**WORK INSTRUCTIONS FOR SAFE MAINTENANCE OF PCI.**

**1.0 PURPOSE**

**Safe Maintenance of PCI**

**2.0 SCOPE**

**PCI**

**3.0 RESPONSIBILITIES**

**Engineer In charge and workmen on job**

**PROCESS DESCRIPTION**

**PROCEDURE:**

**PPE –s to be used:**

* Helmet, Safety shoes, safety goggles & Hand gloves.

**Aspect – impact**

|  |  |
| --- | --- |
| Oil Spillage | Land contamination & Resource Depletion |
| Scrap generation | Resource Depletion |
| Oil traced waste generation | Land contamination & Resource Depletion |

**Identified Hazards:**

**Physical Hazard** –

* Pressure,
* Temperature
* Sudden exposure to flame and hot surfaces
* Explosion

**Mechanical Hazard** –

* Trapping between two objects,
* Fall of material, hammer, tools, slinged items, bolts
* Fall of person from platform,
* Entanglement,
* Impact of moving / slanged items.
* Back Pain due to sudden or heavy load.
* Non use of PPE’s while carrying out the activity

**Electrical**-

* Electric shock

**Chemical -**

* CO gas poisoning.
* Nitrogen gas poisoning
* Fire due to gas cutting at gas prone area.

**Human Behavior –**

* Aspect of Contract Employees
* Alcoholism
* Casual Approach

**Work No.1 : Maintenance /replacement of coal receiving bin grizzly.**

**Work No 2 : Receiving hopper liner plate replacement or patching .**

**Work No.3 : Maintenance of Vibro feeder.**

**Work No.4: Maintenance of Electromagnetic iron removal.**

**Work No.5 : Conveyor Maintenance .**

**Work No.6 : Air Blasters maintenance**

**Work No.7 : Replacement/ Maintenance of gas line valves.**

**Work No.8 : Replacement/ Maintenance of CA line valves.**

**Work No. 9: Maintenance / replacement of CA fan.**

**Work No.10 : Maintenance / replacement of waste gas line valves.**

**Work No. 11 : Maintenance of Waste gas fan.**

**Work No 12 : DN800 Bleeder valve replacement .**

**Work No.13 : DN1000 shut off valve.**

**Work No 14 : Maintenance of weigh coal feeder.**

**Work No. 15 : Maintenance of classifier .**

**Work No.16 : Maintenance of sealing blower.**

**Work No.17 : Maintenance of barring motor.**

**Work No.18 : Maintenance of lubrication station.**

**Work No.19 : Maintenance of bag filter .**

**Work No.20 : Rotary valve replacement .**

**Work No.21 : Blast of sheet replacement .**

**Work No 22 : Rubber Expansion bellow replacement**

**Work No.23 : Changing gasket of relief valve at PCI BAG HOUSE**

**Work No 24: Nitrogen/ Oxygen receiver tank discharge line NRV replacement**

**Work No.25: Injection tank maintenance**

**Work No.26: Grinding mill inspection (confined space)**

**Work No.27: Hydraulic power pack maintenance.**

**Work No 28: Balancing of PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan.**

**Work No 29: PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan impeller changing.**

**Work No 30: PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan coupling bush.**

**Work No.1** : **Maintenance /replacement of coal receiving bin grizzly**

Hazards identified :

* Entanglement of leg in between grizzly.
* Fire accident during cutting & welding.
* Inhalation of coal dust .

Do’s:

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Ensure that hopper is completely empty and free from coal.
* Wear proper PPE’s

Don’ts :

* Carry out cutting & welding when hopper is filled with coal.

1. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
2. Take shutdown of vibrofeeder and Main conveyor from Electrical Department (Isolation officer) by using(LOTO).
3. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
4. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
5. Take work permit from the Control room and hand over yellow copy to the technician working.
6. Ensure that Coal receiving bin is emptied by operation dept.
7. Using compressed air clean the bin to the maximum extent possible to eliminate the presence of coal fines.
8. Ensure availability of fire extinguishers and water in the vicinity of coal receiving bin.
9. Insert a MS sheet at the discharge of bin near vibro feeder to prevent any MS material & welding splatters from sliding to the conveyor during grizzly replacement job.
10. Repair the existing grizzly /Replace the damaged grizzly with new one.
11. Continuous monitoring to be done of conveyor during cutting /welding job for any damage due to splatters.
12. Remove the MS sheet which was inserted at the bin discharge.
13. Clear the electrical shutdown of conveyor & vibro feeder
14. Clear the work permit & give clearance for operation..

**Work No 2 : Receiving hopper liner plate replacement or patching .**

**FOLLOW VL/IMS/PID2/BF3/WI/26B ( CONFINED SOP)**

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**Work No.3 : Maintenance of Vibro feeder.**

Hazards identified :

Fire accident during cutting & welding.

* Inhalation of coal dust .
* Fall of slinged items.
* Electrical shock from drive.
* Impact of counter wt. during trial run.

Do’s:

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Wear proper PPE’s
* Ensure to check the stability of structure to which chain block will be slinged.

Don’ts :

* Carry out cutting & welding when area is covered with coal fines.

1. **Replacement of Vibro feeder**
2. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
3. Take shutdown of vibrofeeder, Main conveyor & electromagnetic iron removal motor from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Fix 1Ton chain block on either side of vibro feeder & secure it properly.
7. Slowly lift the vibro feeder by chain block and remove the vibro feeder hanging supports.
8. Once hanging supports are removed slowly lower the vibro feeder on ground.
9. Lift the new vibro feeder using 2 nos. of 1 Ton chain block chain block & place it in position.
10. Ensure that hanging supports are attached to the vibro feeder.
11. Remove the chain block.
12. Temporarily clear the shut down and check direction of rotation of motors, ensure that both the motors are rotating in opposite directions.
13. Clear shut down & work permit & give clearance to operation.
14. **Settings the counter weights of Vibro motor .**
15. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
16. Take shutdown of vibrofeeder, Main conveyor & electromagnetic iron removal motor from Electrical Department (Isolation officer) by using(LOTO).
17. Once shutdown of the compressor is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
18. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
19. Remove the back cover of motor.
20. Each unbalanced motor has two sets of counterweights on either side of the shaft.
21. Adjust the counter weights as per requirement.
22. Now lock the counter weight by firmly tightening the locking bolt.
23. Take direction trial with covers in open condition. Counter weights of both motors should rotate in the opposite direction.
24. Fix back the cover.
25. Give clearance to operation by clearing the work permit.

**Work No.4** : **Maintenance of Electromagnetic iron removal.**

Hazards identified :

* Fire accident during cutting & welding.
* Inhalation of coal dust .
* Fall of slinged items.
* Electrical shock from drive.
* Impact of metal parts when conveyor is started..

Do’s:

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Wear proper PPE’s
* Ensure to check the stability of structure to which chain block will be slinged.

Don’ts :

* Carry out cutting & welding when area is covered with coal fines.
* Start the conveyor without safety guards in place.

1. Drive replacement
2. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
3. Take shutdown of vibrofeeder, Main conveyor & electromagnetic iron removal motor from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Dismantle the side mesh guards .
7. Disconnect the drive chain by loosening its tension.
8. Using 2 Ton chain block remove the old drive & replace it with new one.
9. Clear all the iron dust away from the remover plane.
10. Tighten back the bolts and fasteners.
11. Apply EP2 grease to chain through greasing point.
12. Fix back the side mesh guards.
13. Clear electrical shutdown for conveyor, vibration feeder and iron dust remover.
14. Take trials in presence of operation & electrical department.
15. Clear the work permit and handover for operation.

**Work No.5 : Conveyor Maintenance** .

Hazards identified :

* Fire accident during cutting & welding.
* Inhalation of coal dust .
* Fall of slinged items.
* Electrical shock from drive.
* Entanglement of body part during conveyor trials.
* Fall of rollers during conveyor operation .
* Impact of metal parts when conveyor is started.

