PSAs.

CRA provides Risk-Informed Decision making services and has developed a Risk Monitor for Sizewell B (PWR) NPP and is in the process of developing the Risk Monitor for Kernkraftwert Leibstadt (BWR) NPP.

### Human Factors Assessments

The CRA team has considerable experience in assessing the role of plant operators in operating, maintaining and testing engineered systems. CRA has taken lead roles over many years in the development of HFA techniques, which have been integrated into plant-based risk models and Holistic PSAs of complex plants.

### Safety Case Support

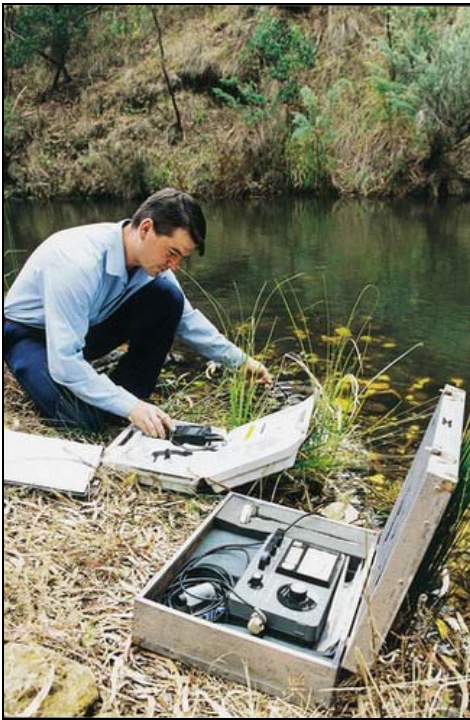
CRA provides a wide range of safety case support services encompassing authoring of safety case submissions (including ALARP assessments), technical references (e.g. Fault Schedules), and support to the client companies Safety Case Officers on the application of appropriate safety standards and methodologies to safety cases.

CRA also acts as an independent verifier/technical peer reviewer, and provides support to INSA (Independent Nuclear Safety Assessment) on safety cases. CRA provides training courses for safety case authors and verifiers for authoring of simple and complex safety cases.

### Support to Regulatory Bodies

CRA provides continued support to the UK Nuclear Installations Inspectorate (NII) on a range of topics including development and use of Safety Performance Indicators, PSAs for Low Power and Shutdown States, and the modelling of ageing in PSAs.





Internationally, CRA has provided support to the Slovenian Nuclear Safety Administration (SNSA) in preparing for the licensing of a new reactor. Other international activities include: Participation in the International Regulatory Review Team (IRRT) and International PSA Review Team (IPSART) missions for the IAEA; Development of IAEA Safety Standards; Representing the UK in the OECD Committees on the Safety of Nuclear Installations (CSNI) and Nuclear Regulatory Activities (CNRA); Representing the UK in the OECD Working Group on Risk (WGRisk); and Providing inputs to the European Commission and to the Western European Nuclear Regulators Association (WENRA) on safety issues.

### Environmental Monitoring and Assessment

Within the global regulatory environment, there is a requirement to report on the environmental impact of discharges from a nuclear site. CRA has international experience of designing and advising on such programmes (examples include Hong Kong, France and the USA) that are scientifically robust and credible to regulators and local authorities, as well as nuclear plant operators. We are members of the United Kingdom Environmental Law Association, UKELA.

CRA can provide an analysis of environmental effects and act as a 'critical friend' to regulators and nuclear site operators on selecting the most appropriate sampling regimes for environmental analysis, and identifying key radionuclides and exposure pathways.

Human exposure close to a nuclear site can be influenced by a multitude of environmental factors. CRA can advise on identifying the most exposed people - those who form the so called 'Critical Group' as defined by the IAEA.



