

| Format No: ER 5/10– F2, JOB SAFETY ANALYSIS (JSA), IB THERMAL POWER STATION, OPGC   |  |  |   |  |                               |   |              |
|---|--|--|---|--|-------------------------------|---|--------------|
| Serial No.  | Department   | Equipment                                | Location  | Job description:   |                               |   |              |
|   | Main Plant Civil   |  | Main Plant                                      | Name of the work :- "AMC for Cleaning & Housekeeping of Main Plant & CHP Area, OPGC-I" |                               |   |              |
| JSA performed by:   | Signature  | Reviewed & Approved by                   | Signature                                       | Date of Issue  | Date of revision              |   | Revision No- |
|   |  |  |   |  |                               |   |              |
| HAZARD TEXT/TYPE ( For reference to identify the Hazard type )  |  |  |   |  |                               |   |              |
| PHYSICAL HAZARDS  | PHYSICAL HAZARDS   | PHYSICAL HAZARDS                         | ELECTRICAL HAZARDS                              | CHEMICAL/ GAS  | EXCAVATION                    | OTHERS  |              |
| Noise   | Fall from height   | Force (Push/Pull)                        | Shock/ Electrocutation                          | Flammable/ Explosive substances  | Collapse/Sliding              | Fire  |              |
| Radiation   | Fall (Slip/Trip)   | Caught in/on or between                  | Static electricity                              | Inhalation of toxic fumes  | Underground live cable damage | Heavy Wind/Rain   |              |
| Confined space  | Fall down/below  | Struck by/against                        | Arcflash/ blast                                 | Ingestion/Absorption   | ERGONOMICS                    | Dust exposure   |              |
| Exposure to pressurised Steam/Air   | Fall of Objects  | Extreme weather (Hot/Cold)               | BIOLOGICAL HAZARDS                              | Body/Eye Contact   | Poor Posture                  | Oil spill   |              |
| Contact with Hot surface  | Contact with moving parts  | Poor illumination                        | Snake/Insect bite/Virus infection               | Spillage   | Repeatative motion            | Human factor  |              |
| PPEs to be used   | Safety helmet, shoe, hand gloves, earplug, dustmask, goggles.      |  |   |  |                               |   |              |
| Tools required  | Phowrah, belcha, gainti etc  |  |   |  |                               |   |              |
| <b>Important Note-</b> While deciding hazard control measures, consider hierarchy of hazard control steps in order of preference. |  |  |   |  |                               |   |              |
| SEQUENCE OF BASIC STEPS   | SAFETY, HEALTH & ENVIROMENT HAZARDS                                | SAFE JOB STEPS / HAZARD CONTROL MEASURES |   |  |                               | Are control Measures adequate to mitigate the risk (Yes/No) |              |
|   |  | Elimination/ Substitution                | Engineering                                     | Administrative   | PPE                           |   |              |
| 1) Excavation of earth manually / mechanically(JCB)   | 1) Contact with live cable/equipment may cause shock/electrocution | na                                       | White marking of the excavated area to be done. | Excavation Permit/ clearance may please be taken before starting of excavation.        | na                            | Yes   |              |
|   | 2) Fall (Slip/Trip)  | na                                       | Work site shall be cleaned properly.            | na   | na                            | Yes   |              |

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|--|--|--|---|--|---|---|
|  |  | Elimination/<br>Substitution             | Engineering                                   | Administrative   | PPE   |   |
|  | 3) Struck by/against                                     | na                                       | na  | Deploy trained and authorized workmen, operator for the Machine. One supervisor to be present to carry out the job. Signal man to be deployed along with red and green flag. | Use safety helmet, shoe, hand gloves and googles. | Yes   |
|  | 4) Poor posture  | na                                       | Work safely and take rest in between.         | na   | na  | Yes   |
|  | 5) Fall (Down/Below) after excavtion                     | na                                       | Barricade the excavted area after excavation. | na   | na  | Yes   |
|  | 6) Hand injury   | na                                       | na  | Workers shall be instructed to work carefully.   | na  | Yes   |
|  | 7) Contact with mobile equipment                         | na                                       | na  | No person is allowed to work near/ under the boom of JCB machine. Work area to be barricaded.  | na  | Yes   |
|  | 8)Traffic hazard   | na                                       | na  | Experienced opertor to be deployed. Speed limit of vehicle is 20 KM/Hr. Don't over load.   | na  | yes   |
| 2) Loading, unloading, using trolley, bobcat and tractor for disposing of ash debris to designated location. | 1) Struck by against                                     | na                                       | Be alert always, work carefully.              | Deploy authorized and trained workmen, operator for the job. One supervisor to be present to carry out the job. Signal man to be deployed along with red and green flag.     | Use safety helmet, shoe, hand gloves and googles. | yes   |
|  | 2) Poor posture during loading, unloading, trolley using | na                                       | na  | Take rest in between, avoid bad postures.  | na  | yes   |
|  | 3) Contact with mobile equipment                         | na                                       | na  | No person is allowed to work near the mobile equipment operatopn area. Work area to be barricaded.   | na  | Yes   |
|  | 4) Traffic hazard  | na                                       | na  | Experienced opertor to be deployed. Speed limit of vehicle is 20 KM/Hr. Don't over load.   | na  | yes   |

