

# CONTINUOUS OPERATION OF POWER PLANTS DURING DISRUPTIVE TIMES

## AN OPERATOR'S LOSS PREVENTION GUIDE

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The coronavirus (Covid-19) outbreak in 2020 proves that an infectious disease pandemic may have an impact on the operation and maintenance of power plants. To secure reliable operation in such situations it is critical that actions are taken to protect the power plants in a thoughtful and deliberate way. Although appropriate actions will be somewhat site-specific, this document provides some considerations and potential actions to be taken.

All of the recommendations are technical advisory in nature from a risk management perspective and may not apply to your specific operations. Please review recommendations carefully and determine how they can best apply to your specific needs prior to implementation. Any queries relating to insurance cover should be made with your local contact in underwriting, agent and/or broker.

Topic	Concern	Potential Mitigation Measures
<b>Operation</b>	<p>Failure following operational errors due to manpower shortage.</p> <p>At the beginning of a pandemic availability of the machinery may not be affected. However, operations staff and other essential staff may be unavailable due to the disease.</p>	<p>Power plant operators have to take protective actions to reduce the risk of infection within shift teams and particularly between shift teams.</p> <p>Consider using additional (remote) Operation and Maintenance (O&amp;M) support, e.g., by corporate centers or Original Equipment Manufacturer (OEM) services.</p> <p>Emergency Business Continuity Plan to be reviewed and activated.</p>
	<p>Fuel Supply: Higher wear and tear, consequential damage.</p> <p>A shortage of fuel supply is not to be expected at the start of a pandemic. At a later stage it cannot be ruled out that supply is disrupted and a plant has to be operated with a fuel that causes higher wear and tear (e.g., lower quality coal, liquid fuel instead of gas, etc.)</p> <p>Reduced power demand or maintenance restrictions may result in temporary or long term preservation of power plants. If not properly performed, consequential damage due to inadequate preservation may occur.</p>	<p>Clarify with the Operation handbook / OEM / Expert if the power plant can be operated with "new" fuel: If possible perform the necessary modifications / commissioning to the power plant to run with the new fuel.</p> <p>Incorporate the higher wear rate in the maintenance planning.</p> <p>Follow the standard procedures when putting a power plant into preservation, e.g., apply preservation measures as defined by the OEM.</p>
<b>Maintenance</b>	<p>Increased risk of equipment failure following deferral of scheduled maintenance.</p> <p>A deferral of inspection / maintenance / overhaul may be caused by a shortage or unavailability of external and internal service capabilities due to travel restrictions, unavailability of key personnel, shutdown of operations of service companies, unavailability of spares etc.</p>	<p>As a general mitigation measure, especially for clients with multiple operational assets, consider varying the power and heat production so that capacity is shifted from plants requiring maintenance to those with sufficient lifetime.</p> <p>The maintenance plans should be adapted, if possible.</p> <p>If an adaption of the maintenance plans is not sufficient, it needs to be discussed whether overhauls or service intervals can be postponed. In this case a risk assessment by qualified engineers also involving the OEM or other expertise should be undertaken.</p> <p>Follow a management of change process to evaluate the overhaul / inspection deferral.</p>
	<p>Operators may come under pressure to delay / modify the statutory testing and maintenance of safety devices due to the restrictions in capacity or operation.</p>	<p>Inform relevant authorities of planned modifications to the statutory testing and maintenance of safety devices (e.g., pressure vessels including boilers, storage tanks, piping systems, pipelines, fired heaters and furnaces and safety relief valve testing), if applicable.</p> <p>Official approval by the authority for extensions on testing of statutory equipment and safety systems might be required.</p>
	<p>Higher repair costs, longer business interruption, aggravated risk for operation after a temporary fix.</p> <p>In case of damage / machinery breakdown or scheduled repair, qualified repair capabilities and spares may not be available. The forced outage will be longer than under normal conditions. A temporary fix is undertaken, which is not proven and bears higher operational risk.</p>	<p>If temporary repairs are to be put in place until an overhaul / inspection / final repair can be conducted, a proper assessment of the integrity has to be conducted.</p> <p>Temporary repairs have to be documented.</p> <p>Consider if the ongoing integrity of temporary repairs can be confirmed / validated by additional inspections.</p>

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<b>Protection</b>	If the economic impact of a pandemic lasts longer than e.g., a few months, the aforementioned negative effects on maintenance and repairs of equipment may lead to a shortage of power generation capacity. The remaining generation equipment will be operated under increasingly unfavorable conditions: high degree of capacity utilization, no time for maintenance, unstable grid condition, frequency fluctuations and consequential trips. Some operators may consider extending trip (alarm) settings or configuration.  Critical: Settings of the protection may be changed, e.g., raising of vibration trip levels.	Contact the OEM and, if applicable, the responsible authority before temporarily modifying / increasing of protection settings or configuration. Follow their advice / recommendations, where applicable.  Follow a management of change process to evaluate and document protection setting deferrals.
	In case of power plant shutdown and reduction of operations personnel, the risk of undetected fire, theft, etc. will still exist or even increase.  Security of the power plant has to be maintained.	Maintain standard site security procedures and systems during the shutdown period.  Consider the appropriate site protection measures to be maintained, refer to:  <a href="#">ARC-Coronavirus-Shutdown-Of-Facilities-Loss-Prevention-Measures.pdf</a> .
<b>Notification</b>	Notwithstanding any possible obligation(s) to notify resulting from the insurance contract, notify the insurer and broker.	Notify the insurer and broker regarding power plant operation outside of the original operational regime, being put into preservation or in the case that planned or mandatory maintenance works will be postponed.
	Documentation of actions taken.	Maintain records of all inspections, maintenance, modified operation parameters, etc., including identification / assigning responsibility for record keeping for a particular power plant.

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