

Maintaining and Improving Nuclear Safety and Security Culture in Adverse Conditions

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Abstract

All nuclear facilities need to maintain constant attention to nuclear safety and security culture. The South African Nuclear Energy Corporation (Necsa) has devoted time and attention to both issues, working with international partners to continually strive for improvement. Since 2018, Necsa has been working with the Oak Ridge National Laboratory (ORNL) to promote nuclear safety and security culture via a cooperative program sponsored by the US Department of State's Partnership for Nuclear Threat Reduction. This safety and security culture program focuses on very practical training with a concentration on specific characteristics of culture—namely beliefs and attitudes, principles, management systems, and behaviors of both leadership and staff members. By helping all staff understand their personal accountability in supporting and promoting a good culture, ownership, responsibility, and growth is fostered within all organizations. During the start of the coronavirus pandemic in early 2020, Necsa management promptly established a disaster management team to make critical decisions about operations and to procedurally navigate issues during the pandemic. This paper will describe how Necsa managed the pandemic to continue essential operations, keep staff safe, and maintain a strong safety and security culture.

Background

The year 2020 will forever be remembered as the year of the pandemic. Industries worked to maintain essential operations while keeping staff healthy and safe in the face of a rapidly spreading virus with harmful consequences. Organizations throughout the world scrambled to obtain personal protective equipment (PPE) and implement workplace sanitization to minimize contamination. Many staff began working remotely when conditions allowed them to do so. For those who continued to work on-site, organizations tried to implement processes to maximize physical distance between employees and required everyone to wear face masks. Testing/screening was conducted to keep those infected from coming on-site. Protocols provided guidance about returning to work for those who had tested positive. All of these measures impacted normal operations.

Necsa's Adaptation – First Steps

Necsa is one of the organizations whose continued operations in South Africa was critical for multiple reasons. Continued operation of the SAFARI-1 reactor supplied the production of radioisotopes for radiopharmacology use in nuclear medicine. The operations of Necsa

subsidiary NTP helped ensure the global supply of much needed radioisotopes (like ⁹⁹Mo) were available for medical treatments. Pelchem is the sole producer and supplier of fluorochemicals in the Southern Hemisphere.

Necsa adjusted operations during the pandemic, beginning with the assembly of a disaster management team (DMT) in late February 2020 when concerns about the virus became prominent. Necsa was proactive in prompt coordination of the DMT, whose initial act was to identify essential functions and workers. When South Africa went into lockdown on 26 March 2020, the DMT had defined levels of security and a phased approach to return to work. The numbers of essential staff were submitted each day to the National Keypoint authority, with the agreement that no more than 500 staff would be on-site during higher risk alert levels, as declared by the South African Government (level 5 was the highest and 1 was the lowest).

The DMT worked with staff to develop a COVID-19 orientation program compulsory for all on-site workers. The training was made available for staff to access via cellular phone or computing device. This was an extremely forward-thinking act by Necsa to ensure accessibility to as many people as possible via their mobile devices. All personnel had to complete this training prior to being allowed on-site and were screened by security. Security staff were trained on protocols for admittance to the site and played an essential role in ensuring the site remained safe and secure.

Many Necsa staff take public transportation to work. With most public transportation unavailable, Necsa used its own transport services vehicles to transport essential personnel lacking other means of transport. As in much of the rest of the world, sanitization, marking social distancing spaces, assessing ventilation, and similar activities became priorities. Because travel documents were required in South Africa to access public roads, official letters were generated for essential workers to come to the facility.

NTP split their essential workforce into teams who work together on a shift. If one team member tested positive, the whole team was removed for testing and quarantine and replaced by another team until the first team could be cleared to return to work without the possibility of infection. Additionally, NTP employed a disinfection company to thoroughly clean workspaces at each shift change as a precautionary measure to prevent contamination between the teams.

There were daily communications between the security staff and the DMT, and some days it seemed like a new crisis arose each day as difficulty in implementing pandemic protocols were unveiled. Some minor problems arose when some staff not identified as essential workers accessed the site. There was no malicious intent, as the staff members were only picking up materials for off-site support; however, it increased the risk of spread. Security staff were retrained on protocols to only permit essential workers and the methods to determine who was an essential worker. Early in the lockdown, PPE and thermometers for screening employees prior to site entry were limited, but this situation improved as the lockdown conditions continued.

