GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 2nd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : giridhanmetal@gmail.com, CIN : U27320WB2019PTC234675

Ref No. GMPL/24-25/MoEF&CC/03

Date: 31.05.2024

To,
The IGF & Incharge
GOI, MoEF&CC,
Integrated Regional Office, Kolkata
IB-198, Salt Lake City, Sector-III
Kolkata – 700106

Ref: Ministry's EC No J-11011/366/2010-IA.II (I) dated 8th April, 2021 & amendment dated 16th January 2023.

Sub: Submission of Six Monthly Compliance Report of Environmental Clearance.

Respected Sir,

With reference to above, we are submitting herewith the six-monthly compliance report of Environmental Clearance (Period October-2023 to March-2024) of M/s Giridhan Metal Private Limited, Jamuria Industrial Estate, P.O- Nandi, P.S-Jamuria, Dist.-Paschim Bardhaman, West Bengal-713344 as per the directives of Ministry of Environment, Forest and Climate Change, Government of India. Point-wise compliance status report along with the latest environment monitoring data is enclosed for your kind perusal.

Hard copy of the report has not been sent following MoEF&CC direction vide File No. 106-12/EPE Dated 11.05.2020. Hope you will find the same in order.

Kindly acknowledge our submission.

List of annexures are given bellow:

Annexure - 1 - DFO survey report on plantation
Annexure - 2 – Some Photographs of Plantation
Annexure - 3 - Photographs of Submerged Arc Furnace
Annexure – 4 – Manual Stack Monitoring Report
Annexure – 5 - Specification of Filter Bag
Annexure - 6 - SO2, NOx reduction process
Annexure - 7 - CTE for GMPL (Expansion Project)
Annexure - 8 – Photographs of ETP
Annexure - 9 - Photographs of Garland Drain
Annexure – 10 - Photographs of Gigging Plant
Annexure - 11 - Affidavit against the observation of regional office
Annexure - 12 – Screenshot of CAAQMS & CEMS Report, connected with CPCB Server
Annexure - 12A – Manual Ambient Air report
Annexure - 13 - Fugitive Report
Annexure - 14 – Photographs of appropriate Pollution System

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Annexure – 15 - Covered canopy of raw material and product
Annexure - 16 - Photographs of SMS Pollution system
Annexure - 17 – Screenshot of OCEMS, connected with CPCB Server
Annexure - 18 - Ground water reports of Surrounding villages
Annexure - 19 - Photographs of ETP
Annexure - 20 - Noise Report
Annexure - 21, Photographs of Solar Energy
Annexure - 22 – MOU for Fly Ash, Bed Ash
Annexure - 23; GHG emission report
Annexure - 24- HIRA Report
Annexure - 25 - Heat stress report
Annexure - 26 - Health reports of worker as per Factory Act
Annexure - 27 - CER Details of GMPL
Annexure – 28 - Corporate Environment Policy
Annexure – 29 – Paper cutting of granted EC advertisement.
Annexure - 30, EC granted intimation local authority.
Annexure - 31 - LED Display for environmental parameter
Annexure - 32 – Acknowledgement of uploaded EC compliance
Annexure - 33 - Environmental Statement for 2022-23
Annexure - 34 - Commitment status on Public Hearing
Annexure - 35 - Jadavpur University Report

Thanking you.

Your sincerely,

GIRIDHAN METAL PVT. LTD. Jamuria

(Authorizes Signatory)

Giridhan Metal Private Limited

Jamuria Industrial Estate, Paschim Bardhaman, West Bengal

CC: Environmental Engineer, West Bengal Pollution Control Board, Asansol Regional Office, K.S.T.P., Dr. B. C. Roy Road, P.O.-Dhadka, Asansol – 713302

GIRIDHAN METAL PRIVATE LIMITED

JamuriaIndustrial Estate, Jaluria,Vill-Ikra&Damodarpur, Dist-PaschimBardhaman, West Bengal

Name of the Project: Expansion of Steel Plant by expanding Sponge Iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,000 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA to 30,000 TPA & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) by Giridhan Metal Private Limited at Jamuria Industrial Estate, Village-Ikra&Damodarpur, Tehsil-Jamuria, District-PaschimBardhaman, West Bengal

Clearance Letter/s No. and date: J-11011/366/2010-IA.II (I) dated 8th April, 2021& amendment dated 16th January, 2023

