Unlock 1.0: reopening plants with safety in mind

Any maintenance engineer would agree with me if I say that it is easier to maintain a running plant as compared to restarting a closed plant. The recent incident at Vizag highlights the importance of a safe plant restart all the more. Subsequent to this mishap, the National Disaster Management Authority (NDMA) – an apex body of the Government of India—came out with guidelines on safe restart of a plant which is available in public domain for all to read. Taking lessons from the past, some of the precautions while restarting a plant will be highlighted here.

By Yaser Ahmed, Operations, L&T Valves

First and most importantly, the manuals available with each plant should be followed to the "T". The plant engineer designed the whole process and arrived at every parameter in the manual after careful calculation and experimentation, all in a controlled environment. Bypassing the manual could have serious implications. For example, the design engineer would have indicated to increase the temperature at the rate of 10°C/min – however, if in a haste to restart operations, the engineer in-plant decides to increase the temperature at 20°C/min, there could be a mismatch with other parameters such as pressure, causing the fluid to misbehave and rupture the apparatus. It is recommended to refer the OEM's manual for every piece of equipment as well while restarting those machines.

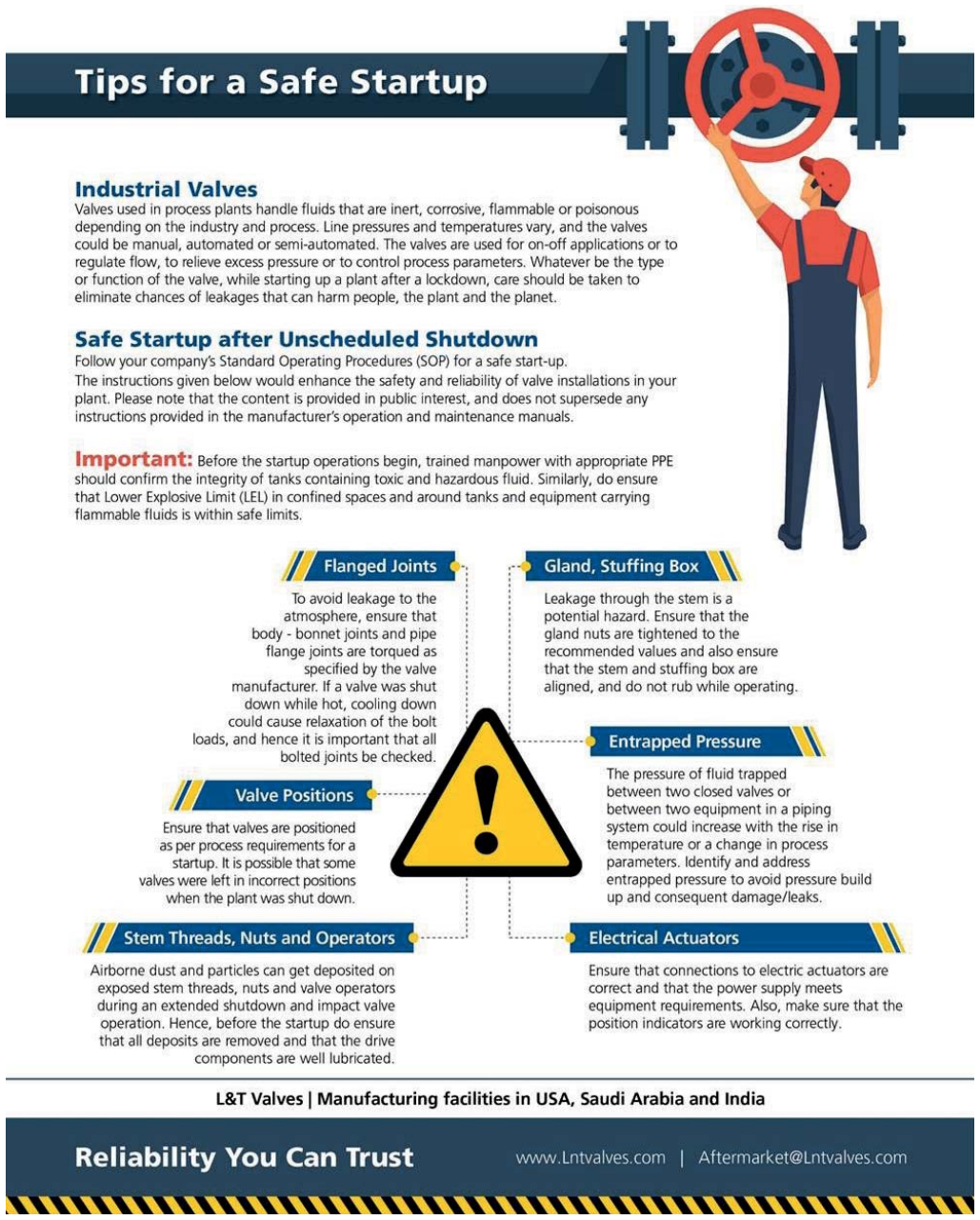
Second, ramp up operations gradually. For example, at 20% the first week, 40% the second week, and so on. One benefit would be that in case of an accident, the volume of hazardous substances leaking would be less, reducing the damage area. Another benefit would be that less people would be harmed in case of an accident, as a smaller workforce would be employed in a gradual ramp up, and rescue operations would be more efficient (after all, it is easier to save every individual in a smaller group as compared to the full staff of the operation.) For this reason, plants should not be immediately be restarted at full capacity.