Do’s:

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Wear proper PPE’s.

Don’ts :

* Carry out cutting & welding when area is covered with coal fines.
* Start the conveyor without safety guards in place.

1. Changing of Rollers and Idlers & brackets in conveyors
2. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
3. Take shutdown of Big Angle conveyor from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Ensure that there is no material accumulation on belt.
7. Remove the safety side guarding.
8. ~~Barricade the entire area below the conveyor~~.
9. Lift the belt over the roller manually, remove the roller and insert the new roller or turn down the bracket .
10. For bracket changing remove the roller and then the bracket. Position the bracket and put the rollers back.
11. Fix the bracket bolts.
12. Fix back the safety side guard.
13. Clear shutdown & take trial.
14. Give clearance to Operation dept.
15. Conveyor Replacement
16. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
17. Take clearance from PCI control room in charge.
18. Put the belt in manual mode of operation and position the joint of the belt (preferably near the entry point of stair case near HAG burner).
19. Take shutdown of Big Angle conveyor, vibrofeeder & electromagnetic iron removal from Electrical Department (Isolation officer) by using(LOTO).
20. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
21. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
22. Remove one length of ~~safety net /~~ bottom deck plate and the collection hopper.
23. Release the tension of belt using screw take up/tensioner device available at the conveyor tail end.
24. Clamp the belt on either side where it needs to be cut .
25. Cut the old belt at the bottom side, join one end of the new and old belt with minimum 6 belt fasteners and to the other end of old belts tie a manila rope.
26. Temporarily clear electrical shutdown to lay the new belt and keep the belt in manual mode.
27. Ensure ZSS, BSS and both Magnets interlock are bypassed or else conveyor will not start.
28. Instruct all workmen on the job not to put hand in between rollers, drum and conveyor belt and only pull the belt. Communicate through atleast 4 walkie talkies.
29. While laying the belt, position persons in the following way:
30. 2 persons near the new roll, to loosen the belt.
31. 6 persons to ~~pull the old~~ feed the new belt.
32. 1 person along with Hydra or Wheel loader which is pulling the old belt.
33. 2 persons on either side of conveyor belt to move along with temporary joint, to ensure that the joint does not get stuck while laying the belt.
34. One person near the ON/OFF switch and another at the tail end for communication while laying the belt.
35. Don’t keep the drive running for long and ensure that the new belt is getting released from the roll
36. Once the laying is over take electrical shutdown of the belt.
37. Remove the fasteners of the joint, required number of carrying rollers and brackets to clamp the belt.
38. Cut sufficient amount of belt to make the joint and use 2 clamps each on either side of joint. Lock clamps of one side firmly to conveyor structure.
39. Use pulling and lifting machine to tension the belt and after tensioning put another clamp and lock it firmly to the conveyor structure carrying side.
40. Remove the side wall conveyor buckets and
41. Take rivet joint of the conveyor by using SS rivets. Fix the side walls and buckets by cold vulcanizing. Special belt joining solution and kit to be used.
42. After required curing time of the belt, remove the clamps .Ensure all the clamps from the belt are removed and all brackets and rollers put back. Rotate input coupling by hand, to reconfirm that all the clamps have been removed
43. Fix back all side guarding
44. Clear shutdown and start the belt in manual mode of operation to take trials , by first running it in inching mode .
45. Take all interlocks in line.
46. Clear the work permit.
47. Hand over the belt to Production dept.

**Work No.6 : Installation/ Maintenance of AIR BLASTER at Ground hopper**

Hazards identified:

* Fire hazards.
* Coal dust hazard.
* Fall from height.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.
* Stay away from the air blaster while taking trial.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept.

1. Complete all the preparatory jobs.
2. Inform & obtain work clearance & work permit from Control room PCI engineer & shift Superintendent .
3. Take shutdown of vibrofeeder, Main conveyor & electromagnetic iron removal motor from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Ensure that the underground hopper is completely empty.
7. For extra safety clean the hopper by using compressed air again & ensure no coal is present.
8. Place sheet on top of conveyor so that it does not get damaged while cutting and welding.
9. Keep water bucket and fire extinguisher with you nearby.
10. Use safety belt for working at height above 2 meter.
11. Cut the bunker of diameter 50mm at the required place.
12. Cut the liner plate inside carefully.
13. Weld a mother plate of thickness 8mm & diameter 50mm at the point where bunker is being cut.
14. Weld the flange with 50mm\*300mm pipe to the mother plate.
15. Use chain block or rope to hold the air blaster in the appropriate position.
16. Weld the support structure for the blaster to the bunker & ensure that the blaster is fixed tightly.
17. Use 12 mm wire rope for extra safety for the air blaster with 3 bulldog clamps on each side.
18. Disengage the chain block or rope.
19. Remove all people from area to take trials.
20. Take trial of the air blaster at 4 to 6 kg pressure in front of operation department engineer.
21. If found all OK finish the job and remove manpower along with tools and tackles completely.
22. Release the shutdown of the equipments taken.
23. Release the work permit and hand over the air blaster to operation department for their use.

**Maintenance of Air blaster**

* 1. Take clearance from the operation department.
  2. Take the shutdown of BIG ANGLE CONVEYOR, MAGNETIC SEPARATOR & VIBROFEEDER.
  3. Ensure that the air blasters are drained and completely free of compressed air.
  4. Remove the PU tube of the blasters.
  5. Use chain block or rope to hold the air blaster in the appropriate position.
  6. Loose the flange bolts and do the maintenance of the blaster or replace it.
  7. Use 12 mm wire rope for extra safety for the air blaster with 3 bulldog clamps on each side.
  8. Disengage the chain block or rope.
  9. Remove all people from area to take trials.
  10. Take trial of the air blaster at 4 to 6 kg pressure in front of operation department engineer.
  11. If found all OK finish the job and remove manpower along with tools and tackles completely.
  12. Release the shutdown of the equipments taken.

**Work No.7 : Replacement/ Maintenance of gas line valves**

Hazards identified :

* Explosion due to cutting & welding.
* CO gas poisoning.
* Electrical shock from drive.
* Fall from height.

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting of gas line without proper intimation to operation dept. & without checking the CO% in line .

1. Shutoff valve DN350 replacement
2. Take clearance from PCI control room in charge and obtain work permit.
3. Ensure operation dept. has carried out water seal for PCI gas line .
4. Ensure goggle valve & shutoff valve of gas line are in CLOSE condition.
5. Take shutdown of Goggle valve from Electrical Department (Isolation officer) by using(LOTO).
6. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
7. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
8. Ensure gas line bleed valves are open and line has been de pressurized.
9. Close the manual gas shut off valve DN 350 near HAG.
10. Disconnect the pneumatic air supply of DN 350 valve which needs to be replaced .
11. Ensure that operation department has carried out Nitrogen /Steam purging in the main gas line. Do not start any work unless clearance is given by operation department.
12. Secure the valve by using belt sling & hook it with hydra.
13. Once all flange bolts are removed, lift the valve from its position & lower on ground.
14. Ensure to monitor CO gas % continuously while working.
15. Replace the damaged valve with new/overhauled one.
16. Tighten all the bolts as per requirement.
17. Clear electrical shutdown and request electrical to connect the cables.
18. Take trial in presence of operation & electrical engineer.
19. Clear work permit & handover for operation.
20. Electric PCI Goggle valve replacement
21. Take clearance from PCI control room incharge and obtain work permit.
22. Ensure operation dept. has carried out water sealing of PCI gas line.
23. Close the DN 350 pneumatic shutoff valve.
24. Disconnect the pneumatic supply of shutoff valve in close condition.
25. Take shutdown of Goggle valve from Electrical Department (Isolation officer) by using(LOTO). Ask electrical engineer to disconnect the cables og Goggle valve.
26. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
27. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
28. Ensure that operation department has carried out Nitrogen /Steam purging in the main gas line.
29. DO not start any work unless it is confirmed by operation department that CO % is zero.
30. Also ensure to keep manual DN 350 valve near HAG in close condition.
31. Secure the valve by using belt sling & hook it with hydra.
32. Once all bolts are removed, lift the valve from its position & lower on ground.
33. Replace the damaged valve with new/overhauled one.
34. Tighten all the bolts as per requirement.
35. Clear electrical shutdown and request electrical to connect the cables.
36. Take trial in presence of operation & electrical engineer.
37. Clear work permit & handover for operation.

