The IAEA Pilot International School of Nuclear and Radiological Leadership for Safety

Overview of the Case Studies

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School of Leadership for Safety

- The overarching objective of the International School for Nuclear and Radiological Safety Leadership is for *early to midcareer professionals* to develop their safety leadership potential through a better understanding of *what leadership means in practice* in nuclear and radiological working environments with their *inherent complexities and often competing considerations*.

- This school is based on *experiential learning* including a *pedagogic progression* through the week on the key learning objectives from GSR Part 2.

- This is achieved using case studies.
Case Studies

• 4 Case Studies

1. Medical Application
   - Misapplication of Radiotherapy treatments
   - Focus on Goal Setting

2. Nuclear Power Plant
   - Hoisting event in the reactor building during an outage
   - Focus on Values and Attitudes

3. Emergency Preparedness and Response
   - Release to the environment from a nuclear waste treatment process
   - Focus on Engagement

4. Summary Case
   - Updating facilities in response to regulatory requirements
   - Focus on All leadership aspects
     - Including an element of Nuclear Security
Case Study Methodology

1. Review the Case
2. Team Discussion
3. Class Discussion
4. Wrap-up and Lessons Learned

IAEA 60 Years, Agency for Peace and Development
Review the Case

- Students are
  - Provided the cases weeks in advance
    - Along with GSR Part 2
  - Expected to arrive having read the cases
    - The cases are too long and complex to be read in class
      - 15-20 pages in length
- Short, 10-15 minute, recap presentation given in class prior to group work

- Cases provide
  - Learning objectives – Based on GSR Part 2
  - Setting the Scene – Background information and main actors
  - Description of the Challenge – The story
  - Leadership for Safety Considerations – Things to consider in analysing the case
  - Suggested References – IAEA safety standards and nuclear security guidance
  - Annexes – Provide additional information to add to the realism of the case
Review the Case cont’d

Main Actors Involved in the Case

The following individuals are relevant to this case:

- **Chief Executive Officer (CEO), Mr. Ballard**
  - He sent a new year’s message 13 months prior to the outage and introduced MSFP with a new business partner: TMP (see Annex 2).

- **Director of Corporate Strategy and Logistics, Wendy Jonas**
  - She sent a letter to the Outage Project Manager, Pierre, on 12 September 2016 highlighting performance expectations for the upcoming outage (see Annex 3).

- **Outage Project Manager (OPM), Pierre**
  - He has been working very quickly in the organization, from field operator to reactor operator to senior reactor operator in just five years.
  - Serves as the link between contractors, Operations, Engineering, and Maintenance staff during the outage.
  - This is his first time leading an outage (appointed September 2016) and he wants to prove himself. He has been asked explicitly several times to ensure the project gets out, as the previous outage did not.
  - Pierre is a bit disappointed that TMP had not been given several project management tasks for this project.

- **Maintenance Manager, Mike**
  - He is very experienced having worked for MSFP for more than 20 years.
  - He informed everyone at a large maintenance and operations meeting prior to the outage that they had an exceptionally large work load for this outage, asking everyone to do their very best. He new fields disappointed and a bit frustrated that the outage schedule and key milestones have not been met, especially by his own maintenance teams. He recalls that his team has not really made any big mistakes, but several unscheduled tasks have arisen with which they have had to deal.
  - He is also not so sure about TMP and doesn’t trust that they will do a good job.

- **Safety Engineer, Julio**
  - He is responsible for providing approval for certain safety aspects of work, such as crane work, floor permits, confined space entry, etc. He is also responsible for performing on-site safety observation audits.

- **Technical Material Officer, Fred**
  - He is the technical engineer responsible for civil engineering aspects of the plant, including radiological shielding block plugs. He is also the only person who would have had the knowledge concerning the composition of the shielding block.
  - He is usually required to be in many plant meetings, however, he often misses these meetings, which led to his being seen by others as not being able to provide timely support in-field personnel.

- **TMP Supervisor, Liam**
  - He is the TMP supervisor responsible for providing oversight of TMP personnel and ensuring they follow all MSFP procedures and polices.

- **TMP Crane Operator, Casey and TMP Crane Spotters, Suzanne**
  - They are the TMP contractors assigned to the shield block lift job.

- **Regulator, Bob**
  - Traditionally, the regulator inspects key aspects of an outage and also reviews the outage planning.
  - He recently challenged the large changes in outage scope to the outage plan which wanted to reduce the duration of the outage stating that they increased outage risk to availability of key safety equipment.