Period of Compliance Report: October 2023 to Mach 2024

Specific Conditions:		
Sl. No.	**Condition**	**Compliance thereof**
i)	Green belt shall be developed in 31.38 acres of land (40%) including the gap filling in the existing green belt with a tree density of 2500 trees per hectare.	The earmarked green area within the plant as per existing Environmental Clearance is 12.7 Hectares (~40% of existing plant area i.e., 31.74 Hectares). Currently, we have planted approx. 23195 no. of trees within the plant premises. The company will intensify greenbelt to the tune of 2500 no. of trees/hectare by gap plantation and additional trees (12055 No.). A joint survey was conducted by DFO & WBPCB on 02nd August 2023 and certify that total 25.74 acres (32.85%) is covered under green belt out of 78.44 acres. The joint survey report is attached herewith as **Annexure – 1.** Some photographs are also attached herewith as **Annexure - 2**
ii)	Closed type Submerged Arc Furnace with 4th hole extraction system shall be installed.	GMPL has already installed Closed Type Submerged Arc Furnace with 4th hole extraction system. Photographs are attached herewith as **Annexure – 3.**
iii)	1x350 TPD and 1x600 TPD DRI Kiln shall be installed. Remaining DRI Kilns as per existing EC accorded by MoEF&CC shall not be installed and 50 TPD DRI Kiln existing at the site shall be dismantled.	1x350 TPD and 1x600 TPD DRI Kiln has been installed as per existing EC. The 50 TPD DRI kiln has already been dismantled.
iv)	Project proponent shall meet the particulate matter emission norms in all stacks less than 30 mg/Nm^3.	GMPL has installed 5 field ESP at 350 TPD DRI, 600 TPD DRI & CFBC boiler to meet the standard norms and pulse jet bag filter at Ferro Alloys plant, SMS plant, raw materials and product handling of DRI plant. The emission reports of WBPCB as well as NABL accredited third party laboratory are within the stipulated standard norms. The test reports are attached herewith as **Annexure –4.**
V)	The Project proponent shall comply with emission norms of PM,SO_X,NO_X and Mercury for captive	GMPL is complying with the gazette notification no. S.O. 3305 (E) dated 7/12/2015.

	power plant at stipulated in the gazette notification no. S.O. 3305 (E) dated 7/12/2015.	GMPL has analyzed the emission parameters by NABL accredited laboratory & the emission results of PM, SOx, NOx and Mercury are within the standard norms. WBPCB has also taken the samples and the results are within the standard norms. The results are attached herewith as **Annexure –4.**
vi)	PP shall be prepare implement an action plan giving annual improvement targets for resource conservation and environment improvement. This plan shall be monitored by the concerned Regional office of the MoEF& CC	We have taken following performance target for the current financial year. 1. Dolomite consumption per ton of DRI will be reduced from 45 kg/ton to 40 kg/ton. 2. Reduction in Auxiliary Power Consumption from 8.5% to 8%. 3. Carbon per ton of Si-Mn production in Ferro Alloys will reduced from 400 kg/ton of Si-Mn to 380 kg/ton of Si-Mn. 4. Solar Power usage will be initiated in admin. building through 32kw.
vii)	The heat rate of coal-based power plant as specified by Central Electricity Authority shall be maintained and monitored	Coal based Power Plant has been commissioned on 20th June 2023 and it is under trial run and during this period the heat rate is around 2600 kcal/kWh which is as specified by the Central Electricity Authority
viii)	Energy efficient drives, VFD for auxiliary motors and slip power recovery system for motors above 1000 KW shall be provided.	Noted. All the motors of above 500 KW are well equipped with VFD, energy efficient drives.
ix)	PTFE Membrane bags shall be used in filter bag house and designed for 150% of normal design air flow.	Noted. GMPL has installed PTFE Membrane bags with filter bag house and designed for 150% of normal design air flow. Specification of membrane bags attached herewith as **Annexure – 5**.
x)	PP shall use ultralow NOx burner with three stage combustion, flue gas recirculation and auto combustion control system. Shall use Post combustion control system (SCR/SCNR process) with NH_3 monitoring when Ammonia is used.	GMPL has already installed De-SOx and De-NOx system in FBC boiler. M/s ISGEC Heavy Engineering, Noida has assured for the same& SO_2,NOx will be less than permissible standard. The letter for the same is attached herewith as **Annexure-6.**
xi)	Project proponent shall undertake rain water harvesting and recharge the ground water. Level monitoring indicators for online real time measurement of rain water harvesting shall be provided.	Rain water harvesting is done in plant premises and the harvested water is stored in the water storage tank for further use in the process. Recharging of ground water is not permitted in our area as per the State Pollution Control Board as per General Condition no. 5 of the Consent to Establish, which is attached as **Annexure – 7.** Since recharging is not allowed hence real time monitoring is not applicable to us.
xii)	Treated effluent shall be recycled and reused	Effluent, generated from entire plant is being treated in Effluent Treatment Plant of capacity 1540 KLD and reused inside the plant premises. The photographs of ETP is attached herewith as **Annexure – 8.**

