**WORK INSTRUCTIONS FOR** **NITROGEN PURGING DURING SHUTDOWN / EMERGENCY SHUTDOWN/FURNACE START UP/ GEPL, FLARE STACK PURGING OF BOTH THE FURNACES IF STEAM IS NOT AVAILABLE**

**Responsibility:**

* Objective : - Nitrogen purging for ensuring there is no CO presence in confined spaces and safe shutdown of furnace.
* Scope : - Blast furnace BF1 & BF2.
* Ref. : - BF3
* Responsibility : - Production Manager, Shift Superintend, Blast Furnace in Charge & Workmen.

**Identified Hazards:**

1. N2 gas inhalation
2. Fall of person
3. Mechanical –Impact
4. Inadequate local lighting
5. Improper housekeeping

**Activity no: 1**

**Work instructions for Nitrogen Purging during Furnace shutdown**: - **BF1 or BF2**.

1. Please check steam incoming valve is closed and pad locked. Take work permit before closing from Boiler.
2. Please ensure N2 incoming valve is also closed before opening of the N2 cylinders.
3. Improper valve may lead to BFG coming in the N2 header. Carry CO at N2 bank.
4. Ensure all cylinders are connected in the bank with full N2 cylinders. For connecting / replacing N2 cylinder in the bank it should be ensured only N2 cylinders are connected. N 2 cylinders colour code is light blue on top of the valve is yellow band. Responsibility: Furnace in charge.
5. Ensure no openings for the bank are kept open.
6. Open N2 valves in the bank which are connected.
7. Open N2 incoming line at steam header. Never allow N2 pressure to come down below 2 kg/cm2.
8. Keep the furnace top gas temperature above 250⁰C.
9. N2 shall be opened just before opening the bleeder in uptake, bells and dust catcher. Ensure that EV2 is closed and EV1 is opened.
10. Open one bleeder first, start water sealing and after water seal open another bleeder.
11. Water seal the saturator as soon as one bleeder is opened.
12. N2 purging should be done till furnace top firing done (minimum 80 nos of cylinders to be opened. i.e. 537 cu.mts volume).
13. Please follow respective work instructions for taking shutdown.
14. Ensure that no relief water is to be opened towards gas line after saturator.

**Activity no: 2**

Work instructions for Nitrogen Purging during Furnace Startup: - BF1 or BF2 (Start-up of Blast furnace should not be done without using trolley of 48 cylinders and minimum 90 cylinders should be purged. If trolley is not available use Nitrogen tanker should be used).

1. Please check steam incoming valve is closed and pad locked. Take work permit before closing from Boiler.
2. Please ensure N2 incoming valve is also closed before opening of the N2 cylinders.
3. Ensure all cylinders are connected in the bank with full N2 cylinders. For connecting / replacing N2 cylinder in the bank should be senior and to be ensured only N2 cylinders are connected. N 2 cylinders colour code is light blue on top of the valve is yellow band. Responsibility: Furnace in charge.
4. Ensure no openings for the bank are kept open.
5. Open N2 valves in the bank which are connected.
6. Open N2 incoming line at steam header. Never allow N2 pressure to come down below 2 kg/cm2.
7. N2 shall be opened just before closing the bleeder in uptake, bells and dust catcher. Ensure that EV2 is closed and EV1 is opened.
8. Drop the saturator water seal close another bleeder as soon as water seal is dropped.
9. N2 purging should be done till two bleeders are closed done (minimum 80 nos. of cylinders to be opened. i.e. 537 cu.mts volume).
10. Please follow respective work instructions for taking start up.

**Activity no: 3**

**Work instructions for Gas line purging**: - **BF1 or BF2** (Start-up of Blast furnace should not be done without using trolley of 48 cylinders and minimum 90 cylinders should be purged. If trolley is not available use Nitrogen tanker should be used).

1. Please check steam incoming valve is closed and pad locked. Take work permit before closing from Boiler.
2. Please ensure N2 incoming valve is also closed before opening of the N2 cylinders.
3. Ensure all cylinders are connected in the bank with full N2 cylinders. For connecting / replacing N2 cylinder in the bank should be senior and to be ensured only N2 cylinders are connected. N 2 cylinders colour code is light blue on top of the valve is yellow band.Responsibility: Furnace in charge.
4. Ensure no openings for the bank are kept open.
5. Open N2 valves in the bank which are connected.
6. Open N2 incoming line at steam header. Never allow N2 pressure to come down below 2 kg/cm2.
7. N2 shall be opened just before closing the bleeder in uptake, bells and dust catcher. Ensure that EV2 is closed and EV1 is opened.
8. Ensure that saturator water seal done.
9. N2 purging should be done till oxygen % at gas line relief valve to be monitored. This activity should be done with two persons along with two CO monitors and with one oxygen monitor.
10. N2 purging shall be done till oxygen % at relief valve comes below 1.5%.

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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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| **Amendment Record** | | | |
| **Revision date** | **Manual Section ref. and para** | **Brief details of revision** | **New Revision No.** |
| 15.07.2022 | Work instructions for Nitrogen Purging | hazard 2,3 & 6 removed | 03 |
| 15.07.2022 | Work instructions for Nitrogen Purging | Activity 1& 2 | 03 |