Event Occurred

As the shielding block was being moved over the refueling pool, the lifting straps failed. This caused the shielding block to fall onto the refueling bridge and into the refueling pool, hitting the reactor vessel flanges and coming to rest on top of the floor. All those in the refueling area were thrown from the refueling bridge and into the refueling pool, reading in varying squares. Bubbles were then seen emanating in the water in the vicinity of the shielding block and containment area as dinitrogen monoxide began to form. This led to the evacuation of containment.

There was shocked and ventured to see the situation! He was thinking, “How could this happen? It was just a routine operation. Why were they not able to successfully complete that job? What went wrong? What did I miss?”

4. Leadership for Safety Considerations

Please analyze and discuss the case amongst your respective teams. Provided below are some questions the team may wish to consider during their discussions. These questions are not meant be an exhaustive list, but rather an aide to the analysis.

- What were the major issues or tensions that created problems within the case?
- What actions were taken (or not taken) in response to these issues or tensions?
- What could have been done differently?
- How would a positive culture for Nuclear Safety have impacted each of the interactions in advance of the event?
- How is your assessment of trust in this organization? Did organizational trust have any impact to the event?
- How would you evaluate the leadership of Pierre? (If you were Pierre in this scenario, at what point would you have made a decision to slow down or stop the lift?)

5. Suggested References:

Annex 1 – Excerpts of the Hospital’s Licence

NUCLEAR REGULATORY AUTHORITY
LICENSE # 132 of November 25, 2014

Issued to: National Oncological Hospital

Licensed activity and facilities – medical application of the following facilities:
- Teletherapy equipment with cobalt 60 radiation sources
- High Dose Rate (HDR) brachytherapy equipment with iodine 192
- Three Linear Accelerators
- Two CT (Computer Tomography) for planning of teletherapy treatment
- One conventional X-ray equipment.

License conditions:
- Skipped –
- 4. all staff members involved in operation of the licensed equipment should not be allowed to work unless they have passed the radiation safety training and certification as specified by regulation
- Skipped –
- 6. two shifts per day of 5 hours each are
- Skipped –
- 9. proper Management System in accord executed
- Skipped –
- 11. the Nuclear Regulatory Authority shall significant to safety, including upgrade or changes
- Skipped –

License valid till: November 25, 2019

Annex 4 – Organization Chart

Annex 6 – Example Complaint from a Patient

To Head of Radiotherapy Service

Dear Mr. PARK,

I am a patient receiving radiotherapy treatment and started my treatment one month ago during the evening shifts. During my treatment, my Radiotherapist fixed some rig for someone on my shift and decided to stop the treatment for 2 days.

Last Monday I came to the hospital to restart my treatment and your Administration Assistant notified me that I will receive my treatment during your first shift.

Yesterday, while receiving treatment during the third shift, I notified the technician that I needed to see the doctor as I felt ill. He responded that a radiologist was not available. He further explained that the evening shift was not and that he is alone and should I wish to see a radiologist, I needed to return in the morning.

I have a sudden memory this morning. I don’t understand why solely except a single technique
Team Discussion

- Students are assigned groups of 4-5 members
  - 45 minutes to analyse and discuss the case in preparation for class discussion

- The analysis and discussion is done in the framework of the Leadership for Safety Considerations as well as the Learning Objectives of each case
  - What were the main issues or tensions that created problems within the case?
  - What could have been done differently?
  - Why do you suppose nobody questioned the decision to introduce a third shift from the very beginning and also after problems began to appear?
  - What is your analysis of the leadership style and behaviours of Jean-Luc? How effective or ineffective was he in taking charge and mobilizing the crisis management team and generating responses?
Team Discussion cont’d
Case Study Methodology

1. Review the Case
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Class Discussion

• 90 minute plenary session
  – Facilitators take the students through the case
    • Ask questions, challenge points of view, understand the actions of one
      character versus another, what would the students have done differently,
      etc…
    – The point is to get students thinking about leadership for safety
      • Not to pass judgement or provide the ‘right answers’

• We have developed teaching notes that support the facilitation of each case study
  – Provide additional information and questions to encourage class discussion
  – Will support train-the-trainer
Class Discussion cont’d
Case Study Methodology

Review the Case

Team Discussion

Class Discussion

Wrap-up and Lessons Learned
Wrap-Up and Lessons Learned

• 30 minutes to conclude the session
  – Provide an end to the story
  – Remind students of the Learning Objectives
  – Provide some lessons to be learned