xiii)	Air cooled condensers shall be used in CPP	As per accorded EC, 12 nos. air cooled condensers have been installed in captive power plant..
xiv)	All stockyards shall be having impervious flooring and shall be equipped with water spray system for dust suppression. Stockyards shall also have garland drains to trap the run off material.	All the stockyards are having impervious flooring and covered and the garland drains are being provided around the sheds to trap run off materials. The photograph of garland drain is attached herewith as **Annexure - 9.**
xv)	Jigging and briquetting Plant shall be installed.	Jigging plant has already been installed. Photographs of the same are attached herewith as **Annexure - 10** GMPL will not be producing Ferro Chrome; hence briquetting plant is not required.
xvi)	85-90% hot charging of billets shall be done. Balance heating can be done through RHF using LDO/FO as heating fuel.	Hot charging of billets (approx. 85-90%) is being done by GMPL, rest will be rolled through re-heating furnace.
xvii)	An affidavit shall be submitted to the Ministry as well as the regional office stating that observations made in the inspection report of Regional Office has been complied within three months from date of issue of the EC.	The affidavit has been made on 27th July 2021 stating that observations made in the inspection report of Regional Office has been complied within three months from date of issue of the EC. Copy of the same is attached as **Annexure-11.**

General Conditions

I. Statutory compliance

Sl No.	Condition	Compliance thereof
i)	The Environment Clearance (EC) granted to the project/activity is strictly under the provisions of EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount construe to approvals/consent/ permissions etc., required to be obtained or standards/conditions to be followed under any other Acts/Rules/Subordinate legislations, etc., as may be applicable to the project.	Noted

II. Air quality monitoring and preservation

i)	The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission as well as Continuous Ambient Air Quality Station (CAAQS) for monitoring AAQ parameters with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time. The CEMS and CAAQMS shall be connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognized under Environment (protection) Act, 1986 and NABL accredited	We have installed 24x7 continuous emission monitoring system at process stacks to monitor stack emission. CAAQMS, has also been installed. The CEMS and CAAQMS have been connected to CPCB online server and links have been sent to SPCB. The screenshot is attached herewith as **Annexure – 12**. GMPL have considered 3 sites for manual Ambient Air Quality Monitoring covering 120° of the plant premises

	laboratories as revised CPCB guidelines dated August, 2018 REV 01.	by NABL accredited laboratory and the results are attached herewith as **Annexure – 12A.**
ii)	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through laboratories recognized under Environment (Protection) Act, 1986 or NABL, accredited laboratories.	GMPL have been monitoring the fugitive emission on quarterly basis by NABL accredited & WBPCB recognized laboratory. The reports are attached herewith as **Annexure – 13.**
iii)	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating point including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards	GMPL has provided appropriate air pollution control systems in all the dust generating points to comply the stack emission and fugitive emission standard. 1. The 350 TPD& 600 TPD DRI is well equipped with 5-fields ESP. 2. The boiler is well equipped with 5-field ESP. 3. Ferro Alloy plant is well equipped with modern & pulse jet type, PTFE membrane filter. 4. Cooler discharge, surge bin, product separation area, product house area and every junction of DRI unit is well equipped with bag filter to control fugitive emissions. 5. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. 6. Primary as well as secondary suction hoods are installed and connected with modern & pulse jet type, PTFE membrane filter bag for steel smelting shop. Photographs of APC systems are attached herewith as **Annexure – 14.**
iv)	The project proponent shall provided leakage detection and mechanized bag cleaning facilities for better operation bag houses.	Mechanized bag cleaning facilities with Purging facility is being adopted for better operation of bag houses. Also, GMPL is adopting TPM (Autonomous Maintenance) in all pollution equipment.
v)	Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/ agglomeration.	As of now, GMPL has been using iron ore pellet as a raw material for 350 TPD & 600 TPD DRI, so no iron ore fines are being generated. Coal and coke fines dust collected in pollution control devices are being reused in CPP.
vi)	The project proponent shall ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation.	The entire conveyors (raw materials & products) are covered by canopy and transportation of raw materials & products are also being done in fully covered conditions to prevent spillage and fugitive dust generation. Photographs of covered conveyors are attached herewith as **Annexure - 15**
vii)	The project proponent shall provide primary and secondary fume extraction system at all melting furnaces.	Steel Melting Shop is well connected with primary and secondary fume extraction system. Photographs showing primary & secondary extraction system are attached herewith as **Annexure – 16.**
viii)	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.	Wind shelter fence, chemical spraying are not applicable. The entire raw material stock piles have been kept inside covered sheds.