**Work No. 8: Replacement/ Maintenance of CA line valves**

Hazards identified :

* Explosion due to cutting & welding.
* CO gas poisoning.
* Electrical shock from drive.
* Fall from height.

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting of gas line without proper intimation to operation dept. & without checking the CO% in line

1. **Shutoff valve DN250 replacement**
2. Take clearance from PCI control room in charge and obtain work permit.
3. Ensure PCI gas line is water sealed by operation dept. & DN350 shutoff valve & google valve are kept in Close condition.
4. Take shutdown of Goggle valve & PCI CA Fan from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Disconnect the pneumatic air supply of DN250 regulating valve in Close condition.
8. Ensure that HAG bleed off valve (chimney valve )is open and there is no stored pressure inside the HAG.
9. Secure the valve using 1 ton chain block.
10. Once all bolts are removed, slowly lower the valve on platform .
11. Replace the damaged valve with a new/overhauled one Tighten all the bolts.
12. Clear electrical shutdown of CA fan & google valve.
13. Take trial in presence of operation & electrical engineer.
14. Clear work permit & handover for operation.
15. **Regulating valve DN250 replacement**
16. This job has to be done during coal mill shutdown.
17. Take clearance from PCI control in charge and obtain work permit.
18. Ensure that DN 250 gas shut off valve is in close position
19. Take shutdown of Goggle valve & PCI CA Fan from Electrical Department (Isolation officer) by using(LOTO).
20. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
21. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
22. Close compressed air supply to the air regulating valve by closing the ball valve & disconnect the PU tubes.
23. Ensure that HAG bleed off valve is open and there is no stored pressure inside the HAG
24. Secure the regulating valve using 1 ton chain block.
25. Start removing the flange bolts & slowly lower the valve on ground.
26. Fix a temporary fabricated dummy plate at the location of removed valve to prevent any hot air coming from HAG.
27. Replace the damaged valve with a new/overhauled one after removing the dummy plate.
28. Tighten all the bolts.
29. Connect the PU tubes and open ball valve of compressed air supply.
30. Request instrumentation to connect solenoid coil
31. Take trial in presence of operation & instrumentation engineer.
32. Clear all electrical shut down.
33. Clear work permit & handover for operation.
34. **CA Fan Bellow replacement**
35. This job has to be done during coal mill shutdown.
36. Take clearance from PCI control in charge and obtain work permit.
37. Ensure that DN 250 gas shut off valve is in close position
38. Take shutdown of Goggle valve & PCI CA Fan from Electrical Department (Isolation officer) by using(LOTO).
39. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
40. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
41. Close compressed air supply to the air regulating valve by closing the ball valve & disconnect the PU tubes.
42. Ensure that HAG bleed off valve is open and there is no stored pressure inside the HAG
43. Ensure that the manual valve is in closed condition.
44. Start removing the flange bolts & slowly remove the damaged bellow.
45. Replace the damaged bellow with a new one.
46. Tighten all the bolts.
47. Connect the PU tubes and open ball valve of compressed air supply.
48. Request instrumentation to connect solenoid coil
49. Take trial in presence of operation & instrumentation engineer.
50. Clear all electrical shut down.
51. Clear work permit & handover for operation.

**Work No. 9: Replacement/ Maintenance of CA fan**

Hazards identified:

* Explosion due to cutting & welding.
* Electrical shock from drive.

.Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting of gas line without proper intimation to operation dept. & without checking the CO% in line

1. This job has to be done during coal mill shutdown.
2. Take clearance from PCI control room in charge & obtain work permit.
3. Take shutdown of PCI CA Fan from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
6. Remove the flange bolts of outlet duct.
7. Remove the foundation bolts of fan and keep it aside manually.
8. Replace the damaged fan with a new/overhauled one.
9. Tighten all the foundation bolts as well flange bolts of outlet duct.
10. Rotate the shaft manually to check the freeness of impeller.
11. Clear electrical shutdown & request electrical to connect the cables.
12. Take trial in presence of electrical & operation engineer.
13. Clear work permit & handover for operation

**Work No. 10: Maintenance / replacement of waste gas line valves**

Hazards identified:

* Explosion due to cutting & welding.
* Electrical shock from drive.
* Fall of slinged items
* Failure of chain block
* Fall of person from platform
* Jamming of finger or hand while removing and fixing of valve.
* Gas poisoning.

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting of gas line without proper intimation to operation dept. & without checking the CO% in line

1. **Replacement of DN 900 flow control valve**
2. This job has to be done during mill shutdown.
3. Take clearance from PCI control room in charge by taking work permit.
4. Take shutdown of PCI Waste Gas Fan from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Ensure that Operation dept. has carried out water sealing of PCI gas line , and ensure that Gas shutoff valve & Google valve are kept in CLOSE condition.
8. Close waste gas shut off valve (manual ) & Ensure to maintain HAG outlet shut off valve in CLOSE condition & Bleeder valve in OPEN condition.
9. Close the LPG line valve connected to HAG & disconnected the LPG hose connected to HAG.
10. Take Electrical shutdown of CA fan by putting off isolators and locking with padlock LOTO.
11. Do not start any work unless clearance is given by operation department.
12. Request instrumentation to remove the solenoid coil connected waste gas flow control valve.
13. Close the compressed air line ball valve connected to the solenoid and remove the PU hose.
14. Secure the valve by using belt sling & hook it with hydra.
15. Start removing the flange bolts & slowly lower the valve on ground.
16. If needed an fabricated dummy plate of sheet can be kept towards fan suction side incase if excessive heat is noticed. Concerned engineer involved in the job to decide the necessity of the same.
17. Replace the valve with a new/overhauled one. Ensue to check the condition of gaskets , if needed replace the gaskets with new one.
18. Tighten all the bolts evenly; there should not be any leakage.
19. Request instrumentation to connect the solenoid coil.
20. Connect the PU hose and open the ball valve of compressed air line.
21. Take trial in presence of operation engineer.
22. Clear all electrical shutdowns
23. Clear work permit and handover for operation.

Note : Incase DN 900 manual valve needs to be replaced then :

1. Follow above procedure from step 1 to 8 .
2. Take shutdown of PCI Waste Gas Line electric valve near HBS Chimney from Electrical Department (Isolation officer) by using(LOTO).
3. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
4. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
5. Using suitable handling facility dismantle the valve and replace it with new / overhauled one.
6. Clear all electrical shutdown after taking trial of manual valve .
7. Clear the work permit and give clearance to Operation dept.

**Work No. 11: Maintenance/Replacement of Waste gas fan**

Hazards identified:

* Electrical shock from drive.
* Gas poisoning.
* Fall of slinged items
* Splashing of oil in eyes .
* Trapping of hands in between rotating machinery .

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting of gas line without proper intimation to operation dept. & without checking the CO% in line.