Safety devices

A third point to note: ensure that no safety devices are disabled during startup. It will be inconvenient to have all safety devices enabled during a restart, as the unusual parameters in effect during a reopening might trigger many false alarms. But it is better to be safe than sorry. If the person operating any equipment finds any form of resistance, then he or she should become alert and immediately notify the relevant officials. It is likely that a pressure build-up or any unsafe situation would have made the operation of the equipment difficult. It would be even better to have redundant new gauges (digital if possible) for every instrument, as it is highly likely for needles of analog gauges to get stuck after being in a stationary position after a long time.

In the enthusiasm of all the non-production time available to maintenance engineers during lockdown, many could have taken free reign to replace all obsolete parts, carrying out numerous retrofitting activities. It is crucial in such cases for the maintenance engineer to brief the production engineers on every activity carried out during the downtime so that they find no surprises during restart, where some system starts misbehaving compared to their expectations. This transfer of information will allow the production engineer to calibrate the retrofitted or new parts of the system to function smoothly with the overall set-up.

Some general advice will now follow, applicable to resumption of activities post the lifting of COVID-19 lockdown measures– which is a unique scenario as compared to general restart of operations in the past:



As part of their Knowledge-sharing Initiative, L&T Valves produced this infographic on safe-startup. The author of this article is not responsible for its design or content.

Unlock #1

In the haste to restart operations, many units would feel tempted to utilize local available techs, as their expert techs would be in a different state or country and would not be able to resume work immediately after the unlock due to potential travel restrictions. But this could lead to tragedy as the local available talent, though knowledgeable in the subject matter at hand, may not have the in-depth insights and experience to run the particular plant or be aware of idiosyncratic issue pertaining to that particular unit. One misstep is one too many in an industrial set-up.

> *We are amidst a unique global phenomenon where operations are getting resumed at similar time frames everywhere. Special precautions are necessary.*

Unlock #2

To bring complete focus to production, plants may bring feel the urge to bring in all 20% manpower only related to production. But this may have a counter-intuitive effect by not providing the necessary support production may need for a safe and swift restart from manpower such as EHS, maintenance, instrumentation, etc. It is actually imperative to ensure 20% of the workforce from every function and department resumes work at the same time, as the communication and feedback from every function is crucial for a safe and healthy restart of a unit. It is too risky to rely on an outside element who may suddenly become unavailable due to connectivity issues.

Unlock #3

Keep a keen eye on all the parameters to notice abnormalities that could prevent a potential hazard. The lockdown situation could be a good opportunity for maintenance teams, as part of essential services, to install sensors to enable monitoring of all such parameters for a safer restart. Monitoring of such parameters for stability should take place even between intervals that scale up – say between 40% and 60% stages.

Unlock #4

Due to the restricted supply chain globally, units may be tempted to substitute a chemical or a commodity with a closely similar one in their operations for an early startup. This could lead to all sorts of accidents as some minor variations in chemical reaction could harm the vessel or produce a defective product.

Unlock #5

We are amidst a unique global phenomenon where operations are getting resumed at similar timeframes everywhere. If professionals around the globe formed a network and shared their restart experiences with one another, it would result in globally reducing the number of restart incidents. For instance, the knowledge sharing by a professional who observed a minor isolated incident at one unit could alert another professional at another unit – possibly the same cause of that minor incident could have potentially caused a major incident at the other one.

Unlock #6

Though the lockdown would have been a good opportunity for clean-up and the equipment may seem nice and shiny, it is still crucial to clean everything once again just before operation resumes as any fluid leakage would become all the more evident and easy to address before all equipment is started.

Unlock #7

Supply chain, logistics and storage professionals will have to be extra cautious of hazardous products such as chemicals, as we are in an unusual situation where not only the chemicals stored by the plant would have become unstable but also those chemicals that are incoming from supplier storage could be unstable. The regular shipments of these chemicals would not have happened months ago before lockdown and would have been despatched only now. While the professionals will be cautious of their own stores, they might not anticipate that the incoming material could be unstable as well.

The article purposely leaves out some basics such as removal of lockout-tagout, the necessary tightness, service and vacuum tests as applicable to the plant and other 101 of resuming operations – which the professionals reading this article would be very much aware about.

**Please note that this article is written in Public interest and does not supersede any guidelines or instructions in place by authorities such as government authorities, governing bodies or the procedures maintained by the plants themselves.*

About the Author

Yaser Ahmed Palikonda Latheef has been in valve manufacturing operations for the past four years. He has been involved in setting up of new manufacturing lines, planning the CapEx requirement for the plant for a given year based on production forecast and new process requirements, finalising specs of machines based on process requirements and procuring these machines. He improves existing set-ups based on lean manufacturing concepts. Of late, his focus has been in digitising operations for better efficiency.