ix)	Design the ventilation system for adequate air changes as per prevailing norms for all tunnels, motor houses, Oil Cellars	GMPL does not have any tunnels, motor houses & Oil Cellars, hence, ventilation systems for adequate air changes are not required.
III.	**Water quality monitoring and preservation**	
i)	The proponent shall install 24×7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 (G.S.R. 414 (E) Dated 30th May 2008;S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plants) as amended from time to time) and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	We have installed 24x7 continuous effluent monitoring system. The treated effluent shall be recycled and reused. The continuous effluent monitoring system is well connected with CPCB server and the link has shared with the SPCB. The screenshot of CPCB connectivity data are attached herewith as **Annexure – 17.**
ii)	The project proponent shall monitoring regularly ground water quality at least twice a year (pre- and post-monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	GMPL is monitoring regularly ground water quality twice a year (pre- and post-monsoon) in adjacent villages. Latest test results of groundwater monitoring in surrounding villages for December 2023 are attached herewith as **Annexure –18.**
iii)	Sewage Treatment Plant shall be provided for treatment of domestic waste water to meet the prescribed standards.	One STP (100 KLD) for treatment of domestic wastewater has been installed in hostel building and inside plant premises domestic wastewater is treated in soak pits. However, GMPL will install a 200 KLD STP in the plant premises shortly.
iv)	The project proponent shall provide the ETP for effluents of rolling mills to meet the standards prescribed in G.S.R 277(E) 31st March 2012 (applicable to IF.EAF) as amended from time to time	ETP has been installed and treated water is being reused. The treated water meets the prescribed standard. The screenshot is attached herewith as **Annexure - 19**
IV.	**Noise monitoring and preservation**	
I)	Noise pollution shall be monitored as per the prescribed noise pollution (Regulation and Control) Rules, 2000 and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	Noise level monitoring is being carried out on quarterly basis by NABL accredited laboratory. The latest test reports are attached herewith as **Annexure –20.**
V.	**Energy Conservation measures**	
i)	Energy conservation measures may be adopted such as adoption of solar energy and provision of LED light etc., to minimize the energy consumption.	The company is committed to maximize energy conservation measures to minimize energy consumption. For the same, GMPL has installed Solar Power of 32 KW on rooftop of administrative building and another 250 KW installation is in progress. Photographs are attached herewith as **Annexure – 21**.

		LED lights have been provided in entire plant area including buildings & offices.
VI.	**Waste management**	
i)	Used refractories shall be recycled as far as possible.	Till now no refractories are being generated in plant and the same shall be complied if generated.
ii)	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.	The fly ash generated from CFBC boiler will be used sent to nearby cement and bricks manufacturing plant. GMPL has done MoU with fly ash bricks manufacturers like M/s Shree Swastick Industries, M/s Sri OM Industries, M/s Damodar Ispat Ltd. etc. The copies of MoUs are attached herewith as **Annexure –22.**
iii)	Dolochar generated from DRI kiln shall be used for power generation.	Dolochar generated from DRI kiln shall be used in CFBC boiler as fuel along with coal for power generation in future after being operational.
iv)	Oily scum and metallic sludge recovered from rolling mills ETP shall be mixed, dried, and briquetted and reused in melting Furnaces.	Oily scum and metallic sludge recovered from rolling mills ETP is being mixed, dried, and reused in melting Furnaces.
v)	Kitchen waste shall be composted or converted to biogas for further use.	Kitchen waste generated from plant premises is being converted to biogas through 100kg biogas plant.
VII.	**Green Belt**	
i)	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration by trees.	GHG emissions inventory and its reduction programme including carbon sequestration by trees for the existing plant has been carried out. The report is attached herewith as **Annexure - 23**
VIII.	**Public hearing and Human health issues**	
i)	Emergency preparedness plan based on the Hazard Identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Hazard Identification and Risk Assessment (HIRA) and Disaster Management Plan are being implemented. HIRA with DMP is attached herewith as **Annexure-24**.
ii)	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	Heat stress analysis has been done and the reports are attached herewith as **Annexure – 25.**
iii)	Occupational health surveillance of the workers shall be done on a regular basis and records maintained.	Occupational health surveillance of the workers is being done and records maintained as per Factory Act. Sample report of employee is attached herewith as **Annexure – 26.**
IX.	**Corporate Environment Responsibility**	
i)	The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 30/09/2020.	The company has spent Rs. 372.98 lacs towards CER activities out of Rs. 436.25 lacs. The balance amount shall be spent shortly. The details of the expenditure has been attached as **Annexure – 27.**
ii)	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should	GMPL has a well laid down environmental policy duly approved by the Board of Directors. The policy is attached herewith as **Annexure-28.**

	prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringement/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/ violation of the environmental/ forest/ wildlife norms/ conditions and/ or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	
iii)	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of control of senior Executive, who will report directly to the head of the organization.	A separate Environmental Cell has been prepared at the project and company head quarter level with qualified personnel, headed by director of the company.
X.	**Miscellaneous**	
i)	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it in at least two local newspapers of the District of State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.	M/s Giridhan Metal Private Limited has advertised public notice regarding Environment Clearance on 28th April 2021 in two local newspapers "EiSamay" (vernacular language-Bengali) and "Prabhat Khabar" (Hindi). The scanned copies of newspaper are attached herewith as **Annexure –29.** The Environment Clearance has also been uploaded in company's website – https://www.giridhanmetal.com
ii)	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	The copy of environmental clearance has been submitted to Heads of local bodies of "Asansol Municipal Corporation" and "Asansol Durgapur Development Authority". The letter with speed post documents are attached herewith as **Annexure – 30.**
iii)	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	Complied
iv)	The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NOx (ambient level as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	The Digital Board has been installed and the Photo of the same has been attached as **Annexure – 31.**
v)	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on website of ministry of Environment, Forest and Climate Change at environment clearance portal.	The six-monthly reports on the status of the compliance of the stipulated environmental conditions on website of Ministry of Environment, Forest & Climate Change has been uploaded on 22nd July 2023 and 01st December 2023 respectively.

		The copy of acknowledgement is attached herewith as **Annexure – 32.**
vi)	The project proponent shall submit the environment statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	GMPL has submitted the environment statement to State Pollution Control Board for 2022-23 FY. The environment statement is also putted on company's website https://www.giridhanmetal.com. The environment statement attached herewith as **Annexure – 33.**
vii)	The project proponent shall inform the Regional Office as well as Ministry, the date of financial closure and final approval of the project by the concern authorities, commencing the land development work and start of production operation by the project.	The date of financial closure was 21st December 2021.
viii)	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	The commitments made during Public Hearing and its compliances are attached herewith as **Annexure – 34.**
ix)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change (MoEF&CC).	We had already informed during inspection that the construction in the western side was started for railway siding with wagon tippler after getting the EC and CTE, later on the Railway authorities did not given permission due to technical constraints and subsequently amendment in EC has been done. The MoEFCC along with IRO-Bhubaneswar and WBPCB have also visited the site and asked for a factual report from IIT/NIT or any reputed Govt. body regarding the construction activities. The company has obtained a review report from Jadavpur University, Kolkata regarding the above said construction and as per report, the old partial construction (now stated to be abandoned) was intended for railway siding with wagon tippler only. The old partial construction can be converted to 2x900 TPD DRI units based on suggested modifications as provided by engineering consultant. It is also noted in review report that the construction work of one shed for storage of coke/coal and extension of TG building were due to safety of man and machines as well as improve the mobility of heavy vehicles for charging of coal/coke. The review report is enclosed as **Annexure - 35**
x)	Concealing factual data or submission of false/fabricated data may result in revocation of	Agreed

	this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	
xi)	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Agreed
xii)	The Ministry reserves the right to stipulate addition conditions if found necessary. The company in the time bound manner shall implement these conditions.	Agreed
xiii)	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing data/ information/ monitoring reports.	Agreed & complied
xiv)	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010	Agreed

JOINT SURVEY REPORT OF GREEN COVER AREA IN THE PREMISES OF M/s GIRIDHAN METAL PRIVATE LIMITED, JAMURIA INDUSTRIAL ESTATE, VILL.-IKRA & DAMODORPUR, P.S.-JAMURIA, DIST.-PASCHIM BARDHAMAN, WEST BENGAL-713344

REFERENCE-DFO's Letter No. 2301/2-50(A) dated31/07/2023

With the following members from Forest Department, West Bengal Pollution Control Board and representative of Giridhan Metal Private Limited at Jamuria Industrial Estate, Vill. - Ikra & Damodarpur, P.S.- Jamuria, Dist.- Paschim Bardhaman- 713344 conducted joint survey for the green cover after thorough verification of whole area.

After GPS survey it was found that 104165 Sq.m. (32.82%) area is green covered out of 317406 Sq.m. land in and around factory premises.

Extra tree plantation is going on inside & outside of the plant premises. There have some areas for improvement for plantation along the road side (which has already earmarked by the company) in the campus of Giridhan Metal Private Limited at Jamuria Industrial Estate, Vill. – Ikra & Damodarpur, P.S.- Jamuria, Dist.- Paschim Bardhaman- 713344.

The following members are actively participating the survey of green cover area.

