Development Work in Safety & Risk Management

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Innovation

Two areas of innovation:

• Safety, Security, Safeguards: (Triple S)
  Colette Grundy

• Risk Reduction Radar: (R³)
  Howard Chapman
NNL have created a new Safety, Security and Safeguards Team within FCS.

The creation of this new team provides an exciting opportunity for NNL to offer an integrated approach to Safety, Security and Safeguards.

Team comprises of highly experienced national and internationally recognised experts with decades of experience in Safety, Security and Safeguards.
Traditional independent 3 pillar approach

**Safety**
- Accident
  - System failure
  - Human error
  - Natural disaster

**Security**
- Incident
  - Sabotage
  - Malicious act
  - External attack
  - Insider

**Safeguards**
- Diversion
- Misuse
- Break out
New integrated Triple S approach

- Safety Licensing
- Safety Engineering & Assessment
- Nuclear Safety
- Safety Management
- Safety Culture

- Vulnerability Assessment
- Emergency Planning and Preparedness
- Stakeholder Engagement
- New Build
- Vital Area Identification
- Security Culture
- Physical Security Advice
- Insider Threat
- Security Culture

- Facility-Related Radiological or Other Consequence
- Material-Related Weapon Consequence

- National Safeguards Programme
- Material Analysis
- Computerised Nuclear Material Accountancy System
- Support to IAEA

- Safety
- Security
- Safeguards
NNL are developing an innovative approach which will analyse comparative data and metrics to provide a simple visual display of complex information allowing key decision points to be compared and contrasted.

This will enable several different metrics under consideration to be examined and provide transparent, timely and accurate information.

This Triple S approach will enable robust decisions to be reached in a considered manner.
Risk Reduction Radar ($R^3$)

Howard Chapman
Traditional Approach to Process Safety

• **ERICPD – Hierarchy**

• **Eliminate** – Consider whether the substance could be altered or substituted such that it no longer presents a hazard.

• **Reduce** – Consider reducing the frequency or inventory of the substance such that the risks are reduced.

• **Isolate** – Making safe by separating the hazard from the individual through physical isolations or zoning.

• **Control** – Enacting managerial arrangements to prevent exposure to the hazard.

• **PPE** – Allow exposure but protect the individual with Personal Protective Equipment (PPE).

• **Discipline** – Reliance on operator training to minimise the risks.
• Methodology for early risk reduction:
  • Traditional methods (ERICPD) can lead to highly-engineered solutions in early stages of design...

Further Ops – Risk gradually increases

Total risk impact of the project can be expressed as the integral of risk over time
Pragmatic Approach

- Methodology for early risk reduction:
  - More pragmatic solutions place greater reliance on PPE and procedural control in the early stages...

It may be considered acceptable to be at the lower end of the hierarchical approach to safety in this time period if the overall integral of risk is less than that from the use of traditional solutions.
New R³³ Approach

- NNL perceived a need for the means to identify and present to stakeholders the most pragmatic and cost-effective solutions in a transparent way.

- The Risk Reduction Radar (R³³) enables the level of risk to be evaluated and visualised for key metrics over time to produce a risk ‘cube’.

- The integral of the cube is the total measure of risk in the solution.

- Risk cubes for different solutions can be directly compared to determine the best solution.