### Decommissioning and Waste Management

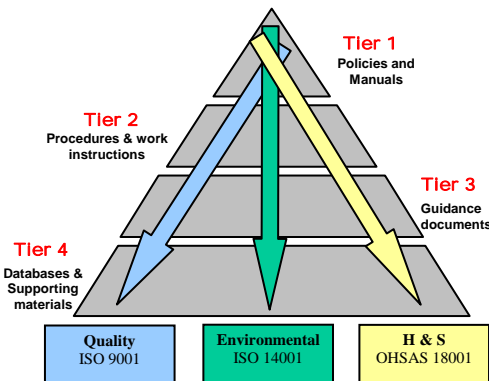
The credentials of our key personnel include an outstanding record of achievement in the completion of challenging decommissioning and waste management projects for major nuclear companies such as British Energy, British Nuclear Fuels, the United Kingdom Atomic Energy Authority and the Atomic Weapons Establishment (Aldermaston). This provides CRA with valuable experience of working closely with clients on many of the nuclear sites within the UK.

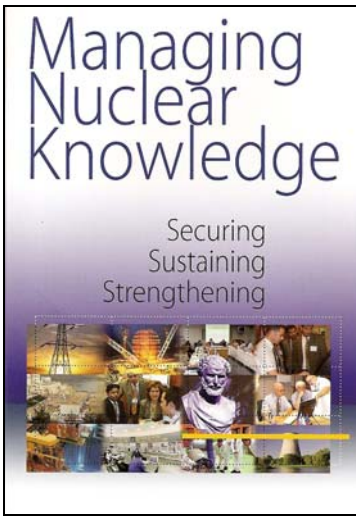
Our key expertise includes optioneering to develop optimal decommissioning strategies and methodologies; waste and material management; project planning and safety management; cost appraisals and preparation of NDA Baseline documents and assessments.

### HSEQ Management Systems

A Health, Safety, Environmental & Quality (HSEQ) Management System is a necessary prerequisite for all organisations working in the nuclear sector. An effective management system provides a structured approach to managing risk and facilitates the application of controls to help prevent and mitigate hazards in the plant or office environment.

CRA consultants have many years experience in developing HSEQ management systems in the nuclear and allied industries. We can undertake a complete system design and implementation from scratch or modify existing systems to meet additional requirements or the need for continuous improvement. Stand-alone or integrated management systems can be developed. We develop systems to international standards such as ISO 9001, ISO 14001, OHSAS 18001 and can incorporate the requirements of IAEA Safety Standard GS-R-3.

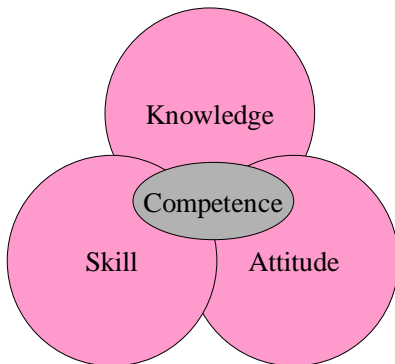




### Nuclear Knowledge Management

Given the extended lifetime of nuclear power plants (up to 60 years) and the longevity associated with the storage of nuclear waste, the management of nuclear knowledge has emerged as a growing challenge in recent years. The need to preserve and transfer nuclear knowledge is compounded by issues such as an ageing nuclear workforce, declining student numbers in nuclear-related fields, and the threat of losing accumulated nuclear knowledge.

CRA employs consultants who are regarded by the IAEA as international experts in Nuclear Knowledge Management (NKM). Our staff can undertake NKM maturity analysis of any type of organisation in the nuclear sector and provide consultancy advice on NKM strategy. We can also lead initiatives to help identify critical knowledge in an organisation, capture/transfer tacit knowledge from experts, advise on implementing a knowledge sharing culture, help establish collaboration processes and advise on selecting supporting IT technologies.

