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IAEA Regional Workshop on Managing the Interface Between Safety and Security for Research Reactors

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Working Group 3
Facilitator Joe Rivers
Eileen Beth Hernandez
Md. Abdul Malek Soner
Katherine Lucas
Doan Hai Dang Vo
Trianti Nuri
Ridha Rosalan

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Case Study 1 – 500 kW to 3MW

- If considering the reactor change from 500 kW to 3MW there are significant safety and security implications.
- Answer to Q1 - Q3 is yes
  - consider change to the design, configuration and OLCs as a result of increased power
  - consider processes/activities that would be affected as a result of increased power, e.g. – number of people on site and period of time on site, types of experiments and reactor utilisation, frequency of handling fuel and radiological materials
  - revise DBA and security analysis considering increased source term
  - determine what safety and security regulations apply to the change – re-licensing required
  - change would involve all groups within the reactor operating organisation, including security and all expertise listed in working group outline
  - multiple changes all requiring assessment considering safety and security (reactor safety committee, security experts, regulators)

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Case Study 1 – potential impact on safety related to changes to physical protection system

- Q1 The proposed change could result in an increase in the frequency of occurrence of an accident previously evaluated in the facility safety analysis
  - Installation and maintenance of the fence posts (digging and concreting) or associated security surveillance equipment if poorly executed may damage the structures surrounding and supporting the underground building services, possibly increasing the frequency of potential disruption to power to safety systems, water supplies for reactor cooling and heating steam. Damage to heating steam line may result in damage to water and power supply
  - Assessment of the change would require facility service drawings and security design of fence and the safety analysis.
  - This would require support and communication between the engineering (design and structural analysis), the safety analysis team, security/physical protection and safeguards committee and reactor safety committee to assess/address using established change control processes, including assessment of the safety category of the change and regulatory implications (which may require regulatory approval)
  - The engineering team and maintenance would need to work with the security team to ensure that the design, installation and maintenance of the fence would not compromise the building services and surrounding structure.

Case Study 1 – potential impact on safety related to changes to physical protection system

- Q2 The proposed change could increase the risk of exposure to staff
  - The combined increase in power (consequence) and the increased frequency of potential disruption to power to safety systems, or reactor cooling could increase the risk of exposure to the facility staff.
  - The additional fence barrier may impede egress of reactor staff and students during an emergency involving a radiological release. The new interior security doors will also potentially impede egress of reactor staff, increasing the exposure time.
  - Both the fence and security doors may also potentially impede the access of emergency responders to reach injured personnel.
  - Proper assessment of the increased exposure risk would require support radiation protection advisors, emergency management planning teams, the safety analysis team and reactor safety committee. The senior management team (reactor manager) would need to communicate to the concerned facility groups, including operations staff, students, radiation protection and emergency management staff.
  - Established change control processes would be followed involving discussion with the above groups, and including assessment of regulatory implications. Interactions with the regulators would be managed by regulatory affairs manager, licensing officer or reactor manager.

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Case Study 1 – potential impact on safety related to changes to physical protection system

- Q3 The proposed change could create the possibility for a malfunction of a SSC important to safety with a different result than from any previously evaluated in the facility safety analysis
  - Depending on the equipment located in the utility room and the additional physical protection (e.g. hardening of walls, installation of barriers) there could be the possibility of damaging an SSC and malfunction with a different result not previously evaluated in the safety analysis (loss of support/auxiliary systems)
  - This would require facility engineering drawings and design of the utility room and its equipment, and the safety analysis.
  - Changes to the utility room would need to be discussed with, assessed and addressed by engineering, security and safety analysis staff using established change control processes, including assessment of regulatory implications

Case Study 2 – impact on security due to safety change

- The proposed change and activities could decrease the reliability or availability of a security system to perform its intended functions
  - The chemical tank will reduce the possibility of detection of unauthorised personnel in the protection area due to the obstructed view.
  - The delivery vehicle will further reduce defence in depth in detection
  - If the delivery time is at the same time each week, knowledge of the decreased detection availability could be exploited – work management (control and planning) needs to be considered by the operations team and security team if additional protective measures are to be applied during the delivery.
  - If the delivery vehicle is required to enter the protected area, this could introduce sabotage risk from potential collision of the truck and damage of plant, or due to driver access to the protected area who could exploit vulnerabilities identified through familiarity with the facility.

Case Study 2 – impact on security due to safety change – continued

- The new chemical tank could also present a sabotage target, resulting in environmental and safety risk
- The security team would need to provide support on personnel security matters related to the driver(s)
- The Operations team should inform ESOs (ambulance/fire services) regarding presence of the tank for awareness of potential hazard or access issues in an emergency.
- Operations would also discuss implications with environmental groups, WHS and the security Team
- Established change control processes would be followed to address safety and security issues involving discussion with the above groups, and including assessment of regulatory implications.

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HARI – Security Management and Materials on-site

- HARI has a Nuclear Security Management System which is integrated in the organisation's IMS.
- The NSMS covers a comprehensive range of security topics comprising formal documentation, policies, procedures, practices and actions
- clearly defines the security responsibilities of HARI role holders and external support agencies (response force) and stakeholders
- change management, covers safety and security
- Safety interface
- provides facility layout and protected area features
  - materials with the potential to result in URC located in protected area

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HARI – Nuclear Security Management System

- Key elements – Appendix 10
  - Leadership for Nuclear Security – organisational structure
    - Suggest to first focus on the integrated management system and to include a subsection defining security culture and characteristics and interactions with safety culture, and how this is supported before stating the leadership focus on reward and recognition.
  - Security Operations
  - Physical Security
  - Personnel Security
  - Information Security
  - Computer Security
  - Management Processes
  - Analysis and Planning
  - Security Analysis – threat and sabotage target analysis (consequence analysis)

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HARI – NSMS - Key elements Appendix 10 continued

- Security System Design and Evaluation
- Security Plan
- Security Contingency Plan interfacing with Emergency response plan
- Access Control
- Security Training - general aspects of security culture are included here
- System sustainability
- Resource and budgeting
- Maintenance, testing and calibration
- Performance assurance
- Compensatory measures – could also refer to scalable measures associated with increased threat based on intelligence

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HARI – NSMS

- Process improvement
- Security event reporting
- Security forces, guard and off site response force
- Interfaces with the facility IMS
  - Human Resources
  - Procurement, contracts and agreements
  - Policies and directives
  - Processes and Procedures
  - Records Management and document control - suggest to include triggers for review (staff identification of errors or improvements, changes in regulatory requirements)
  - Delegation of authority
  - Management of change
  - Performance evaluation
  - Safety interface
  - Nuclear Material Accountancy and Control

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HARI – Materials on site

- Quantities and locations of nuclear and radioactive materials identified in Appendix 7 (theft targets).
- Appendix 23 Contingency Plan Section 4.4 lists the nuclear materials and also their security category
  - Suggest to also list the security category of materials in Appendix 7.
- Accounting system provides means for deterrence and detection of the unauthorised removal of radioactive and nuclear materials.
- Non-nuclear hazardous materials are not included, but an incident involving these may lead to a nuclear security or safety risk – this may be worth noting

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Thank you

Questions?

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