1. **Oil filling in Plummer block**
2. This job has to be done during mill shutdown
3. Take clearance from PCI control room in charge and obtain work permit .
4. Take shutdown of PCI Waste Gas Fan from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Top up oil inside the bearing block up to maximum level.
8. Open the shutoff valve for HBS waste gas supply.
9. Clear electrical shut down and work permit & hand over for operation.
10. **Bearing replacement of bearing block.**
11. This job has to be done during mill shutdown
12. Take clearance from PCI control room in charge and obtain work .
13. Take shutdown of PCI Waste Gas Fan from Electrical Department (Isolation officer) by using(LOTO).
14. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
15. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
16. Isolate PCI waste gas fan from waste gas supply by closing shutoff valve.
17. Remove the coupling guard and keep it aside.
18. Decouple the motor & bearing block.
19. Secure fan top casing with sling belts & hook it with hydra.
20. Remove the casing bolts & slowly lower it on the ground.
21. Secure ID fan shaft and impeller with sling belts & hook it with hydra.
22. Drain oil from bearing block carefully without spillage.
23. Follow procedure WI/MAINT/93.for handling of oil.
24. Remove the bearing block top cover and keep it aside.
25. Slowly lift impeller from the casing and lower it on the ground.
26. Remove the bearing with help of bearing puller and replace it with a new one.
27. Put back the impeller inside the casing and keep it hanged from hydra.
28. Fix the bearing block top cover and tighten all the bolts.
29. Put back the fan casing top cover and tighten all the bolts.
30. Couple the motor and bearing block and fix back the coupling guard.
31. Fill oil inside the bearing block.
32. Rotate shaft with hand and check its freeness.
33. Clear electrical shutdown and take trial in presence of electrical & operation engineer.
34. Clear work permit & handover for operation

**Note: For motor replacement Follow** :

1. Above procedure from step 1 to 6 .
2. Remove motor foundation bolts and secure it with Hydra .
3. Replace the old motor with spare assembly.
4. Fix the foundation bolts.
5. Carry out necessary alignment using dial gauge .
6. Tighten the foundation bolts of motor .
7. Fix the coupling & fit the coupling guard.
8. Clear the electrical shutdown and take trial .
9. Check the vibration readings , if found normal give clearance to operation dept.

**Work No.12: DN800 Bleeder/ chimney valve replacement**

Hazards identified:

* Gas poisoning.
* Fall from height.

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept. & without checking the CO%.

1. This job has to be done during mill shutdown.
2. Take clearance PCI control room in charge by taking work permit.
3. Take shutdown of PCI CA Fan & PCI Waste Gas Fan from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
6. Ensure water sealing is carried out for PCI gas line & google valve is kept Close.
7. Similarly close the DN 350 gas line manual valve near HAG inlet .
8. Close the LPG line valve connected to HAG & disconnected the LPG hose connected to HAG.
9. Start Nitrogen purging inside the HAG & continue till all CO is removed.
10. Do not start any work unless clearance is given by operation department.
11. Request instrumentation to remove the solenoid coil connected to Bleeder valve.
12. Close the compressed air line ball valve connected to the solenoid and remove the PU hose.
13. Secure the bleeder valve by using belt sling hanged from hydra/ suitable handling facility .
14. Start removing the flange bolts & slowly lower the valve on ground.
15. Replace the valve with a new/overhauled one. Please do inspect the condition of gaskets , if needed same to be replaced.
16. Tighten all the bolts evenly, There should not be any leakage
17. Request instrumentation to connect the solenoid coil.
18. Connect the PU hose and open the ball valve of compressed air line.
19. Take trial in presence of operation engineer.
20. Clear all electrical shutdown.
21. Clear work permit and handover for operation.

**Work No.13: DN1000 shut off/ Mill inlet valve replacement.**

Hazards identified:

* Gas poisoning.
* Fall from height.
* Burn injury
* Explosion near HAG.

Do’s:

* Wear proper PPE’s.
* Ensure that CO level is zero before the activity is started.
* Ensure that protection sheet is placed towards HAG side of duct once valve is removed to prevent excessive hit and flame.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept. & without checking the CO% .

1. This job has to be done during mill shutdown.
2. Take clearance PCI control room in charge by taking work permit.
3. Take shutdown of PCI CA Fan & PCI Waste Gas Fan from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
6. Ensure that operation has carried out water sealing of PCI gas line & google valve is kept close .
7. Close the LPG line valve connected to HAG & disconnected the LPG hose connected to HAG.
8. Open the bleeder valve of HAG & release the stored pressure.
9. Start Nitrogen purging inside the HAG & continue till all CO is removed.
10. Do not start any work unless clearance is given by operation department by purging HAG.
11. Request instrumentation to remove the solenoid coil connected to shut off valve.
12. Close the compressed air line ball valve connected to the solenoid and remove the PU hose.
13. Secure the shut off valve by using belt sling hanged from hydra.
14. Start removing the flange bolts & slowly lower the valve on ground.
15. Ensure to fix a protection sheet towards HAG side of duct once valve is removed to prevent excessive hit and flame.
16. Replace the valve with a new/overhauled one.
17. Tighten all the bolts evenly, There should not be any leakage. Do ensure to inspect the gasket & replace if needed.
18. Request instrumentation to connect the solenoid coil.
19. Connect the PU hose and open the ball valve of compressed air line.
20. Take trial in presence of operation engineer.
21. Clear all electrical shutdowns.
22. Clear work permit and handover for operation.

**Work no.14: Maintenance of weigh coal feeder.**

Hazards identified:

* Electric shock.
* Fire hazard.
* Trapping of hand in moving machinery.
* Entanglement of hand inside the coal weigh feeder.
* Inhalation of coal dust.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept. & without checking the CO% .

1. **Replacement of coal feeder gear box (belt drive) & scrapper gear box .**
2. Take clearance from PCI control room in charge by taking work permit.
3. This job has to be done during coal mill shutdown
4. Take shutdown of PCI Weigh Coal Feeder from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Secure the gear box with help of manila rope of minimum 20mm dia.
8. Disengage gear box and slowly lower it on the platform.
9. Replace it with new/overhauled gear box.
10. Ensure sufficient oil level is maintained inside the gear box.
11. Clear electrical shutdown & take trial in presence of electrical & operation engineer.
12. Open inlet & outlet valves of coal feeder.
13. Clear work permit & hand over for operation
14. **Replacement of scrapper chain / scrapper**
15. Take clearance PCI control room in charge by taking work permit.
16. This job has to be done during coal mill shutdown
17. Take shutdown of PCI Weigh Coal Feeder from Electrical Department (Isolation officer) by using(LOTO).
18. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
19. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
20. Open all the inspection door and clean it to remove coal from inside.
21. Identify the damaged link & remove the connecting split pin. Similarly identify the damaged scrapper and replace it with new one .
22. Replace damaged link with a new one.
23. Close all the manholes & tighten all the flanges to ensure no leakage.
24. Clear the electrical shutdown & take trial in presence of operation engineer.
25. Clear work permit & hand over for operation.
26. **Inspection of weigh coal feeder**

1. Take clearance PCI control room in charge by taking work permit.

2. Keep weigh coal feeder in local mode at local panel and press emergency stop push button

3. Open all inspection doors of coal feeder

4. Complete coal feeder cleaning to be done. Responsibility: Operation

5. Electrical shutdown is not required for coal feeder inspection because during inspection belt and chain scrapper will be kept in running mode in presence of operation in charge .

6. Maintain sufficient distance from the weigh feeder for observation .Release the emergency stop push button and run the belt .

7. Check the belt condition, rollers condition, chain scrapper condition.

8. Stop the belt and chain scrapper and close all the inspection doors.

**Note** : Incase if any abnormalities is noticed in scrappers / links then follow mentioned activity “**Replacement of scrapper chain / scrapper”.**

9. Keep coal feeder in remote mode at local panel.

10. Clear the work permit and give clearance to operation.

1. **Replacement of coal feeder belt**

**Hazards identified :**

* Fire accident during cutting & welding.
* Inhalation of coal dust .
* Electrical shock from drive.
* Entanglement of body part during conveyor trials.
* Fall of rollers during conveyor operation .
* Impact of metal parts when conveyor is started

**Do’s:**

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Wear proper PPE’s.

