

National Nuclear Laboratory



Maintaining & Developing Technical Knowledge

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National Nuclear Laboratory



ICNC2011



Outline

- Context
- Skills Development
- Skills Maintenance
- Conclusions

Context

Context – Decommissioning and New Build



Context - Nuclear Skills Shortage



- “Meeting the skills challenge for the 21st century”,
24 July 2006, Nuclear Industry Association
- “Skills crisis looming in UK nuclear industry”
5 November 2007, The Times Skills review
- “Fukushima May Worsen Global Nuclear Skills Shortage,
U.K. Watchdog Says”
4 July 2011, Bloomberg Business Week

Context – the National Nuclear Laboratory (NNL)

Mr Hutton [as Secretary for Business, Enterprise and Regulatory Reform] said "***The creation of the national nuclear laboratory will safeguard the UK's high-tech nuclear expertise, facilities and skills.***"

from 'National nuclear lab to be set up',
24 July 2008, Financial Times

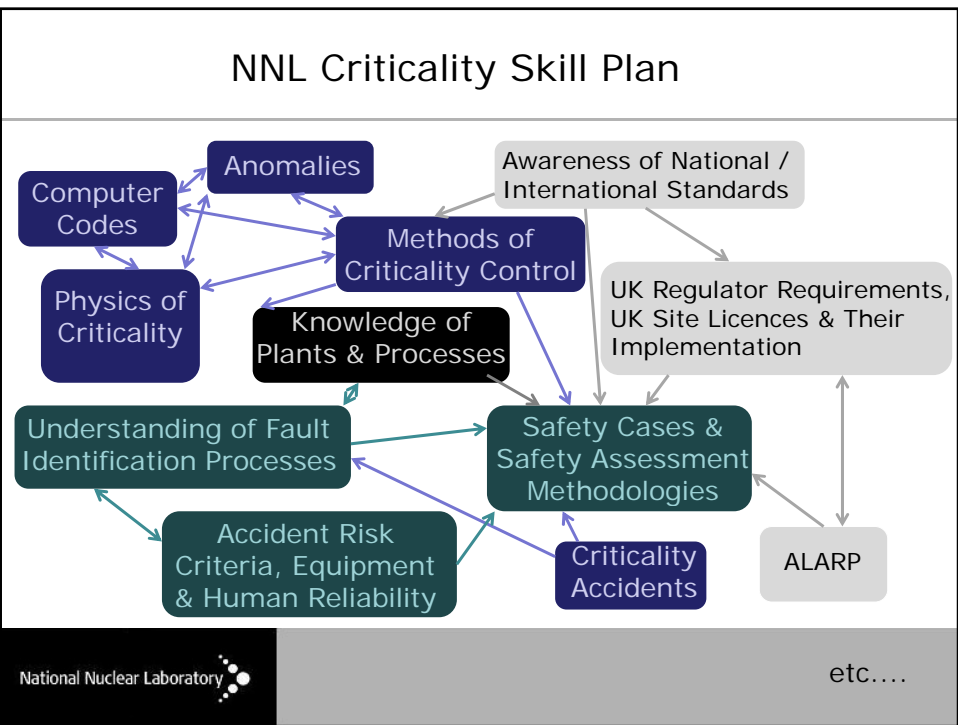
Skills Development

Suitably Qualified & Experienced Persons (SQEPs)

The diagram illustrates a three-stage progression of SQEPs. It features three blue five-pointed stars arranged horizontally from left to right. Each star contains white text: 'SQEP 1', 'SQEP 2', and 'SQEP 3' respectively. Three gray arrows point from left to right, connecting the stages: one arrow points to the first star, a second arrow points from the first star to the second, and a third arrow points from the second star to the third.

Tracking skills development through the NNL Criticality Skill Plan

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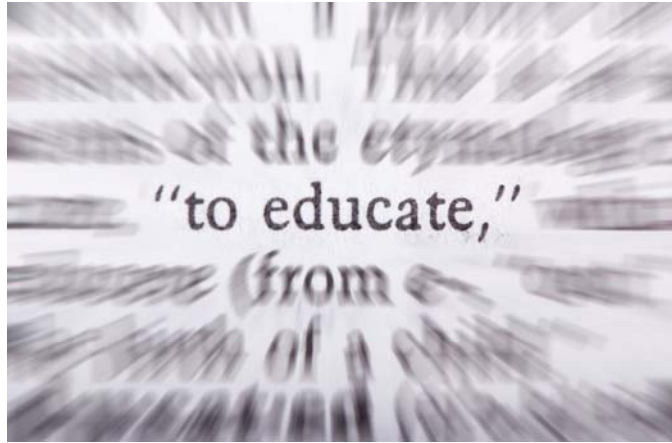


