

Effective Nuclear Regulation and Safety Management in a Pandemic



Effective Nuclear Regulation and Safety Management in a Pandemic

Since March 2020, the COVID-19 pandemic has been disrupting almost every facet of global activity. Governments have imposed measures, especially sanitary ones, in an attempt to contain the spread of COVID-19. These actions have in turn changed how industries operate and challenged their ability to ensure safe business continuity. The global nuclear industry responded effectively to the pandemic: nuclear power plants, for example, continued to operate safely, providing energy when the world needed it most, and nuclear regulators adapted their processes to ensure continuous oversight. The experience gained in managing activities during this global health emergency nevertheless offers valuable learning opportunities for industries beyond the nuclear sector.

Two years on from the outbreak of the global health crisis, it is important to analyse how the nuclear industry progressively developed business continuity modalities within a constrained context (which may include sanitary measures, limited staff availability, supply chain complications, the shutdown and/or restarting of some nuclear facilities and/or services) and to explore the long-term impact of COVID-19 on safety management. New safety paradigms have emerged. It is essential to consider what has changed, why, and which of the new approaches has had a positive impact and should be maintained for the future.

Special topical session

On 1 June 2022, the NEA Committee on Nuclear Regulatory Activities (CNRA) and the Committee on the Safety of Nuclear Installations (CSNI) brought together the operational experiences of three guest speakers from the aviation, health and nuclear sectors. The speakers participated in a panel session that discussed lessons learnt from the COVID-19 pandemic. The lessons learnt related to, among other things, ensuring business continuity during a health crisis and long-term risk management, and identified new initiatives to potentially build upon. NEA Director-General William D. Magwood, IV, moderated the discussion, which was opened by Petteri Tiippana and Jean-Christophe Niel, the Chairs of the CNRA and CSNI, respectively.

The discussion highlighted several challenges and opportunities, particularly the need to:

- identify lessons learnt in order to enhance the resilience of the nuclear sector, its main actors, organisations and practices in preparation for both expected and unexpected future challenges;
- develop tools to increase trust within each organisation and among external stakeholders and as a key component of future resilient responses;

- attract, develop and retain key competencies that are needed in the sector and will be indispensable in the case of unexpected challenges;
- compare the response of the nuclear sector to major crises to that of other sectors.

Panellists

Over 40 experts from the CNRA and the CSNI from 15 countries and international organisations came together to listen to three guest speakers and participate in the panel session. Mr Pascal Luciani, Deputy Director of the French Civil Aviation Safety Authority gave a presentation on “Shutting down and starting up again safely: The Case of Civil Aviation”. Mr Pascal Garel, Chief Executive of the European Hospital and Healthcare Federation (HOPE) then provided insights into “Industrial continuity in overflow context: The Case of Hospital Management System”. The final guest speaker, Mr Luis Soriano Martinez, Director of the World Association of Nuclear Operators’ (WANO) Paris Centre, examined “Perspectives from the commercial nuclear power sector”.



Left to right: Petteri Tiippana, Chair of CNRA and Director General, STUK; William D. Magwood, IV, NEA Director-General; Pascal Luciani, Deputy Director, French Civil Aviation Safety Authority; Pascal Garel, Chief Executive, HOPE; Luis Soriano Martinez, Director, WANO Paris Centre; Jean-Christophe Niel, Chair of CSNI and Director General, IRSN.

Nuclear safety and regulatory challenges since the COVID-19 pandemic began

Continue to monitor the long-term effects of the pandemic and facilitate constructive dialogue with other sectors

At the height of the pandemic, many similarities were found between industries that are strictly regulated by high safety standards. These standards mostly relate to adaptations of safety practices that were essential to operate with lockdown measures in place, manage organisational and human factors and ensure a state of preparedness for coping with unexpected situations.

Analysing the experiences gained over two years of operation during the pandemic crisis proves enlightening. However, the long-term effects are still not fully known.