**Don’ts :**

* Carry out cutting & welding when area is covered with coal fines.
* Carry out welding without prior permission from Instrumentation Department as there are load cells mounted which need to be disconnected prior to welding jobs.

1. Complete all the preparatory jobs.
2. Take clearance from PCI control room in charge by taking the work permit.
3. Take shutdown of PCI Weigh Coal Feeder from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
6. Open the inspection doors and both front and back doors.
7. Temporarily release the shutdown for cleaning of the coal feeder.
8. Run the coal feeder and chain scrapper in local mode and clean it thoroughly. Ensure that there is no coal inside. Also ensure that Raw Coal Bin is free of coal completely.
9. Take the shutdown again and put the LOTO lock.
10. Close the entry point manual gate & coal feeder discharge gate completely.
11. Release the tension of belt using screw takes up available at the conveyor tail end.
12. Open all the top flanges provided for lighting.
13. Place 40 NB pipe above the top flange at head end side to hold the head pulley by using manila rope f minimum 20mm dia.
14. Remove both DE and NDE side flange at head pulley.
15. Remove encoder, coupling and bearing housing at NDE and mounting, tie studs at DE side.
16. Inform Instrumentation department to disconnect the Load cell
17. Push the Drive pulley towards PCI control room for about 250mm.
18. Remove all carrying rollers and the load cell along with the structure outside.
19. Remove the both side housing bolts of tail pulley.
20. Insert manila rope through tail end lighting flange to hold the tail pulley. Manila rope to be tied to manual gate channel.
21. Tilt the tail pulley and bring it outside through tail side door.
22. Remove the old belt.
23. Place the new belt from tail end to head end side by pulling using manila rope.
24. Place the head pulley in between the endless belt.
25. Shift the head pulley to its position by pushing the drive arrangement.
26. Fix DE and NDE main flange bolts at head pulley.
27. Place tail pulley in between the belt and fix the housing bolts on both the sides.
28. Fix all the carrying rollers and load cell along with the frame to the conveyor structure.
29. Give tension to the belt using screw take up at tail end side.
30. Remove all the manila ropes from the pulley.
31. Temporarily release the electrical shutdown for trial for 5 mins. If required tracking to be done by inching operation . Do not insert your hand inside the weigh feeder housing when belt is running.
32. Inform Instrumentation department for load cell connection.
33. Close all the manholes and inspection doors.
34. Release the shutdown and permit and hand over to operation department.
35. **Work Procedure for installing AIR BLASTER at RAW COAL BIN at PCI**

**Identified Hazards:**

**Physical Hazard** –

1. Pressure, temperature, sudden explosion due to flame, Burn injury.

**Mechanical Hazard** –

1. Trapping between two objects,
2. Fall of material, hammer, tools, slinged items, bolts
3. Fall of person from platform,
4. Entanglement,
5. Impact of moving / slinged items.
6. Back Pain due to sudden or heavy load.
7. Non use of PPE’s while carrying out the activity
8. Toppling of Raw coal hopper
9. Failure of hydraulic jacks

**Electrical**:

1. Electric shock

**Chemical:**

1. CO gas poisoning.

**Do’s:**

* Ensure the availability of firefighting equipment around the vicinity of work place.
* Wear proper PPE’s
* Ensure availability of CO monitor.
* Load cells are removed and dummy load cells are installed.
* Ensure that nitrogen line is isolated and PU tube of the valve is removed.
* Ensure coal bin is completely free of coal.
* Use safety belt for cutting at height above 2 meter.

**Don’ts:**

* Carry out cutting & welding when hopper is filled with coal.
* Carry out welding until clearance given from Instrumentation department.

1. Complete all the preparatory jobs like fabrication of scaffolding.
2. Take clearance from the operation department and instrumentation department for welding and cutting at Raw coal bin.
3. Take the work permit from the PCI control room engineer. Also take signature of Instrumentation In charge (SESA) on the same permit.
4. Ensure that Raw coal bin is completely free of coal & Load cell platform is also cleaned. (Resp-Operation dept).
5. Close coal feeder manual gate (Raw coal bunker discharge) completely.
6. Remove the expansion bellow above manual gate so as to isolate the bunker from coal feeder.
7. Place the hydraulic jacks (4 Nos) at suitable locations so as to lift the bunker evenly.
8. Gradually start lifting the bunker equally from all sides by 20 mm from existing height.
9. Place the rubber at required location on load cells so as to isolate it from bunker.
10. Request the Instrumentation dept to disconnect the load cells.
11. Use chain block or rope to hold the air blaster in the appropriate position and inclination.
12. Fix the blaster at required locations with necessary gas cuttings and welding.
13. Remove the chain block or rope.
14. Weld a hook at appropriate height so as to fasten the blaster clamp for extra safety.
15. Fix the blaster clamp and tight it with bolts.
16. Request Instrumentation department to give connection to the load cells.
17. Remove the support rubber which were fixed slowly and carefully.
18. Give connection to the blaster and take trial at 4 to 6 kg/cm2 in front of operation department.
19. If found all OK then fix the expansion bellow which was removed.
20. Finish the job and remove the manpower along with all tools and tackles.
21. Release the work permit and give clearance to Instrumentation department for load cells fixing and its calibration.

**Work No.15 : Maintenance of classifier**

Hazards identified:

* Electric shock.
* Fire hazard.
* Fall from height
* Fall of objects from height .
* Jamming of hand inside the gear box.
* Splashing of oil .
* Fall due to spillage of oil on platform.
* Hitting on structure due to lesser head room .

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept. & without checking the CO%.

1. **Replacement of classifier gear box**
2. Take clearance from PCI control room in charge ~~by taking work permit.~~
3. This job has to be done during mill shutdown.
4. Take shutdown of PCI classifier from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Close DN 1000 valve connecting fume furnace and grinding mill.
8. Open the chimney bleeder valve and vent out the pressure of furnace into atmosphere.
9. Remove the gearbox by loosening the foundation bolts.
10. Install the new gear box and tighten the bolts. Ensure sufficient oil is maintained inside the reducer gear box.
11. After carrying out the work ,clear all the electrical shutdowns .
12. Take direction trial of classifier along with electrical and operation. Also ensure that lubrication pump is running and sufficient discharge is given by oil pump.
13. Close the bleeder valve and open DN 1000 shut off valve and operate the fume furnace.
14. Inform electrical /instrumentation to give the supply & take trial.
15. Take trial and Clear the work permit.

**Work No.16: Maintenance of sealing blower**

Hazards identified:

* Electric shock.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept. & without checking the CO%.

1. **Cleaning /replacement of Seal blower suction filter**
2. This job has to be done under mill shutdown.
3. Take clearance from PCI control room incharge & obtain ~~work permit for the job.~~
4. Take shutdown of PCI Seal Blower from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Isolate the filter from seal Blower.
8. Remove the filter casing of suction filter and then remove the filter.
9. Clean the filter by blowing low compressed air or replace it with a new one if excessively clogged with dust.
10. After cleaning or replacing the filter, put back the filter to its original position.
11. Put back the casing of suction filter.
12. Clear the electrical shutdown for mill and seal blower.
13. Clear the work permit & hand over for operation.
14. **Replacement of motor /impeller**
15. Take clearance from PCI control room in charge ~~by taking work permit~~.
16. Take shutdown of PCI Seal Blower from Electrical Department (Isolation officer) by using(LOTO).
17. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
18. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
19. Remove the bolts of suction end of casing along with the flexible compensator bolts and keep it aside .
20. Now with the help of suitable jacking arrangement , dismantle the impeller from the motor shaft
21. Fit the spare impeller firmly on shaft .
22. Try rotating the impeller manually to check for freeness
23. Fix back the casing cover along with flexible compensator .
24. Clear the electrical shutdown and take trial of equipment
25. Note down the vibration readings of motor base , if found OK then clearance can be given to operation , else necessary impeller balancing needs to be carried .

