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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: | Dry ore addition to ladle for SSG |
| 2) | Location (s) where the work is carried out. | PCM crane bay |
| 3) | Who normally/occasionally carried out the task? | Company employees, contractors labours & 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/13B |
| 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, | Wheel loader |
| 9) | Any electrically operated hand tools are used | No |
| 10) | Manufacturers or supplier’s instructions for operation and maintenance plant machinery and powered hand tools are available or not: | No |
| 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: | Dry ore |
| 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. | Yes  2mtrs |
| 14) | Services used Eg: compressed air, oxygen, acetylene,  LPG gas, hydraulic oil, welding electrode for welding | No |
| 15) | Physical form of substances encountered during the work (For example fume, gas, vapour, liquid, dust/powder, solid): | Powder/ dry ore |
| 16) | Content and recommendations of safety data sheets relating to substances used or encountered:  (This is applicable in case of chemical material) | No |
| 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. On 10/10/2015 at 15:30hrs person responsible for cleaning jam of dedusting unit (DS Area) was standing next to hood. At that time jam weighing about 50kg which was stuck on the top of the hood fell on ground of its own. This could have hit on person if he was engaged in any activity such as removing the jam of side wall, cleaning jam of ladle hood, lance clearing, rail cleaning etc.

Causes: Accumulation of spilled metal on the DS hood.

CAPA: Exploring the possibility of engineering control to eliminate the accumulation of metal on hood.

1. On 19 Jan - During the sorel trial run today morning in BF2 there was eruption of metal and slag from the ladle due to addition of ore, resulting in mild fire at hot metal crane cable. The fire was put off. There was no injury to anyone since everybody was alerted and kept away from the ladle area in anticipation of this eruption. There was damage to BF2 hot metal crane LT pantograph cable.

Causes: 1000kg iron ore was added and hot liquid metal was poured slowly and stopped for some time so as to allow chemical reaction to subside. When crane operator again brought ladle to pour hot metal, some metal & slag from ladle got erupted vertically damaging the crane cables.

CAPA: Continue the trial run under close supervision following HIRA & SOP and alerting nearby people till process is properly established

2.Exploring possibility of installation of Hot Metal Mixer as available in integrated steel plant

1. On 6th Feb 2016-During the sorel trial run today at around 12:00hrs in BF2 there was metal splashing with a sound took place from the ladle due to addition of ore, resulting in mild fire at hot metal crane cable. The fire was put off by using fire extinguisher. There was no injury to anyone since everybody was alerted and kept away from the ladle area in anticipation of this eruption. There was damage to BF2 hot metal crane LT pantograph cable. This was happened after pouring around 12-to-15-ton metal to ladle.

Causes: Un controlled reaction in the ladle due to contact of liquid hot metal with iron ore lumps

Contributory cause: Process of special grade metal production is in trial phase and not yet established.

Risk of explosion is substantial as there is no linkage of any control measure which can confirm that there won’t be any explosions.

CAPA:

Trials to be suspended with immediate effect.

2. MOC to be reviewed and engineering controls to be established before starting next trials

3. Possibility of visiting other plants where such process is being followed to be checked.

1. On 17.03.2016 at around 17:45 hrs After metal was poured into the ladle containing GGB ore ~ (around 500 kg), the agitation was stopped after tilting & ladle was lifted for pouring. After 15min. as the pouring was about to start, mild eruption occurred resulting in metal spillage around the crane. During this the 10t hook wire rope got damaged.

Causes: Reaction was not completed.

CAPA: Production of sorrel to be review thoroughly and need to establish proper method of process.

2. Nobody should be in front of ladle area on PCM platform in anticipation of this eruption

1. On 04/08/2021 in BF1 cast house at 17:40hr, cast no 19375 for trial of ferro Silicon addition. It was added in metal runner, initially ferro silicon 4 bags Carrying 20 to 25kg each were added & when 5th bag was added there was

Mild eruption in the metal dam. Immediately Ferro silicon addition in metal

Runner was stopped.

Root cause: Temperature difference of metal and lumps

CAPA: Proper infrastructure to be developed for carrying out such activity

**Hazards identified**

1. Splashing of slag formed due to metal reaction with lumpy ore
2. Explosion inside ladle due to metal contact with very high moisture of ore
3. contact with hot Metal
4. Fall of ladle due to snapping of wire rope
5. Fall of ladle due to resting on another ladle
6. Spillage of metal due to collision of cranes
7. Spillage of hot metal due to boiling of metal
8. Spillage of metal due to overflow of ladle
9. Spillage of metal due to ladle puncture
10. Explosion due to spillage of metal
11. Explosion due to water clogging
12. Fire
13. Impact with ladle
14. Human Behaviour -Non-use of PPE
15. Nonadherence to Work instructions
16. Human Behaviour - Improper house keeping
17. Inadequate local lighting
18. heat
19. Burning due to contact of hot metal

20.Damaging of Crane due to metal explosion.

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