| SEQUENCE OF BASIC STEPS  | SAFETY, HEALTH & ENVIROMENT HAZARDS                                       | SAFE JOB STEPS / HAZARD CONTROL MEASURES |  |   |   | Are control Measures adequate to mitigate the risk (Yes/No) |
|--|---|--|--|---|---|---|
|  |   | Elimination/<br>Substitution             | Engineering  | Administrative  | PPE                                       |   |
| 3) Sweeping the floor and cleaning the cub webs of rooms         | Exposure to dust while cleaning   | na                                       | Sprinkle water before sweeping to minimize the dust hazard | na  | Use safety glass, dust mask & hand gloves | yes   |
| 4) Sweeping and cleaning of floor & wet moping                   | Fall (Slip/Trip)  | na                                       | na   | Use caution board "wet floor" while water washing floors to warn others   | na  | yes   |
| 5) Cleaning activities/Sanitary worksin noise pollution areas    | Exposure to dust & noise  | na                                       | na   | Use dust mask & ear plug and take rest few times in noise provided area during cleaning   | na  | yes   |
| 6) Cleaning of toilets   | Exposure to micro organisms/bacteria during cleaning or repair of toilets | na                                       | na   | Use hand gloves & wash the hand in detergent/soap after cleaning.   | na  | yes   |
| 7) Cleaning of equipments in boiler, TG and auxillaries          | Fall (Slip/Trip) due to oily surface                                      | na                                       | na   | Use hand gloves and clean the oily surface with cotton. Keep the signage at working place.  | na  | yes   |
|  | Exposure of dust & noise  | na                                       | na   | Use dust mask & ear plug  | na  | yes   |
|  | Contact with hot surface or moving parts                                  | na                                       | na   | Use all PPEs as mentioned above and barricade the area to avoid contact of body parts with any hot or moving equipments. Take PTW.                  | na  | yes   |
|  | Fall of objects from height   | na                                       | na   | Use all PPEs as mentioned above. Before execution of work under any structure or equipment, the supervisor should be look after the safety aspects. | na  | yes   |
|  | Fall from height  | na                                       | na   | Use full body harness   | na  | yes   |
|  | Exposure to hot air/water/steam/hot oil                                   | na                                       | na   | The area should be barricaded, the work should be executed in presence of supervisor.   | na  | yes   |
| 8) Cleaning of floors by Scruber , equipments inside Panel rooms | Contact with panels, Electric shock hazard, Flash blast                   | na                                       | Deployed trained workmen .                                 | Cleaning of Electrical panel rooms shall be carried out in presence of Electrical person only.  | na  | yes   |

| SEQUENCE OF BASIC STEPS  | SAFETY, HEALTH & ENVIROMENT HAZARDS | SAFE JOB STEPS / HAZARD CONTROL MEASURES  |                            |  |     | Are control Measures adequate to mitigate the risk (Yes/No) |  |  |  |  |  |  |  |  |  |  |  |
|--|-------------------------------------|---|----------------------------|--|-----|---|--|--|--|--|--|--|--|--|--|--|--|
|  |                                     | Elimination/<br>Substitution  | Engineering                | Administrative   | PPE |   |  |  |  |  |  |  |  |  |  |  |  |
| 9) Loading/unloading of Hydrogen cylinder  | Fall (Slip/Trip) & Traffic hazard   | na  | Deployed trained workmen . | Clean the working path way properly. Be active.  | na  | yes   |  |  |  |  |  |  |  |  |  |  |  |
| 10) Cutting/cleaning of grass, bush by manually/using machine                                      | Biological hazard                   | na  | Deployed trained workmen . | Work very cautiously, don't enter inside bush area without taking precautionary measures. Use a long stick to hit the bush area before enter inside. | na  | yes   |  |  |  |  |  |  |  |  |  |  |  |
| Emergency Safety Measures (Rescue/Fire Brigade etc):   |                                     | Emergency Contacts-Main Control Room- 222, 233,244, Fire- 777, 222257, Ambulance- 248/337, Hospital-666 |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
| Overall Job Risk Category- (High/Medium/Low) :   | Medium                              |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
| JSA Review during PJB:   |                                     |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
| Pre Job Briefing (PJB) is applicable to all persons involved with the task.                        |                                     |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
| Pre Job Briefing (PJB) Acknowledgement: I undertake that the JSA is communicated to me effectively |                                     |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
| Name   | Agency's name                       | Signature   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
|  |                                     |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |
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|  |                                     |   |                            |  |     |   |  |  |  |  |  |  |  |  |  |  |  |