**C. Replacement of Inlet/ Outlet side bellow.**

* 1. This job has to be done under mill shutdown.

1. Take clearance from PCI control room in charge 3. Take shutdown of PCI Seal Blower from Electrical Department (Isolation officer) by using(LOTO).
2. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
3. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
4. Remove the flange bolts and remove the damaged bellow.
5. Replace the damaged bellow with the new one.
6. Tighten all the flange bolts.
7. Release the electrical shutdown and take trial.
8. Release the work permit and hand it over to operation department.

**Work No. 17: Maintenance of barring gear motor**

Hazards identified:

* Electric shock.
* Fall of material from height.
* Jamming of hand while engaging /disengaging the clutch coupling.

Do’s:

* Wear proper PPE’s.
* Ensure that no activity is carried out using top hoists.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept.& without checking the CO%

1. **Replacement of bearings in barring motor**
2. Take clearance from PCI control room in charge
3. Take shutdown of PCI Mill motor & Barring motor from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
6. Decouple the barring motor shaft with mill motor.
7. Remove the coupling guard & keep it aside.
8. Remove the foundation bolts of motor & Lift the motor using manila rope.
9. Drain all the oil from plumber block.
10. Remove the bearing inside the motor with help of bearing puller and replace the same type new bearing.
11. Close the casing and refill the oil into plumber block.
12. Fix back the motor on its same position by lowering the chain pulley block.
13. Check for the alignment for coupling back barring motor and grinding mill motor.
14. Tighten the foundation bolts and all nuts.
15. Couple back the shaft with mill motor & put back the coupling guard
16. Clear shutdown for both motors and take trial.
17. Clear work permit & hand over for operation.

**Work No. 18: Maintenance of lubrication station**

1. **REPLACEMENT OF PUMP.**
2. This job has to be done only during mill shutdown
3. Take clearance from PCI control room incharge & obtain work permit for the job.
4. Take shutdown of PCI Hydraulic system from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
7. Secure the pump with help of 2 Ton chain block & slowly lower it on the ground.
8. Replace the damaged pump with a new/overhauled one.
9. Clear electrical shutdown & take trial.
10. Clear the work permit & hand over for operation
11. . **OIL FILTERS INSPECTION**

1. This job has to be done only during mill shutdown

2. Take clearance from PCI control room in charge & obtain work permit for the job.

1. Remove the bolts and take out the delivery or return line filters. Ensure that oil tray is kept in the vicinity to avoid oil spillage.
2. Always keep cotton waste and cotton cloth along with you.
3. Wash / clean the filter properly in diesel and check for any damage or clogging.
4. Replace the filter if found damaged or jammed.
5. Fix back the filters after thorough inspection.
6. Tighten the bolts.
7. Take trial after releasing the work permit.
8. Release the work permit and hand over for operation.
9. **OIL REPLACEMENT**
10. This job has to be done only during mill shutdown
11. Take clearance from PCI control room incharge & obtain work permit for the job.
12. Take shutdown of PCI Hydraulic system from Electrical Department (Isolation officer) by using(LOTO).
13. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
14. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure)..
15. Drain out the oil from the tank from drain point using oil pump.
16. Ensure oil is drained out to maximum extent by ensuring with the help of portable gauge rod and then open the manhole flanges.
17. Clean the lubrication tank from outside using cotton cloth and sponge to maximum extent.
18. Since the area is confined ensure availability of oxygen and monitor it continuously by oxygen monitor.
19. After cleaning of tank close the manhole and tighten it securely.
20. Fill the oil from new barrels into the tank upto required level.
21. Fix back all the flanges of return line filter and securely tight it.
22. Release the shutdown of oil pumps and clear the permit.
23. Hand over to production for operation.

**Work No.19 : Maintenance of bag filter**

Hazards identified:

* Fire hazards.
* Coal dust hazard.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept.

1. Replacement of bag filter.
2. This job has to be done during mill shutdown.
3. Take clearance from control room in charge by taking work permit.
4. Take shutdown of PCI Main ID Fan (4M) from Electrical Department (Isolation officer) by using(LOTO).
5. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
6. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
7. Stop nitrogen purging and close the nitrogen supply valve of dedusting unit.
8. Explain the hazards of Nitrogen and CO to concerned workmen before starting the job.
9. Ensure that before starting the job workmen is wearing hand gloves, nose mask, safety goggles, and helmet.
10. Check Oxygen % before job is started , it should be 19.5 to 23% .
11. Open the top cover by loosening bolts.
12. Remove purging header above bags by removing bolt and keep it aside.
13. Lift the cage of the bag to be replaced( twisting with jerk helps in easy removal of cage)
14. Remove bag and replace it with a new one.
15. Fix back purging header and tighten the bolts.
16. Fix top cover and ensure tightening of bolts.
17. Clear the electrical shut down of HT coal fines fan (Mill shutdown to be cleared if it was taken).
18. Open the nitrogen supply to dedusting and start purging the nitrogen.
19. Inform production engineer about completion of work and clear work permit.
20. Replacement of electromagnetic puffing valves/ union assembly.
21. This job has to be done during mill shutdown.
22. Take clearance from PCI control room in charge ~~by taking work permit~~.
23. Take shutdown of PCI Main ID Fan (4M) from Electrical Department (Isolation officer) by using(LOTO).
24. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
25. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
26. Stop nitrogen purging and close the nitrogen supply valve of dedusting unit.
27. Explain the hazards of Nitrogen and CO to concerned workmen before starting the job.
28. Ensure that before starting the job workmen is wearing hand gloves, nose mask, safety goggles, and helmet.
29. Check Oxygen % before job is started , it should be 19.5 to 23% and CO level should be less than 50ppm .
30. Keep nitrogen purging panel in local mode
31. Drain the respective header where valve or union is to be replaced.
32. Carefully remove the damaged valve/ union.
33. Replace with the new one.
34. Fix the bolts tightly and ensure the healthiness of gaskets.
35. Close the drain valve and open the nitrogen connection.
36. Check for any leakage.
37. If all found OK then clear the shutdown and release the work permit.

**Work No.20: Rotary valve replacement**

Hazards identified:

* Fire hazards.
* Coal dust hazard.
* Electric shock

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept.

1. Take clearance from control room in charge by taking work permit.
2. Take shutdown of PCI Main ID Fan (4M) from Electrical Department (Isolation officer) by using(LOTO).
3. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
4. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
5. Close manual gate valve above vane feeder to avoid fall of coal fines.
6. Remove the mounting bolts & lower the valve on the platform manually with help of two manpower.
7. Refer WI/MAINT/12 for material handling.
8. Replace vane feeder with new/overhauled one, fully tighten the bolts.
9. Ensure the mounting bolts are fully tightened. There should not be any leakage between the flanges.
10. Open the gate valve above the vane feeder.
11. Clear electrical shutdown and take trial in manual mode along with electrical & operation dept.
12. Clear work permit & Request control room in charge to revert the system back to Auto mode.

**Work No. 21: Blast of sheet/ Explosion sheet replacement**

Hazards identified:

* Fire hazards.
* Coal dust hazard.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept

1. Take clearance from PCI control room incharge & obtain work permit for the job.
2. Note the pressure in the pressure gauge nearer to the explosion valve.
3. Close all the manual valves connecting the coal fan silo and pressure system.
4. Open the relief valve to vent out nitrogen into atmosphere
5. Monitor the drop in pressure in gauge due to closing of inlet supply valves.
6. Remove the flanges holding the blastoff sheet .
7. Replace the blastoff sheet with new sheet and tighten all the bolts into the flanges along with asbestos rope or gasket in between flanges.
8. Ensure the material of blast off sheet is aluminum SWG 22 and thickness of sheet is 0.6mm
9. Open the inlet valve to pressurize t
10. 10.Once the pressure starts building up, check for any leakages and rectify by arresting or minimizing to negligible level.
11. Clear the work permit & hand over for operation.