Additional Challenges as the Pandemic Continued

With positive cases continuing for several months, the limited operations lasted much longer than anyone expected. Essential staff were restricted from going on-site if they exhibited any symptoms or had concerns about exposure. They were directed to go to their private physicians for COVID-19 testing. The site implemented contact tracing and thorough disinfecting procedures for anyone who reported a positive test.

The social impact of the pandemic was more serious than anticipated. Stress was at a very high level throughout the organization; staff were concerned about their health and their jobs. Many had family members and friends who suffered from the virus. Necsa made psychological counseling available by phone, but often it was the direct supervisor and their outreach that provided the most comfort and support.

The challenges associated with working from home for many was significant. Many staff were pushed into working remotely without any training, support, or enforcement. Some staff appeared to have significant productivity issues and issues with time management. Necsa lacked consistent information technology (IT) and cyber protocols before the pandemic, which created a difficult environment for those who worked remotely. Many laptops were a decade old with aged operating systems. Updates were needed for many to be able to run the currently supported operating systems. When the site went to level 4 operations, Necsa was able to start purchasing some laptops, which helped a great deal. The IT staff, however, had a heavy workload, largely due to updating software and hardware.

Necsa found communication to be a big challenge. Although lower-level managers often maintained good communications with their staff, it was harder for the executives and senior managers to do so. Burdened with other issues at the site, communications were lacking. Many employees had no access to email and could not be reached by a safety management system. They felt left out and unsure what was happening with their jobs.

Lagging maintenance became an issue during the pandemic. Maintenance of equipment and facilities is a critical activity. The pandemic magnified this issue for maintenance issues, such as ventilation. With new pandemic protocols, employee screening, access restrictions, and staff reluctance to risk exposure to the virus, new and additional maintenance protocols were adapted and implemented to comply with COVID-19 protocols.

Positive Growth and Problematic Issues During Difficult Times

ORNL and Necsa, with support from the Partnership for Nuclear Threat Reduction, have been working together for several years to enhance both safety and security culture, focused on sharing best practices and lessons learned at nuclear facilities. During the pandemic when in-person collaboration was suspended, these partners came together via remote means to engage the safety culture ambassadors representing each organization within Necsa. This group is responsible for interfacing with its participating organizations to ensure both safety and

security remain a priority. These remote workshops offered an open exchange for participants to discuss issues and solutions in navigating the pandemic and its impact on the human element of safety and security.

In the workshops, the groups discussed wide-ranging issues:

- The impact of the pandemic on the safety and security culture of the workplace.
- The role of DMT to support continuity of operations at Necsa
- Communications with non-essential workers to identify concerns and help staff to maintain productivity remotely.
- Adapting training to support remote activities
- The role of security with respect to site access control, training, and communication during the pandemic.
- The improved use of technology for remote working and its subsequent productivity improvements, along with the negative impact of no break between work and home life.
- The lack of preparation for remote work and the resulting steep learning curve.
- The ability of Necsa to continue remote and on-site operations in such a way that no one lost a paycheck.
- Inherent limitations on the IT applications used for remote work and virtual collaborations.
- The impact of Covid fatalities on Necsa operations.
- How limitations on social gatherings, holidays, and memorial services affected individuals' mental health.
- Rumors and falsehoods about the virus and vaccinations causing fear and uncertainty.
- Reduced inspection schedule by the National Nuclear Regulator, the impact on safety and security documentation, and the self-reporting that Necsa took on.

By the end of the joint workshops, Necsa reported 132 positive COVID-19 cases with 3 fatalities., The site was functioning at level 1, the lowest risk alert level, with staff allowed on-site per their direct supervisor's approval.

Lessons Learned and Best Practices

The group addressed the role each staff member has in assuming personal accountability—from ensuring they wear their PPE/masks appropriately, maintaining social distancing, and communicating effectively about task responsibilities to strictly following procedures. Humans respond better when they feel they are treated with dignity and respect. Some security officers were known to follow the rules when at work, but then colleagues saw they did not always follow guidelines outside of work. This could be perceived as a lack of respect to fellow human beings. Considering this aspect helps reinforce personal accountability we have both inside and outside the workplace.