• This is not meant to provide the ‘right answer’
  – Key lessons with respect to leadership for safety our experts identified in drafting the case studies
  – Brief discussion with class on how these lessons compare to the discussion
Wrap-Up and Lessons Learned cont’d

End of the Story

- Subsequent investigation determined that three fuel assemblies and the reactor vessel flange were damaged.
  - Fortunately, the containment was sealed for other maintenance activities thereby preventing dose consequences to the public.
  - Repair estimates for the event added 180 days and millions of dollars to the outage.
- Investigation later determined that the steel blocks were made primarily of concrete, not lead and steel.
  - During construction, the material of the lifting straps was never marked on the block despite the 11 lifting straps.
  - Also revealed that the block weighed 11 times more than had been estimated.

Learning Objectives

- Let us recall...
- Setting goals for safety, including:
  - Dealing effectively with competing goals
  - Effectively seeking information
  - Making decisions for safety
  - Communicating the basis of decisions

Some Lessons to Learned

- Dealing effectively with competing goals
  - Identify competing goals in decision-making
  - Do not underestimate the importance of safety and security
  - Do not treat safety and security as a given
- Effectively seeking information as a leader
  - Seek and provide information on all safety-relevant factors from the appropriate parties
  - Sources of information should not be limited to managerial staff
  - Change Management needs to be implemented fully and properly, with evaluation of all possible impacts as well as correct communication of changes
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<td>Case Study #4</td>
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Other Learning Tools

- Provided with ‘Points for Reflection’ in advance of the pilot
  - Questions to get students thinking about leadership for safety
  - Can review Wednesday PM
- Learning Map
  - Students can record what they learned from each case and what they need to improve
  - Can review Thursday PM
Some additional thoughts about the Safety Leadership Pilot School, and beyond

Jacques Repussard
The challenges of Nuclear and Radiological Safety Leadership...

- Regulator/licensee interface
- Interfaces within the manager’s unit (resource allocation, individual competencies / behaviour, conflicts...)
- Interfaces within the Organisation (production goals, budgets, corporate or government strategy, interpersonal issues, nuclear security...)
- TENSIONS and INTERFACES Require a safety-informed management
- With actors /stakeholders outside the « licensee / nuclear regulator system » (contractors, media, NGOs, the public)
- Generated by an accident, an emergency or any situation / evolution with a potential to take things out of control
Regulatory objective: demonstrate « safety leadership » in performing managerial duties. GSR-2 describes general approaches: goal setting, engagement, values and attitudes, improvement, ...

Managers have to implement such approaches through the use of their « normal » managerial processes / resources, being aware that « safety first » is bound to sometimes create tensions with other decision parameters (production, image, confidentiality,...)

- Allocating resources/responsibilities under their control
- Taking decisions/initiatives within their remit
- Accessing and managing information (and time available)
- Managing interfaces with other actors/stakeholders within their area of command and beyond, possibly outside their organisation

*NOTE: managing is influenced by national cultural backgrounds*
Exercising safety leadership: Ability to adequately safety-inform managerial processes

Right to exercise authority:
- Close an issue by making safety-informed decisions, or (re)open options eg by ordering a risk analysis, convening an expert panel, etc

Privileged access to information and power of initiative to use it / share it
- Look for new info, sharing info or not, paying attention to out of field info (weak signals, etc)
- Re-assess situation in the light of information: over confidence, misplaced trust, etc...
- Engage in « partnership » values (a two way road, implying mutual information and trust)

Influencing potential of managers: how best to defend / promote safety considerations: without ignoring competing goals; choose the best suited approach: hard line / mediation / conviction...

Tensions/Challenges confront managers

GSR-2 safety leadership guidelines
- Attitudes
- Engagement
- Goal setting

CAPACITY TO CHOOSE PERTINENT ATTITUDES AND ACTIONS WHICH DEMONSTRATE A GOOD SAFETY LEADERSHIP
Possible next steps...

Following the assessment of the Pilot, and considering the broad interest which has been revealed in member States:

• **Extend geographically** the availability of the one week course, taking into account feedback from the Pilot

• **Extend the safety leadership education program** to build an "international school for nuclear and radiological safety leadership" with a capacity to deliver University Diplomas

• **Develop R&D on safety leadership** (a field yet to be addressed, at the interface of management research and human/organisational risk factors research)

• These Steps will require new partnerships with interested member States, international & regional organisations (NEA, EC, FORO, …) and Universities & professional training entities (ENSTTI, …).
THANK YOU FOR YOUR ATTENTION