**Work No 22: Rubber Expansion bellow replacement**

Hazards identified:

* Fire hazards.
* Coal dust hazard.

Do’s:

* Wear proper PPE’s.
* Ensure that coal spillage level is zero before the activity is started.
* Ensure no leakage of compressed nitrogen.

Don’ts

* Carry out welding & gas cutting without proper intimation to operation dept.

1. Take clearance from PCI control room incharge
2. This job has to be done in the absence of compressed nitrogen in the injection tanks.
3. Arrest the nitrogen flow into injection tank by disengaging all the valves connecting injection tank and compressed nitrogen tank.
4. Open the relief valve to vent out nitrogen into atmosphere.
5. Ensure there is no coal in coal fines bin by closing the manual gate valves connecting injection tank & coal fines silo.
6. Remove the rubber expansion bellow by loosening the bolts of the flanges connecting them.
7. Replace damaged bellow with a new one and tighten the bolts.
8. Open all the manual gate valves connecting injection tank and. coal fines silo.
9. Close the relief valve and pressurize the injection tank with compressed nitrogen
10. Clear the work permit & hand over for operation.

**Work No.23 : Changing gasket of relief valve at PCI BAG HOUSE.**

Hazards identified:

* Fall of person from height.
* Fall of material, hammer, tools, slinged items, bolts.

Do’s:

* Wear proper PPE’s.
* Use safety belt while welding the platform and changing the gasket.
* Ensure that the platform is firm and strong.
* Keep CO monitor with you.

Don’ts

* Cutting job should not be done without prior permission from concerned department.

1. Complete all the preparatory jobs.
2. Take clearance from the operation department and instrumentation department for welding job. Take the work permit from the operation department.
3. Take shutdown of PCI Main ID Fan (4M) from Electrical Department (Isolation officer) by using(LOTO).
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Nitrogen purging to be done and ensure that there is no pressure in the bag house.
7. Isolate the nitrogen purging line completely.
8. Loosen the bolts of the flange carefully.
9. Remove the old gasket and replace it with the new one.
10. Tighten the bolt and finish the job.
11. Release the shutdown of the coal fines fan temporarily.
12. Check for leakage.
13. If all found ok then release the shutdown and the work permit.
14. Hand over to operation department.

**Work No 24: Nitrogen/ Oxygen receiver tank discharge line NRV replacement**

Hazards identified

* Pressure in line
* Trapping between two objects,
* Fall of material, hammer, tools, slinged items, bolts

Do’s:

* Wear proper PPE’s.
* Ensure that line pressure is completely drained out.

Don’ts

* Welding and Cutting job should not be done without prior permission from concerned department

1. This job is to be done only at Plant shutdown. Take clearance from operation department.
2. Ensure that N2/ O2 tank discharge line manual valve to be in close position.
3. Ensure N2/O2 all header to be drain completely and drain valve to be kept in open position till the NRV replacement.
4. Ensure line pressure is depressurized completely.
5. Take work permit from operation department.
6. Remove the existing NRV and replace it with new NRV.
7. Ensure all bolts are tightened completely after replacement of NRV.
8. Close the N2 header drain valve and then open the discharge line manual valve.
9. Clear the work permit and give clearance to operation.

**Work No 25 : Injection tank fluidizing bed mesh inspection**

1. This work to be carried out in plant shutdown.
2. Take clearance from PCI control room in charge and take the work permit.
3. Ensure that control room engineer depressurizes the injection tank of which job is to be carried out.
4. Ensure injection tank to be emptied upto maximum possibility.
5. Ensure that injection tank on which job is to be carried out, all pneumatic valves are in close position and manually engaged.
6. Also disconnect PU tubes of all the concerned valves.
7. Disconnect nitrogen line from fluidizing bed by disconnecting metallic hose of DN 20.
8. Remove bolts from opposite sides, 4 bolts each side.
9. Place the maintenance trolley properly at bottom of fluidizing bed.
10. Remove the remaining bolts of fluidizing bed and place the bed on trolley.
11. Drag the trolley to one side slowly by placing the jumbo bag at opposite side so that if any coal fines material is there, it will fall in the bag.
12. Inspect the mesh and gasket of the fluidizing bed.
13. If required replace the gasket.
14. Fix back the fluidizing bed to its position and tighten the bolts properly.
15. Connect DN 20 metallic hose which was removed.
16. Connect all the PU tubes of the pneumatic valves and open the air supply.
17. Also disengage the valves manually.
18. Ask operation department to pressurize the tank and check for any leakage. If found any the arrest it.
19. Clear the work permit and give clearance to operation.

**Injection tank rubber bellow, valves, spool piece and metallic hose inspection**

**Identified Hazards:**

**Physical Hazard** –

* Pressure,
* Temperature
* Explosion

**Mechanical Hazard** –

* Trapping between two objects,
* Fall of material, hammer, tools, slinged items, bolts
* Fall of person from platform,
* Entanglement,
* Impact of moving / slinged items.
* Back Pain due to sudden or heavy load.
* Non use of PPE’s while carrying out the activity

**Chemical -**

* Nitrogen gas poisoning
* Fire due to gas cutting at gas prone area.

**Human Behaviour –**

* Aspect of Contract Employees
* Alcoholism
* Casual Approach

1. Take clearance from PCI control room in charge and take the work permit.
2. Ensure that control room engineer depressurizes the injection tank of which job is to be carried out.
3. Ensure that injection tank on which job is to be carried out, all pneumatic valves are in close position and manually engaged.
4. Also disconnect PU tubes of all the concerned valves.
5. Disconnect nitrogen line of the concerned tank.
6. Remove bolts from opposite sides slowly and ensure pressure is zero in the tank.
7. Inspect the valve, bellow, metallic hose, spool piece and gasket of the tank.
8. If required replace the gasket.
9. Fix back the valve, bellow, metallic hose or spool piece to its position and tighten the bolts properly.
10. Connect all the PU tubes of the pneumatic valves and open the air supply.
11. Also disengage the valves manually.
12. Ask operation department to pressurize the tank and check for any leakage. If found any the arrest it.
13. Clear the work permit and give clearance to operation.

**Work No.26: Grinding mill inspection ( Confined space)**

**FOLLOW VL/IMS/PID2/BF3/WI/26A**

**Work No.27: Hydraulic power pack maintenance.**

**Safe Maintenance Of Hydraulic Equipment.**

* Objective : - Safe maintenance of Hydraulic equipment .
* Scope : - PCI Hydraulic power pack
* Ref. : - OEM manual & drawing
* Responsibility : -Engineer in charge & workmen on the job

PPE –s to be used:

 Safety shoes, helmet, cotton cloth, ear plugs, goggles and hand gloves.

Aspect – Impact

|  |  |
| --- | --- |
| Oil Spillage | Land contamination & Resource Depletion |
| Oil traced waste generation  **Hazards Identified:** | Land contamination & Resource Depletion |
| **Mechanical hazards** | | |
| 1. Trapping between the moving parts | | |
| 2.  Impact of hammer, tools, components. | | |
| 3.   Fall of materials such as hammer, pipe wrench, spare parts, bolts, spanners, slinged items. | | |
| 4.    Entanglement between rotating components. | | |
|  | | |
| Human behavior aspect : | | |
| 1. Alcoholism, non usage of PPE's, workmen nature and casual approach | | |
| Physical hazards | | |
| 1.      Pressure of hydraulic oil. | | |
| 2.      Temperature of oil. | | |
| 3.      Fall of oil in eyes, ears, mouth | | |
|  | | |
| Electrical hazards | | |
| 1.      Electrical shock | | |
|  | | |
| Chemical Hazard | | |
| 1. Fire. | | |

**Work No 1 : Hydraulic Pump /Motor replacement**

**Work No. 2 : Bladder replacement .**

**Work No 1**: **Hydraulic Pump /Motor Replacement**

1. 1)Take Work Permit from Operation department for carrying out the job.
2. 2) Take shutdown of PCI hydraulic system from Electrical Department (Isolation officer) by using(LOTO).
3. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
4. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).