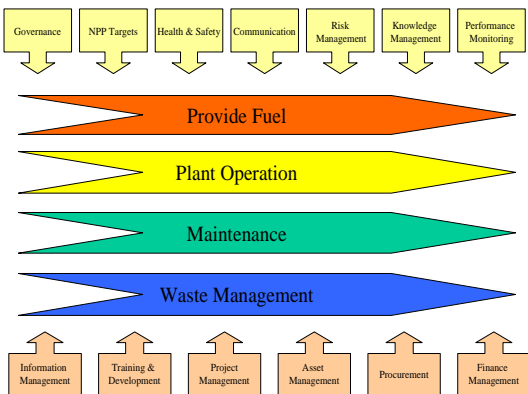


### Nuclear Competence Management

Nuclear organisations require skilled and competent personnel for safe and effective interventions throughout the nuclear design, build, operation and decommission life cycles of nuclear facilities. Regulatory bodies also require that arrangements be in place to ensure that for all tasks effecting safety, core skills, qualifications, experience, competencies and responsibilities are clearly identified.

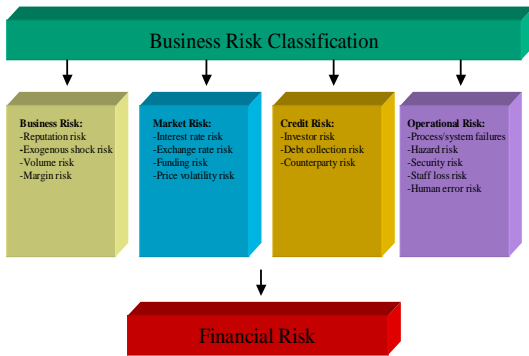
CRA staff have implemented competency frameworks to help organisations manage their competence requirements. This includes the development of role profiles, individual role competencies, competence scoring methodologies and related assessment tools to provide management overview. We use task analysis and other techniques such as RACI analysis to help identify responsibilities and accountabilities.

### Business Process Development



Business Process Management (BPM) involves the use of appropriate tools and techniques to design, analyse, and manage operational business processes and, where possible, to improve those processes.

All organisations require streamlined and effective business processes to support efficient working, compliance with regulatory requirements and the overall performance objectives of the business. Closely related to this is the constant need to achieve more whilst at the same time maintaining or even reducing budgets. CRA staff have a proven track record in helping nuclear industry organisations conceive and implement BPM solutions. We use a wide range of tools to help deliver services to clients including the use of gap analysis, process capture templates and web enabled process modelling systems. The use of education, training and change management techniques are essential enablers to any BPM implementation to ensure that the new business processes are implemented and embedded effectively.



## Business Risk Management

Identifying and quantifying risks within a business is about recognising new opportunities, as well as being prepared for the undesirable events or actions that may jeopardise a company's strategic objectives. Management facing day-to-day pressures may unintentionally lose sight of risks posed to their operations, which could give rise to potentially deleterious effects on their business continuity. The CRA risk management team aims to offer a holistic solution, which can assist your business with the identification, assessment, management and mitigation of all such risks.

Our knowledgeable, multi-disciplined team is able to assess an organisation's current and future risk management needs. We can provide the advice needed to develop a pertinent strategy and assist you with its implementation. CRA offers a wide range of Risk Assessment Techniques, which are applied together with the appropriate Risk Management skills required to control and mitigate identified risks.



## Education and Training

Our expert trainers have a wealth of experience and knowledge in the field of risk assessment and risk management. We can provide tailored courses to suit private companies and public organisations alike.

Our principal programmes comprise:

- Risk Awareness
- Risk and Hazard Management
- System Modelling

All our programmes incorporate realistic practical examples, with accompanying workshops. All courses can be held either at the client's office or at our prestigious conference rooms here at Wesley House.



## Delivering the Nuclear Future

CRA recognises that considerable human and financial resources will be required to deliver the world's Nuclear future.

Our graduate training programme has been approved by the Institute of Mechanical Engineers in recognition of the quality of our programme. We are an Associate Employer member of the National Skills Academy Nuclear (NSAN) and a member of the South East and East Region Steering Group which gives us a significant opportunity to influence the development of skills. We are also in discussion with Imperial College, London to provide a nuclear engineering doctorate programme to develop practical expertise in nuclear safety and risk assessment for the next generation of nuclear engineers who will deliver the world's nuclear future.

CRA is also collaborating with banking, energy and other professionals to devise better structures to facilitate new financing in the sector.



## Where to Find Us

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