Sl. No.	Name	Designation	Signature with Seal
1	Mr Sanjay Pati	Range Officer, Asansol (T) Range	02/08/23 Forest Range Officer Asansol (T) Range
2	Mr Anik Barman	Assistant Environmental Engineer	West Bengal Pollution Control Board Asansol Regional Office Kalyanpur Satellite Township Project Dr. S.C. Roy Road, P.O. Dakshin Dr... Asansol-713302, Dist. Paschim Bar...
3	Mr Sanjay Agarwal	Director, Giridhan Metal Pvt. Ltd.	For Giridhan Metal Pvt. Ltd. Director 02/08/23

Measurement Sheet

Area inside the Giridhan Metal Private Limited:

Sl. No.	Patch Description	Local Name of the Spices	Height of the Spices (m)	Total Area (Sq.m)	GPS Coordinate
1	Ferro Office Area	Mahogany Neem Sonajhuri Sirish Chatim Green buttonwood Jarul	4-5 ft 4-5 ft 3-4 ft 3-4 ft 4-5 ft 8-10 ft 4-5 ft	1675.75	23°41'46.11"N 87° 5'50.51"E 23°41'46.13"N 87° 5'51.16"E 23°41'45.81"N 87° 5'51.12"E 23°41'45.83"N 87° 5'49.63"E 23°41'45.97"N 87° 5'49.38"E 23°41'46.24"N 87° 5'49.28"E 23°41'47.81"N 87° 5'49.18"E 23°41'48.94"N 87° 5'49.24"E 23°41'49.01"N 87° 5'49.62"E 23°41'47.99"N 87° 5'49.63"E 23°41'47.94"N 87° 5'49.44"E 23°41'47.69"N 87° 5'49.43"E 23°41'47.67"N 87° 5'49.65"E 23°41'46.88"N 87° 5'49.60"E 23°41'46.47"N 87° 5'49.65"E 23°41'46.41"N 87° 5'50.53"E
2	Ferro Division Cooling Tower and Chimney area	Sonajhuri Sirish Green buttonwood Mahogony Karanj	4-5 ft 3-4 ft 8-10 ft 4-5 ft 4-5 ft	1644.24	23°41'47.98"N 87° 5'49.96"E 23°41'47.99"N 87° 5'50.28"E 23°41'48.34"N 87° 5'50.30"E 23°41'48.61"N 87° 5'50.39"E 23°41'48.63"N 87° 5'51.36"E 23°41'48.87"N 87° 5'51.40"E 23°41'48.85"N 87° 5'50.78"E 23°41'48.96"N 87° 5'50.61"E 23°41'49.03"N 87° 5'50.62"E 23°41'49.11"N 87° 5'50.68"E 23°41'49.26"N 87° 5'50.73"E 23°41'49.26"N 87° 5'50.99"E 23°41'49.17"N 87° 5'51.02"E 23°41'49.20"N 87° 5'51.20"E 23°41'49.32"N 87° 5'51.18"E 23°41'49.18"N 87° 5'51.37"E 23°41'49.13"N 87° 5'51.51"E 23°41'49.13"N 87° 5'51.65"E 23°41'49.13"N 87° 5'51.94"E 23°41'49.45"N 87° 5'51.89"E 23°41'49.46"N 87° 5'52.26"E 23°41'49.15"N 87° 5'52.30"E

					23°41'49.16"N 87° 5'52.44"E
					23°41'48.91"N 87° 5'52.45"E
					23°41'48.98"N 87° 5'52.94"E
					23°41'49.32"N 87° 5'52.92"E
					23°41'49.67"N 87° 5'52.83"E
					23°41'49.57"N 87° 5'50.63"E
					23°41'49.48"N 87° 5'50.25"E
					23°41'49.17"N 87° 5'50.10"E
					23°41'48.70"N 87° 5'50.04"E
					23°41'48.31"N 87° 5'50.02"E
					23°41'48.29"N 87° 5'49.96"E
3	CPP Reservoir Area	Mahogany Sonajhuri Bakul Sirish Sishu Chatim Green buttonwood	4-5 ft 5-6 ft 4-5 ft 5-6 ft 5-6 ft 5-6 ft 8-10 ft	4384.72	23°41'44.07"N 87° 5'49.04"E
					23°41'44.15"N 87° 5'51.73"E
					23°41'42.86"N 87° 5'51.75"E
					23°41'42.86"N 87° 5'51.38"E
					23°41'43.72"N 87° 5'51.33"E
					23°41'43.77"N 87° 5'50.21"E
					23°41'43.53"N 87° 5'50.22"E
					23°41'43.53"N 87° 5'51.17"E
					23°41'42.81"N 87° 5'51.17"E
					23°41'42.83"N 87° 5'51.75"E
					23°41'41.89"N 87° 5'51.77"E
					23°41'41.92"N 87° 5'51.54"E
					23°41'41.91"N 87° 5'51.21"E
					23°41'41.79"N 87° 5'50.72"E
					23°41'41.79"N 87° 5'50.19"E
					23°41'41.92"N 87° 5'48.86"E
					23°41'41.90"N 87° 5'48.20"E
					23°41'42.03"N 87° 5'47.40"E
					23°41'42.01"N 87° 5'48.59"E
					23°41'42.43"N 87° 5'48.60"E
					23°41'42.44"N 87° 5'48.79"E
					23°41'43.65"N 87° 5'48.77"E
					23°41'43.68"N 87° 5'49.04"E
					23°41'42.02"N 87° 5'49.05"E
					23°41'42.02"N 87° 5'49.45"E
					23°41'42.07"N 87° 5'49.83"E
					23°41'43.74"N 87° 5'49.83"E
					23°41'43.71"N 87° 5'48.92"E
4	CPP DM Plant Area	Mahogany Sonajhuri Chatim Green buttonwood	5-6 ft 3-4 ft 5-6 ft 8-10 ft	256.92	23°41'43.36"N 87° 5'46.90"E
					23°41'43.35"N 87° 5'47.14"E
					23°41'42.08"N 87° 5'47.12"E
					23°41'42.09"N 87° 5'47.02"E
					23°41'42.08"N 87° 5'46.92"E

