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|  | **VEDANTA LIMITED –**  **VALUE ADDED BUSINESS** | **Format No.:** | **FRMT/MR/10** |
| **INTEGRATED MANAGEMENT SYSTEM** | **Revision Date:** | **10.07.2023** |
| **HAZARD IDENTIFICATION** | **Revision No.:** | **03** |
| **Page No.:** | **1 of 1** |

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| **Departmental Use Only** | |
| **Revision No: 01** | **Unit: PID1** |
| **Revision Date: 10.07.2023** | **Dept.: Production** |

A. Work activity information

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| **Sr.No.** | **Details** | **Remark** |
| 1) | Task being carried out, their duration and Frequency: | Ladle desulphurization (Filling of canister, opening of oxygen/ nitrogen cylinders & lowering of the lance.  10-15 minutes  12-16 times a day |
| 2) | Location (s) where the work is carried out. | Desulphurization unit |
| 3) | Who normally/occasionally carried out the task? | Company employees, contractors’ labors & supervisors. |
| 4) | Who else may be affected by the work (For example visitors, subcontractors, the public) | Visitors |
| 5) | a) Has the personnel trained for performing the task  b) Any special training required | Yes  No |
| 6) | Is the written systems of work mandatory? If yes state, the procedure no. | Yes.  VL/IMS/PID1/PROD/WI/13 |
| 7) | Is the work permit required for the task? | No |
| 8) | Plant and machinery that may be used:  Eg : crusher, conveyor, crane, heavy earthing equipment, Truck etc, | Hydraulic unit,40t crane, Ladle, Wheel loader & compressed air / Nitrogen |
| 9) | Any electrically operated hand tools are used | NIL |
| 10) | Manufacturers or supplier’s instructions for operation and maintenance plant machinery and powered hand tools are available or not: | Yes |
| 11) | Chain block, tools and shackles such as wire rope, hydraulic jack etc are used. | No |
| 12) | What materials are handled? Size, shape, surface character and weight of materials that may be handled: | Hot metal, burnt lime & nitrogen cylinder etc. |
| 13) | Is the material is required to be moved by hand. If yes Distance and heights of the place where materials have to move by hand. | NIL |
| 14) | Services used Eg: compressed air, oxygen, acetylene,  LPG gas, hydraulic oil, welding electrode for welding | Compressed air & hydraulic system |
| 15) | Physical form of substances encountered during the work (For example fume, gas, vapour, liquid, dust/powder, solid): | Liquid metal, lime powder & nitrogen gas |
| 16) | Content and recommendations of safety data sheets relating to substances used or encountered:  (This is applicable in case of chemical material) | yes |
| 17) | a) Relevant acts, regulations and standards relating to the work being done, the plant and machinery used, and the materials used or encountered:  b) Is the activity is reviewed for compliance to statutory requirement | Factory Act  Yes |
| 18) | What is the data (s) required to be monitored during the activity and the frequency of monitoring? | Nil |
| 19) | Any information available from within and outside the organization on incident, accident and ill health experience associated with the work being done, equipment and substances used: | Yes |

2. From the above activity information hazards are to be identified and recorded below using Appendix 'A' of SP/41

1. 29.07.2003, while filling the tank lime powder went into the eyes of the contractor labour
2. 06.08.2003, while closing the bottom valve of lime tank, hose came out and powder spread all around the area.
3. Burnt lime bag fell on the wheel loader bonnet
4. 25.11.2003, contractor labour found filling the lime tank without dust protection goggle
5. 20.04.2004, while desulphurization process was on hose got disconnected from the crimped end-R K Shetty
6. 22.08.2004 ladle cover of bf2 DS unit collapsed-Raviraj hoble
7. 12.10.2004, ladle cover does not have hand railings
8. 01.10.2004, backhoe damaged the overhead cable while shifting the ladle cover
9. On 03.06.05 burnt lime went into his eyes while cleaning the pipe.
10. On 13.11.2015 at around 14:50 hrs, while attending lime chocking problem at the desulphur lime conveying unit there was spillage of lime which got showered on 4 employees standing nearby. All were wearing adequate PPE's. No injury to any person.
11. On 19.01.2017 at around 10:00 hrs. While taking trial of SSG grade small splash of metal occurred after 20 minutes of the controlled pouring of hot metal into the preheated ladle containing preheated iron oxides. There was no injury.

Causes: 1. metal splashes/eruptions are occurring due to trapping of gases under slag cover

CAPA: 1. Exploring possibility to weigh the iron ore lump and feed through conveyor belt by spreading ore uniformly in the ladle and pouring hot metal by spreading uniformly.

Agitation during process will be ensured by purging air/inert gas.

1. 0n 09.07.2017, After D/S process completion, lance broke away from middle and fell down.

Causes:

1) Poor/improper refractive coating of the lance

2) Excessive mechanical force applied below lance

3) Structural damage to piping inside lance

CAPA: As an immediate corrective action, a new valve was provided above the desulphurization unit for forcefully releasing any blockage using compressed air from above

2. Periodic inspection of lances for checking sufficiency/condition of refractory material on lance

3. No persons will be allowed to clean the lance hole by positioning below the lance.

4. Structural damage issue will be taken up/informed to the supplier to take corrective and not to have joints in between.

5. Training of persons for safe operation of desulphurization unit

1. On 6/02/2020, At around 00:15 hrs. at PID 1, while doing desulphurization operation a fire observed at lance cylinder immediately Desulphurisation activity stopped & lance taken up fire extinguished by spraying water on cylinder & unit handed over to mechanical for cylinder replacement. No injury to the person.

Causes:   
Hot gases from DS process causing combustion of rubber seal of cylinder  
Root

cause:  
ID fan running indication taken on starter, not of VFD

CAPA

• Lance removal Interlock logic of DS unit to be modified, taking VFD indication along with starter indication  
•DP measuring in duct line with interlock for lance removal to be given   
• SOP and HIRA to be revised

**Hazards identified**

1. Contact with burnt lime powder
2. Pressure in the N2 line
3. Fall of lime bag
4. Fall of DS ladle cover
5. Impact on overhead cable while shifting the ladle cover
6. Electric shock
7. Contact with lime powder
8. Contact with hot metal & other accessories
9. Fall of metal jam from top
10. Human Behavior -Nonuse of PPE / WI
11. Human Behavior -Improper house keeping
12. Inadequate local lighting
13. Skin problems due to contact with burnt lime powder
14. Burns due to contact with hot metal
15. Dust generation
16. Fall of DS lance
17. Fall of a person
18. Fall of Cylinders
19. Impact with moving Machinery
20. Cutting of DS Cap sling.
21. ID Tripping during DS operation.
22. Metal Splashing During DS
23. Contact with moving ladle car
24. Fall of ladle during placing on ladle car without radio remote
25. Explosion in exhaust line of dedusting unit during DS
26. Blockages in pathways
27. High water pressure in cooling pipes of hood
28. Abnormal sound of depressurizing valve
29. High noise level in F.D. and I.D. fans.
30. Release of air pressure in hose after DS
31. Opening of powder discharge valve at tank bottom
32. Breaking of lance and falling down
33. ID fan running indication taken on starter, not of VFD

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| **Prepared By:** | **Reviewed By:** |
| **Signature:** | **Signature:** |
| **Review Date: 10.07.2023** | **Review Date: 10.07.2023** |