

Guideline

Equipment Stop

for 2 to 8 Weeks

LafargeHolcim

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Introduction

The goal of this guideline is to provide a checklist to support plants in preparation for an equipment shutdown for external purposes (not a kiln/mill shutdown for maintenance purposes) for a period of 2 to 8 weeks.

For longer stops (2 to 6 months and above) procedures already exist. Consult: [Lafarge](#), [FLS](#)

This procedure was elaborated in collaboration by various people from different trades and specialities (see Annex).

General Remarks

The principal is to protect equipment from corrosion or important blockages at restart. Care has to be taken to protect against adverse weather conditions during the stop (freezing, etc).

Organize the start of the equipment (except kiln) on auxiliary drives (when existing) for a few minutes once every 4 weeks. Consider turn/move equipment/parts that normally have problems/blocks after stops (known issues) more frequently. Take care to start lubrication and hydraulic units in advance to allow heating up of oil.

Start the Ball Mill only if an auxiliary drive exists (not with main drive). For the VRM run with auxiliary drive and rollers down (if possible, to also turn them). Assumption is that the table is almost (but not completely!) empty. Large fans (to distribute the oil lubricated bearing) shall be manually turned if no auxiliary drive exists.

Maintain weekly walk-by inspections. Have a specific focus also on water leakage, flooding, drainage, etc.

Remark: If special and additional measures are taken, i.e. non-standard, record and document the actions in order to correct the situation before future start-up

1 Quarry

In some countries temporary closure of mining sites is a strictly regulated process. Follow the governmental procedures and requirements, and also consider the following points:

- 1.1 Conditions to keep the permit valid and active
- 1.2 Determine stockpile to be filled and maintained
- 1.3 Block and secure quarry accesses, ponds, slopes and other risky areas
- 1.4 Secure explosive storage
- 1.5 Secure electrical rooms and transformer stations (see Equipment)
- 1.6 Secure the uninterrupted operation (power supply) of dewatering and pumping installations (manage the risk of flooding and reserves sterilization)
- 1.7 Ensure uninterrupted power supply for critical equipment (e.g. explosive magazine, ventilation, sewage, lighting and security)
- 1.8 Secure liquid fuel tanks and gas storage for the duration of the temporary closure - empty the tanks if required
- 1.9 Carry out procedure for parking of mobile equipment - supplier manual
- 1.10 Follow OEM instructions on mothballing Heavy Mining Equipment (e.g. bucketwheel- and bucketchain excavators, wheel loaders, trucks and drill machines)
- 1.11 Carry out Procedure for crusher and conveyor belt stoppage (see Production)
- 1.12 Clean water collectors and stormwater channels

2 Production

- 2.1 Stop equipment empty (belts, elevators, screws, air slides, pneumatic conveying system, hoppers, bins, silos) - plan the sequence of stopping to assure this
Inspect and clean accordingly material handling transfer points for build-up, clogging (incl. pneumatic transport elbow with tendency for clogging)
- 2.2 Ball mill to be run empty of material in the same way as for ball dropping
- 2.3 Clean the floors
- 2.4 Perform bag filter precoating

Goal: avoid blockages on the extraction point - Run each extraction point for a few minutes per week, e.g. recirculate raw material silo for 1h every week

- 2.5 Keep fluidization for silos running - important to assure air is dry!
- 2.6 Silo that tends to block - recirculate/extract some small amounts (if possible)
- 2.7 Especially for cement silos without extraction (no sales) - possible strategy: recirculate, use trucks, produce some bags, empty completely, pump from one silo to the other, etc.
- 2.8 Avoid water ingress: checks silo for leakage (sealing of silo on top of silo)

Specific attention for grinded coal (TSF) risk of self-ignition

- 2.9 Follow the normal shutdown sequence of the coal mill with the additional advice to empty out the raw coal bin before stopping. Keep fuel dosing running till pulverized coal bins, dosing system and transport is completely empty
- 2.10 Add raw meal to the system in case of high risk fuel while the mill fan is still running. Keep the fan running for 5 min to clear the system then stop the fan.
- 2.11 Bag filter cleaning and dust transport to continue for sufficient period, typically 20 min, after stopping the mill fan to empty the bag filter/transport of pulverized fuel.
- 2.12 Coal mill table to be cleaned locally immediately after stopping the mill.
- 2.13 Monitoring of critical parameters while down (1 per shift), i.e. temperatures and CO levels.

Daily surveillance of fuel (TSF) stockpiles, especially for high risk fuels (VM>35%) and stockpiles more than 6-10m high.