					23°41'42.71"N 87° 5'46.90"E
5	CPP DM Plant Area near CPP Reservoir	Mahogany Green buttonwood	5-6 ft 10-12 ft	338.78	23°41'42.41"N 87° 5'47.94"E 23°41'42.42"N 87° 5'48.57"E 23°41'43.31"N 87° 5'48.53"E 23°41'43.27"N 87° 5'48.16"E 23°41'42.67"N 87° 5'48.18"E 23°41'42.65"N 87° 5'47.96"E
6	CPP Office Artea	Mahogany Sirish Chatim	5-6 ft 3-4 ft 5-6 ft	693.13	23°41'45.80"N 87° 5'46.90"E 23°41'45.72"N 87° 5'47.28"E 23°41'43.56"N 87° 5'47.21"E 23°41'43.60"N 87° 5'46.87"E
7	Infront of CPP DM Plant Office	Green buttonwood Sirish Debdaru	8-10 ft 4-5 ft 5-6 ft	565.21	23°41'42.69"N 87° 5'45.36"E 23°41'42.70"N 87° 5'46.46"E 23°41'42.53"N 87° 5'46.66"E 23°41'42.33"N 87° 5'46.73"E 23°41'41.86"N 87° 5'45.72"E 23°41'42.00"N 87° 5'46.71"E 23°41'42.10"N 87° 5'46.57"E 23°41'42.14"N 87° 5'46.04"E 23°41'42.22"N 87° 5'45.71"E 23°41'42.37"N 87° 5'45.70"E 23°41'42.34"N 87° 5'45.51"E 23°41'42.48"N 87° 5'45.49"E 23°41'42.48"N 87° 5'45.37"E
8	WHRB Chimney Area	Sonajhuri Jarul Karanj Green buttonwood Sishu Chatim	5-6 ft 5-6 ft 5-6 ft 8-10 ft 6-8ft 5-6ft	1350.08	23°41'43.22"N 87° 5'45.07"E 23°41'42.85"N 87° 5'45.05"E 23°41'42.84"N 87° 5'44.29"E 23°41'42.92"N 87° 5'44.03"E 23°41'42.85"N 87° 5'43.78"E 23°41'42.85"N 87° 5'43.07"E 23°41'42.98"N 87° 5'42.93"E 23°41'44.10"N 87° 5'42.93"E 23°41'44.04"N 87° 5'43.26"E 23°41'43.25"N 87° 5'43.25"E 23°41'43.25"N 87° 5'43.58"E 23°41'44.02"N 87° 5'43.57"E 23°41'44.02"N 87° 5'43.86"E 23°41'43.28"N 87° 5'43.86"E 23°41'43.28"N 87° 5'44.31"E 23°41'44.02"N 87° 5'44.30"E 23°41'44.01"N 87° 5'44.62"E
9	SMS Pump House Area	Green buttonwood	8-9ft	475.2	23°41'43.93"N 87° 5'51.82"E 23°41'44.00"N 87° 5'52.02"E 23°41'43.00"N 87° 5'52.02"E 23°41'43.00"N 87° 5'52.25"E

