**WORK INSTRUCTIONS FOR\_** **HANDLING ABNORMALITIES IN BLAST FURNACES**

**Responsibility: FURNACE INCHARGE/ SHIFT INCHARGE**

**Identified Hazards:**

1. Contact with hot material causing burns
2. BF Gas leakage
3. Fire & explosion
4. Contact with hot water causing burns
5. Contact with hot cake
6. Fire in the compressor room
7. Nonuse of PPE
8. Improper house keeping
9. Inadequate local lighting
10. Running in hurry to attend to the problem soon but getting hurt
11. Spillage of hot coke from bleeder

**Significant Aspects:**

1. Fire & Explosion
2. Gas leakage
3. **Emission of dust**
4. **Energy consumption**
5. **Spillage of water**
6. Unauthorized operation or repair of any equipment is a punishable offence.
7. Whenever furnace is hanging (hot or cold). Open the steam in between the bells to avoid fire on furnace top.
8. Keep the top gas temperature below 210 deg. at all the time to prevent the gas catching fire on the furnace top, by opening the top water sprays.
9. Ensure that the top spray valve is kept closed when not in use
10. Inform the shift superintendent at the earliest over P.A or intercom.
11. If the temperature could not be controlled by water reduce the wind volume carefully
12. Do not allow the furnace to hang for long time. Whenever possible give checks with snort or IVC.
13. Remove all the people working on the roofs of cast house or in GCS plant area.
14. Keep the persons on both sides of furnace to prevent unauthorized entry to prevent the people coming in contacts with hot coke or ore pieces thrown out of bleeder in case of major slips. Barricade all four sides.
15. If major slip occurs check all the drip pots for gas leakages and refill them with water to prevent gas poisoning.
16. Incase slag/metal appears in tuyeres clear all the slag by taking shutdown
17. Try to keep the area around the furnace free of combustible material, which may catch fire and check if any such material catches fire due to hot coke Put off the fire with suitable extinguishers.
18. Keep all the people working in the area informed about chances of such slips.
19. Replace all the used fire extinguishers at the earliest.

**Clearance for furnace top**

1. If anybody wants to work on hydro pack of top charging system and saturator top area, prior permission has to be taken from the furnace control room engineer in consultation with shift-in-charge.
2. During abnormal conditions, personnel have to wear safety over coat in addition to the normal PPE viz. Safety shoes, helmet, and goggle.
3. Before starting the job CO presence to be checked with the help of CO detector and work should not be started if the leakage is beyond permissible limit.
4. It is strictly forbidden to hand over the key belongs to Furnace Top to anyone other than the concerned Company Official, who takes the Work Permit.

**Coke removal from blowpipe/opening of peephole flange**

1. **Reduce the wind volume to min 14000NM3/HR and blast pressure of 0.30 KG/CM2**
2. **Ensure that mech. Fitter is wearing safety over coat, ear plugs & screen with helmet while opening the flange.**
3. **Ensure that the flange is opened by standing on one side.**
4. **Ensure that the taphole operators are ready wearing safety over coat, helmet with screen & pair of ear plugs for cleaning the coke from blowpipe.**
5. **Restrict the movement of other personnel while opening the peephole flange/cleaning**

**Hunting of furnace**

**Identified Hazards:**

1. Gas leakage due to breaking of drip pots.
2. Bursting of air line

**Significant Aspect:**

1. **Noise generation.**
2. **Usage of water**

**Procedure:**

1. Control room engineer should ensure that whenever the furnace starts hunting, gradually reduce the wind vol. till hunting stops.
2. Inform GEPL /Boiler regarding furnace hunting immediately.
3. Inform furnace In charge and SS regarding furnace hunting.
4. When hunting stops gradually increase the wind vol.
5. If hunting continues, with permission of SS start one more blower.

**Hanging of furnace.**

**Identified Hazards:**

1. Slipping of furnace & furnace top catching fire.
2. Spillage of hot coke through the bleeder.

**Significant Aspect:**

**Heat generation.**

**Noise generation.**

**Procedure:**

1. Control room engineer should ensure that whenever the furnace starts hanging, open the steam between bells to avoid fire on furnace top.
2. Keep top gas temperature below 210⁰C by opening top sprays.
3. Inform furnace In charge and SS regarding furnace hanging.
4. If top temp could not be controlled by water then reduce wind volume carefully.
5. Ensure that top spray valve is kept closed when not required.
6. Inform GEPL /Boiler regarding furnace hanging immediately.
7. Try to open the cast as soon as possible if it is due.

Human abnormal activities:

* Ladle overflow
* Metal overflow from main runner
* BF Gas leakage
* Mud gun Failure
* Red spot /Hot spot-on furnace shell
* Burning of peephole assembly

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| **Prepared By:**  Head – Production PID I | **Reviewed & Issued By:**  Management Representative | **Approved By:**  Head – Pig Iron Division |
| **Signature:** | **Signature:** | **Signature:** |
| **Date: 15.07.2022** | **Date: 15.07.2022** | **Date: 15.07.2022** |

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