It would be beneficial to establish a dialogue with other highly regulated industries in order to share views on strengthening safety and resilience and develop initiatives to increase the reliability of managing such events.

Review and streamline safety practices to consider unexpected or unprecedented situations

The pandemic challenged conventional safety practices. For example, there were severe restrictions and limitations with regards to on-site surveillance and inspection, periodic qualification testing and in-person training, particularly when strict lockdown measures were in place. Remote practices had to be implemented and some requirements had to be waived.

These challenges underlined the need for enhanced trust between regulators and operators and for discussions on the possible adaptation or “modernisation” of conventional safety practices for the future. These adaptations included, for example, the adoption of remote working and use of virtual reality technology where possible and where effective.

Shared experience on inspection practices: There is no substitute for in-person inspections and oversight to capture safety-related information. Remote inspections rely on indicators that only give a partial view of the situation but can provide much more flexibility and data. Therefore, the scope of the “modernisation” of inspection practices in normal and non-normal situations still needs to be discussed between regulators and operators. In addition, it could be beneficial to share this discussion with other industry sectors.

Shared experience on derogation with substantial safety margins: Regulators have put mechanisms in place to address derogations during the pandemic, with the need to accompany waiver decisions with a risk assessment before implementing mitigation measures and monitoring the impact of the waivers. With regard to operator requests to regulators to waive certain requirements, in principle waivers should be kept to a minimum. The objective is for operations to remain within the safety margins in spite of the waiver. It could be beneficial to share experiences on the approaches and decision-making processes for managing derogations that have been applied in different sectors.

Prepare for the unexpected

There is evidently a need to be able to respond to unexpected situations, including challenging situations such as pandemics and high impact natural disasters. Existing procedures provide correct responses and courses of action and should remain in place. However, it would be beneficial



It's not just about COVID-19 but how we respond to the unexpected and to challenges in our normal practices.

.... It's not so much planning for the next pandemic but it's learning how to adapt and be more resilient.

William D. Magwood, IV
NEA Director-General



Group photo taken at the OECD Boulogne Building on 1 June 2022.

to review and enhance current working practices in order to ensure that they can offer a better response to the unexpected. In the case of unexpected events, it is clearly difficult to define a “worst-case scenario”. Nuclear actors nevertheless have an obligation to maintain high levels of nuclear safety in these situations. In doing so, they should evaluate the following:

- How to develop “intrinsic” knowledge (scenario-thinking based on analysis and understanding of situations) in addition to “procedural” knowledge (linked to the application of existing procedures). “Intrinsic knowledge” would allow initiatives and innovation to add value. Both the COVID-19 pandemic and the Fukushima Daiichi Nuclear Power Plant accident are considered to be examples of unexpected situations where scenario-thinking was useful for making the right decisions.
- How to train dedicated teams for unexpected situations (for example, through exercises and situations that are unforeseen in procedures). This could be a practical and operational way forward. Although it is not possible to guarantee that the next crisis would be covered by such exercises, such training should increase the flexibility, initiative and capacity for innovation of response teams.
- How to better account for the emergence of unexpected factors and changes to the environment (such as lockdown measures and the adaptation of the natural environment during the COVID-19 pandemic) in a systemic approach.
- How to ensure direct access to reliable and high-quality data that can support decision making during crisis situations as well as how to use available data more effectively in non-crisis situations in order to better prepare for possible crises.

Anticipate loss of competencies, isolation and communication issues

The pandemic and lockdown measures prevented face-to-face contact between individuals for long periods of time. There was therefore an observed tendency for people to be more isolated and for the communication of potentially crucial informal information to be limited. These changes negatively affected the efficiency of maintenance, the continuous training of employees and workers, and the development of organisations’ collective knowledge and culture, in particular the safety culture and the preservation of several heritage aspects. The maintenance of strong leadership in the absence of personal contact with staff remained a challenge that required the application of innovative solutions. Moreover, the integration and training of new people, including mentoring, was clearly more difficult to achieve during the pandemic. It is still difficult to measure the impact of all these restrictions and new solutions. The monitoring of any related degradation that is not visible today and the implementation of countermeasures could help mitigate long-term effects.