Experience-Based Applied Training of Criticality Safety Consultants

- Studying guides / documents under an experienced mentor's supervision supplemented with real-life examples
- On-the-job experience or work shadowing including:
 - providing operational support to customers including plant inspections
 - attending meetings and Management Safety Committees, HAZard OPerability studies (HAZOPs) and Management Investigations
 - providing plant/classroom based criticality safety training
 - writing nuclear safety assessments
 - checking documents

Skills Maintenance

Skills Maintenance



Criticality Technical Forum

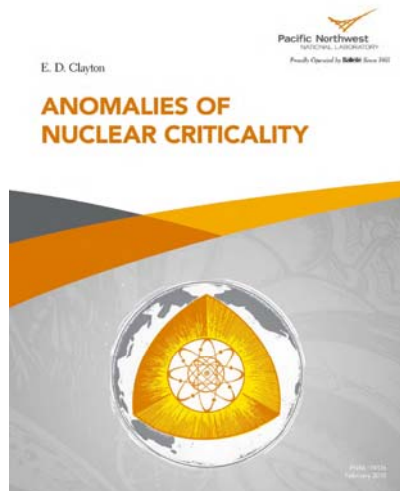
- A monthly lunchtime event that is attended voluntarily
- It provides a relaxed environment in which the team is able to discuss technical issues (as well as helping to maintain a sense of team cohesion)
- The Criticality Technical Forum harnesses the enthusiasm and energy of the team with an informal approach to criticality safety skills maintenance
- It encompasses activities such as:
 - Technical Presentations
 - Criticality Sweepstakes
 - Modeling Competitions
 - Christmas Criticality Quiz



Technical Presentations

Anomalies Presentations:

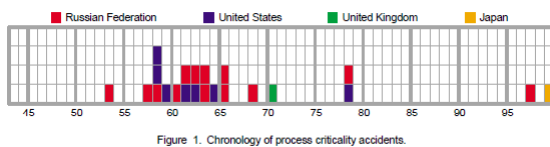
Each team member presents a section of Clayton's anomalies book followed by a general discussion



Technical Presentations

Accident Presentations:

Each team member presents a section of the Los Alamos 'A Review of Criticality Accidents' book followed by a general discussion



Technical Presentations

"Fifteen Minutes of Fame": Short presentations covering the principle operations and criticality safety controls in areas where the team members currently (or historically) provide(d) criticality support



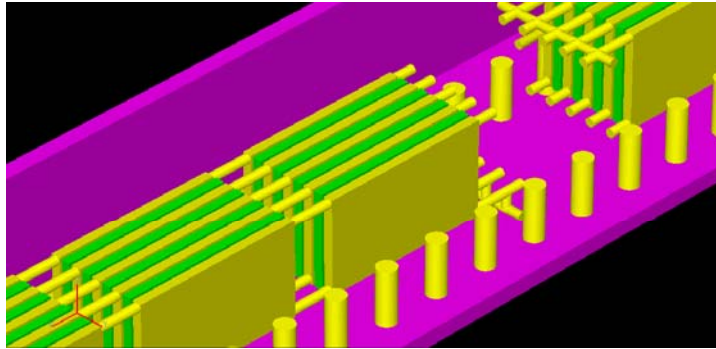
Technical Presentations

Guest Speakers: Visitors are invited to give presentations on areas of interest to the criticality team (e.g. human factors, fire safety issues etc.)



Criticality Sweepstakes

Monte Carlo neutronics computer code (MONK) models that were written as part of projects are presented to the team who provide their best “guestimates” as to the system's neutron multiplication factor (i.e. k-effective)



Modeling Competitions

MONK models are created on a theme with the best image winning. Extra ‘points’ go to the model which is the most reactive and which uses the most ambitious modeling techniques



Christmas Criticality Quizzes

The quiz typically contains questions about subjects such as:

- General knowledge of criticality accidents
- Nuclear data (i.e. identifying the correct fissile isotope for a series of fission cross-section curves)
- Standard expressions (such as the four and six factor formulae)
- Obscure critical quantities
- and so on...



Conclusion

This presentation details the NNL's approach to training criticality safety consultants, focusing on:

- The basic aims of the NNL's Criticality Skill Plan
- The type and breadth of training provided
- How skills are maintained across the Nuclear Safety Section
- The role of the Criticality Technical Forum in providing an informal but proactive environment aiding skills maintenance

Thank you

Questions?