3)**For changing** **Pump assembly, follow below procedure**:

1. Close the suction valve .
2. Loosen the suction flange & discharge end hose ,
3. Now remove the mounting bolts of hydraulic pump & dismantle the same from position.
4. Inspect the coupling condition & change if needed .
5. Ensure that the new coupling is having a step, so that both couplings (motor- pump) do not get pressed against each other. Also ensure that the coupling Is locked on the shaft by means of grub screw.
6. Assemble the pump and kindly ensure for a minimum float of 5mm in Nylon coupling .
7. Fix suction flange , replace “O” rings if needed .
8. Fill some amount of clean hydraulic coil into the pump via the discharge end to ensure that pump does not run dry during initial rotation .
9. Connect the discharge end hose .
10. Open the suction line valve.

4)**For changing the motor assembly**,

a) Ensure that minimum 2 ton certified chain block is used for lifting the motor

b) Once cables are disconnected by electrical , start loosening the motor foundation bolts.

c) Now slide the motor backwards to disengage from the coupling , then slowly lift the motor from its foundation frame & lower it on the ground by means of proper handling arrangement.

d) Lift the spare motor and mount it on the frame,

e) Tighten all the foundation bolts after checking the alignment.

f) Ensure that there is a ,minimum 5 mm float in nylon coupling.

6) Clear s/d. & take trial of pump-motor & give clearance .

7) Clear Work permit .

**Work No. 2 : Bladder replacement .**

a. Take work permit to carry out the job.

c. Isolate the accumulator by closing the inlet valve to the accumulator.

d. Drain the oil from the accumulator by opening the pressure release valve below the accumulator cylinder.

e. Drain nitrogen from the bladder to the atmosphere by connecting the regulator & opening the release knob.

f. Disconnect the connections of the accumulator, and slowly lower the cylinder using a manila rope.

g. Remove the lock nut on top of the cylinder and the take out the bladder from it.

h. Put the new bladder in to the cylinder. While doing this, it has to be ensured that there is no dust on the bladder.

i. Put the cylinder back on to the stand using a manila rope and make all the connections.

j. Charge the Nitrogen into the accumulator as per Nitrogen charging procure mentioned above.

**DO**

* Ensure that the motor eye bolt is in good condition before lifting it.
* Nitrogen used for charging is 99.999% pure.
* Housekeeping is carried out after job completion.
* Do housekeeping activity as per [WI/MAINT/91](file://Mgr_maint/qehs/departmental%20manual/11%20%20Work%20instruction/WIMAINT91%20HOUSE%20KEEPING.doc)

**Dont’s**

* Carry out Nitrogen filling exercise with non calibrated pressure gauge.

**Work No 28: Balancing of PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan**

1. Take clearance from operation for working on Coal Fines ID FAN.
2. Take electrical shut down of Coal Fines ID FAN motor, Discharge valve & Inlet damper (100% close position).
3. Take work permit from operational in charge for Coal Fines ID FAN balancing work (**VL/IMS/PID2/BF3/WI/26**)
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Before starting the work, fan should be in stand still state. No external device to be used to stop the fan to zero state.
7. Once fan achieves zero state open the side cover of casing.
8. Remove coupling guard & paste reflective stickers/tape and position sensor to capture rotation.
9. Weld excitation/test/correction mass as per instruction by CBM expert.
10. Close the casing cover.
11. Temporarily clear the s/d of Coal Fines ID FAN & give clearance to start the fan.
12. Once fan starts only 1 person along with CBM engineer will go to capture vibration readings under closedsupervision of Engineer.
13. After capturing vibration readings stop Coal Fines ID FAN.
14. Again take shutdown of Coal Fines ID FAN & wait till the impeller comes to stand still
15. After vibration analysis open the casing door & Weld correction mass as per CBM expert & close the casing door.
16. Temporarily clear the electrical shutdown of Coal Fines ID FAN and take trials as per above procedure if vibration readings are satisfactory then take shutdown of Coal Fines ID FAN.
17. Weld the piece fully and close the door.
18. If vibration readings are not satisfactory, then 2/3 more trials to be taken as per CBM report. (repeat steps 7 to 17)
19. Normalize the system once readings are as per requirement, ensure all the safety guards are in place and release all equipment shutdowns (permanently) and close the work permit.

Note -

1. Refer work procedure [WI/MAINT/12](file:///C:/Users/HP/AppData/Local/Temp/Temp3_SOPHIRA.zip/SOP%26HIRA/IMS%20SOP/WIMAINT12%20MATERIAL%20HANDLING%20.doc) for handling valves and filter.
2. Welding procedure as per SP 44
3. Please refer WI/MAINT/94 for fabrication, erection and dismantling
4. Use certified cutting torch set.
5. Use certified slings, D-shackles, Grinding M/c, etc
6. Do not stand below the load when it is hoisted.
7. Use all PPE-s
8. Use proper tools like spanners.
9. Take CO detector and monitor the CO level while working
10. Return back all scrap to store.
11. Use 24v lamp inside the working area

**Work No 29: PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan impeller changing**

1. Take clearance from operation for working on Coal Fines ID FAN.
2. Take electrical shut down of Coal Fines ID FAN motor, Discharge valve & Inlet damper (100% close position).
3. Take work permit from operational in charge for Coal Fines ID FAN impeller replacement work (**VL/IMS/PID2/BF3/WI/26**)
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Before starting the work, fan should be in stand still state. No external device to be used to stop the fan to zero state.
7. Remove the damper from the suction side
8. Remove the impeller casing front cover
9. Remove the impeller lock nut
10. Remove the impeller safely from the shaft by using proper tools & tackles by using Mono rail & CPB with proper slings & d-shackles
11. Shift the impeller to some safe place using hydra
12. New/overhauled impeller to be shifted to the required position and fixed on the shaft
13. Tighten the lock nut of the impeller
14. Fix back the front cover of the casing & tighten its bolts
15. Fix back the removed suction side damper
16. Clear the electrical shut down and take trials
17. Clear the work permit and give clearance to production

**Work No 30: PCI Coal Fines ID FAN/PCI CA Fan/PCI Waste Gas Fan coupling bush replacement**

1. Take clearance from operation for working on Coal Fines ID FAN.
2. Take electrical shut down of Coal Fines ID FAN motor, Discharge valve & Inlet damper (100% close position).
3. Take work permit from operational in charge for Coal Fines ID FAN impeller replacement work (**VL/IMS/PID2/BF3/WI/26**)
4. Once shutdown is taken keep the equipment key and isolation key in the LOTO box and tag the LOTO box with the equipment ID and hand the LOTO box to the technicians (keep the shutdown paper in the box).
5. Ensure technicians working on the equipment puts their personal LOTO on the LOTO box. (as per One Man One LOTO procedure).
6. Before starting the work, fan should be in stand still state. No external device to be used to stop the fan to zero state.
7. Replace the coupling bushes wherever required (damaged)
8. Check & tighten all the coupling bolts
9. Clear the electrical shut down and take trials
10. Clear the work permit and give clearance to production

**REFERENCES: Operation & Maintenance manual.**

**Amendement Record**

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| --- | --- | --- | --- |
| **Date** | **Manual Section Ref. & Para** | **Brief details of Revision** | **New Rev.** |
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| --- | --- | --- |
| **Prepared By:**  Area Engineer | **Reviewed & Issued By:**  Management Representative | **Approved By:**  Mechanical Head |
| **Signature:** | **Signature:** | **Signature:** |
| **Review Date: 15.02.2021** | **Review Date: 15.02.2021** | **Review Date: 15.02.2021** |