- 2.14 Visual inspection to identify any area of smoldering (smelling, smoke)
- 2.15 Temp measurements to check if there is a temperature increase inside the pile
- 2.16 Having means of fire fighting in place - water hydrants, etc.; document explaining the critical aspects of fuel storage and control measures
- 2.17 Make sure all fuel piping and tank with heat transfer fluid (or electrical heating) are maintained in operation or properly drained

3 Refractory

- 3.1 Case 1 - fresh bricks: close the system and minimize air flows to avoid humidity. For stops longer 4 weeks apply [vegetable oil](#) on the basic bricks.
- 3.2 Case 2 - used bricks: leave coating on bricks for protection, apply vegetable oil on areas with salt infiltration to avoid hygroscopic reaction (e.g. UTZ - vegetable oil is uncritical with respect to legislation and working procedures).
- 3.3 Protect doloma bricks by applying [vegetable oil](#) on them. For stops longer 6 weeks, doloma bricks shall be partitioned off at both sides to avoid air contact and ingress of humidity.
- 3.4 In humid areas, fresh lime may be kept at the tip casting and at the hood door (open bags, drums) to absorb moisture (replace lime when stoichiometric moisture absorption <80%).

4 Electrical

- 4.1 Electrical rooms: keep ventilation and air conditioning systems in operation
- 4.2 MV motors: check heating systems and switch on where installed () connect if necessary)
- 4.3 Isolate brushes of slip ring motors from the slip ring surface
- 4.4 Cabinets for VSD check heating systems and switch on where installed
- 4.5 Back-up: TIS, PCS, subcontrol system (e.g. Reclaimer, hydraulic system, analyzer, weighing system), VSD parameter settings - and check battery status
- 4.6 Check functioning of UPS system
- 4.7 Checked and keep in operation the emergency power supply (e.g. Firefighting,...)
- 4.8 Disconnect or shut off battery loading stations and disconnect associated equipment such as forklifts at dispatch, warehouse, etc.

5 Lubrication

- 5.1 Re-grease all equipment before stopping it to allow a good distribution of the grease
- 5.2 In case of freezing risk - heat or recirculate oil lubrication system
- 5.3 Every 4 weeks run lubrication systems for a few minutes - to protect bearings and gears from corrosion
- 5.4 Every 2 weeks lubricate kiln roller shafts - manually or using recirculation pumps (oil temp!)
- 5.5 Lubrication storage room: check and close all drums and any recipients not required during the shut-down period

6 Hydraulic Systems

- 6.1 Stop hydraulic pumps, check that breathing systems (desiccant) is working
- 6.2 Retract piston rod inside cylinder (wherever possible)

7 Compressors

- 7.1 Prior to stopping compressed air, take the opportunity to inspect all networks to identify leakages while there is no noise in the plant.
- 7.2 For aeration compressors still running - important to assure air is dry!
- 7.3 Isolate still operating and stopped system - close valves and register them on a file
- 7.4 Stop compressors, purge circuits, drain tanks, any other low part of the system (consider your usual pain points) - Avoid any remaining water in the network
- 7.5 Close the valves of the system and register them on a file

8 Industrial Water Distribution

- 8.1 Consider whether you need to keep the water treatment and circuit running for circulation system avoid blockage of the system by material settling
- 8.2 If you plan to stop (in case of freezing risk) be sure to purge all the circuit and identify low points (kiln support bearing housing, heat exchanger...) for complete drainage
- 8.3 Drain water injection systems (e.g. VRM, BM, cooling tower, dust suppression, scrubber) to avoid water ingress to the system
- 8.4 Leave the drain valves of the system open and register it on a file

9 What needs to remain operational

- 9.1 Emergency procedures against natural hazard exposure, e.g. flood or wind, incl. preventive monitoring. Ensure that the preventive protection measures can be implemented in case of an alarm, storm, flash flood, wind, etc.
- 9.2 Fire detection and protection systems as well as security systems must remain operational, inspection and maintenance to be done as during normal operations
- 9.3 Temperature and gas control systems in the coal department
- 9.4 CO₂ inertisation system - make sure tanks are sufficiently full
- 9.5 Ensure security against trespassing and theft. Vacant buildings (at distant locations) can present an exciting, but dangerous, playground to children and young people
- 9.6 Carefully study the health requirements for drinking water (ie avoid Legionella)
- 9.7 Set up pest control actions depending on the environment in electrical rooms, cable tunnels, warehouses, etc.

Before Restarting

Before start-up, carry out a re-commissioning of the line. Your existing kiln shut down restarting procedure can be used for this purpose.

Close the water drain valves and open the air valves closed - the register becomes helpful now.

Inspect for build-up which may have fallen during stoppage and prevent proper re-commissioning.

A more detailed procedure on preparation for restarting is currently under development.

Annex 1: Contributors

For any clarification and suggestions please contact the respective specialist or the coordinators of this document:

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