One supervisor shared that managers need to lead by example and that she made a point of calling her staff individually on a regular basis. She reached out on a personal basis to her small group of 13 people. Although work issues were addressed, the opportunity for discussion provided an outlet to assuage staff fears and encourage open dialogue about deeper issues that could lead to problems if not properly addressed.

The group discussed that, as staff begin to resume their roles in the workplace, a retraining process to adjust back into a fully functional mode may be required. During the pandemic, many staff did not have laptops nor the ability to support their normal activities remotely; therefore, some managers had to assume several of their staff's roles. One such manager shared she delved into her work role (both to accomplish goals and personally as a stress reliever), but she did not continue to provide mentoring as she did when working on-site. As staff began returning to working on-site with improved conditions, she transitioned roles back to them but did not understand when they could not do in a week what she had been able to do in a day. Her staff relayed that she was no longer mentoring them to help increase their understanding and productivity. The manager shared how she felt she had failed them in not performing this mentoring role, and adjustments were required.

The team addressed the need to have consistent preparedness with action plans to accommodate any issues (pandemic, emergency, any abnormal situation), talking through how ensuring that good training, observation, and oversight lead back to confirming safe and secure operations. All new processes must be rolled out systematically to give each staff members an opportunity to understand with adequate support.

Coaching is always important, especially as staff plans to transition to new roles. Succession planning can be successfully implemented with good mentoring and coaching.

The groups worked together to compile their list of lessons learned during the pandemic, which included the following results:

1. Communication must be maintained/enhanced.
2. Some jobs cannot be done remotely. Implement precautions for those staff members who must be on-site.
3. Developing resiliency/preparedness for any issues (large or small) is critical. Have an action plan available that can be adapted for specific issues and contingencies.
4. Plan for remote work continuation with adequate IT support and communication resources.
5. Staff need clearly defined key performance indicators for each position. This is a joint human resources and management function to define each job position identifying expectations and tasks, thereby ensuring employees comprehend their responsibilities during limited on-site and remote work operations.
6. We are all adaptable and resilient.

When considering where operations can be improved and other opportunities to strengthen security and safety culture during impactful events like the pandemic, the following suggestions were shared:

- Emphasize communications at all times, especially when operations are disrupted by events like COVID-19.
- Train management how to better lead staff in a virtual (and evolving) environment.
- Ensure conventional safety is not pushed back for “current safety.” There is still a need to do behavior-based safety/security reporting, use PPE appropriately, follow safety and security procedures, and not bypass good practices due to the pandemic.
- Improve action/recovery planning (for any disaster/situation).
- Increase capability to support activities remotely (technology, procedures, training, IT resources, etc.).
- Increase both visual and virtual training.
- Ensure succession planning occurs.
- Share work with colleagues. Communicate well and mentor colleagues.

The international team discussed each of the lessons learned and best practices in terms of how different staff reacted to the situation. One ambassador shared how staff either had succeeded or failed at assuming personal accountability during the changes brought about by the pandemic. She remarked, “If you don’t see it as an opportunity to grow, it reflects upon the type of person that you are.” She also addressed how many had worked countless hours to implement the processes the DMT defined to ensure operations could be maintained at Necsa in a safe and secure fashion, whereas others exploited the lack of oversight and ignored their duties.

Moving Forward

The safety and security culture ambassadors addressed the need for management involvement and continued contact with their staff, both personally and operationally. This continued communication motivated staff and reminded them that they are personally accountable to support the organization and contribute in a positive way to the organizational culture. All participants agreed the remote workshops were a great opportunity for broadening perspectives and considering improvements that can impact both safety and security at Necsa. The opportunity to come together virtually helped alleviate some of the stress and frustration, realizing that we all are going through the same difficult experiences to maintain operations within our facilities.

The Necsa/ORNL team is working to plan future activities together to continue discussions and navigate the challenges of operating nuclear facilities in a safe and secure fashion during any difficult situations that may arise.