Organisations could benefit from improving and strengthening ethics guidelines cultivating professionalism in such situations

Professionalism and the development of ethics in managing unforeseen situations, with a focus on safety, are fundamental when dealing with a crisis. In terms of human factors, individuals experienced stressful situations during the pandemic (for example, isolation, the impact of the pandemic on relatives and the worry of potential exposure to the virus) that each person could tolerate to

differing degrees. Maintaining staff motivation and well-being was a challenge for team leaders. Limited face-to-face contact resulted in managers feeling unable to gauge their employees' state of mind. Leadership challenges also emerged related to the decision-making process at several levels: the hierarchy between the institutions in charge of public health recommendations and nuclear safety requirements could be questioned in several practical cases.

Guidance on managing individuals and teams in a changing and stressful environment would help to better prepare for future crises

Guidance could also address how individual mental health and personal focus can be an issue in highly stressful situations that take place over a significant period of time. It should also include the process for dealing with situations where organisations do not have the capacity to replace stressed staff and, for example, whether psychologists should be involved to help manage these situations.

Increase flexibility, adaptation, trust and long-term resilience

The understanding that the environment can change radically, acceptance of unexpected situations leading to unusual measures and confidence in the ability to deal with the unexpected are essential in the nuclear sector. Previous contingency plans failed to anticipate the specifics of pandemics and there was no clear roadmap to recovery. Planning and decision making evolved in response to the pandemic. People and systems were evidently able to adapt quickly to new situations, measures could be implemented in the short term and there was a rapid switch to a revolutionary approach of work, where possible. One important lesson learnt is that measures can be implemented faster than expected if adequate decision-making processes are in place.

Specific decision-making processes were implemented during the pandemic with dedicated structures which proved to be efficient and were closed down when normal operations resumed. Although this may be appropriate in most cases, in some cases new decision-making processes could remain valid and be used to optimise normal operation processes.

In general, there is a clear need for organisations' greater resilience for dealing with unexpected situations. An important concern is how flexibility and adaptability can be mobilised by the licensees while keeping the highest standards to manage the safety of nuclear facilities. While aiming to implement adequate flexibility and adaptability in facilities, licensees should justify ensuring nuclear safety. Regulators should review their licensing and approval processes, including operational oversight, to be able to consider these evolutions and assess them. For example, a risk-informed approach implies greater trust between licensees and regulators. Another trust factor is the harmonisation of how key principles and limits are understood and the value of exceptional rules being discussed collectively. Creating a risk-informed approach emerges as an area for future discussion and the NEA already includes it in its programme of work. Such a discussion could assess how to better implement risk-informed regulation and improve trust between regulators and licensees.



Implementing dedicated decision-making structures, including flexible processes, into the general organisational procedures to support the implementation of faster and more effective responses in future crises should be advanced.

Moreover, the key assumptions for safety rules and management should be reassessed in detail in order to identify areas where unexpected external factors could prevent their application or may require flexibility in the application of rules aiming to achieve the intended safety objectives.

Discussions could also address the principles regarding the exceptional rules to be followed during a global crisis, with the aim of making them easier to accept and to then consider them in country-specific decision processes.

Nuclear Energy Agency (NEA)
46, quai Alphonse Le Gallo
92100 Boulogne-Billancourt, France
Tel.: +33 (0)1 73 21 28 19
nea@oecd-nea.org www.oecd-nea.org

September 2022

Cover page photos: Meeting (Monkey Business Images/Shutterstock); Helmets (Nuel57/Shutterstock); Group of people wearing masks (petovarga/Shutterstock).