					23°41'42.01"N 87° 5'52.20"E
					23°41'41.99"N 87° 5'51.86"E
10	SMS Chimney Area	Sonajhuri Green buttonwood	6-7ft 8-9ft	545.17	23°41'45.28"N 87° 5'51.68"E
					23°41'45.29"N 87° 5'51.94"E
					23°41'45.19"N 87° 5'51.98"E
					23°41'45.14"N 87° 5'52.02"E
					23°41'45.10"N 87° 5'52.09"E
					23°41'45.12"N 87° 5'52.17"E
					23°41'45.19"N 87° 5'52.24"E
					23°41'45.23"N 87° 5'52.26"E
					23°41'45.22"N 87° 5'52.61"E
					23°41'45.03"N 87° 5'52.60"E
					23°41'45.02"N 87° 5'52.77"E
					23°41'44.59"N 87° 5'52.78"E
					23°41'44.60"N 87° 5'51.75"E
11	CFBC Chimney Area	Green buttonwood Neem Chatim	12-13ft 6-7ft 6-7ft	769.37	23°41'44.98"N 87° 5'45.12"E
					23°41'44.96"N 87° 5'45.91"E
					23°41'45.26"N 87° 5'45.90"E
					23°41'45.44"N 87° 5'45.90"E
					23°41'45.45"N 87° 5'46.01"E
					23°41'45.91"N 87° 5'46.00"E
					23°41'45.90"N 87° 5'45.93"E
					23°41'46.14"N 87° 5'45.93"E
					23°41'46.21"N 87° 5'45.83"E
					23°41'46.33"N 87° 5'45.82"E
					23°41'46.44"N 87° 5'45.94"E
					23°41'46.47"N 87° 5'45.14"E
					23°41'45.93"N 87° 5'45.14"E
					23°41'45.92"N 87° 5'45.65"E
					23°41'45.34"N 87° 5'45.62"E
					23°41'45.32"N 87° 5'45.12"E
12	Central Store Area	Green buttonwood Sonajhuri Chatim Golmohor Neem Jarul	7-8ft 5-6ft 6-7ft 8-10ft 6-7ft 4-5ft	1618.12	23°41'46.59"N 87° 5'45.13"E
					23°41'46.59"N 87° 5'45.53"E
					23°41'46.79"N 87° 5'45.52"E
					23°41'46.78"N 87° 5'45.32"E
					23°41'49.15"N 87° 5'45.33"E
					23°41'49.17"N 87° 5'45.76"E
					23°41'48.99"N 87° 5'45.89"E
					23°41'48.88"N 87° 5'46.08"E
					23°41'49.02"N 87° 5'46.26"E
					23°41'49.33"N 87° 5'46.30"E
					23°41'50.14"N 87° 5'45.94"E
					23°41'50.30"N 87° 5'45.71"E
					23°41'50.38"N 87° 5'45.43"E
					23°41'50.29"N 87° 5'45.25"E

					23°41'50.22"N 87° 5'45.08"E
13	Central Store Area near CPP Conveyor Belt	Green buttonwood Sonajhuri Chatim	8-10ft 4-5ft 6-7ft	813.12	23°41'46.83"N 87° 5'45.98"E 23°41'46.81"N 87° 5'46.34"E 23°41'46.96"N 87° 5'46.44"E 23°41'47.08"N 87° 5'46.59"E 23°41'48.26"N 87° 5'46.64"E 23°41'48.30"N 87° 5'46.34"E 23°41'48.52"N 87° 5'46.21"E 23°41'48.68"N 87° 5'46.18"E 23°41'48.67"N 87° 5'46.07"E
14	CPP Coal Crusher Area	Mahogany Neem Sonajhuri Sirish Chatim Green buttonwood Jarul Sishu Peepal Kadam	5-6ft 7-8ft 7-9ft 4-5ft 6-7ft 8-9ft 5-6ft 6-7ft 4-5ft 6-7ft	2392.12	23°41'50.58"N 87° 5'45.20"E 23°41'50.57"N 87° 5'45.60"E 23°41'50.47"N 87° 5'45.83"E 23°41'50.27"N 87° 5'46.10"E 23°41'50.01"N 87° 5'46.27"E 23°41'49.80"N 87° 5'46.27"E 23°41'49.78"N 87° 5'46.40"E 23°41'49.60"N 87° 5'46.38"E 23°41'49.59"N 87° 5'46.59"E 23°41'49.71"N 87° 5'46.64"E 23°41'49.73"N 87° 5'46.79"E 23°41'49.66"N 87° 5'46.99"E 23°41'49.47"N 87° 5'47.03"E 23°41'49.52"N 87° 5'47.39"E 23°41'51.41"N 87° 5'47.41"E 23°41'51.47"N 87° 5'47.12"E 23°41'51.32"N 87° 5'46.90"E 23°41'51.09"N 87° 5'46.89"E 23°41'51.18"N 87° 5'46.51"E 23°41'51.18"N 87° 5'46.38"E 23°41'51.30"N 87° 5'46.25"E 23°41'51.19"N 87° 5'46.04"E 23°41'51.20"N 87° 5'45.92"E 23°41'51.33"N 87° 5'45.57"E 23°41'51.40"N 87° 5'45.25"E 23°41'51.14"N 87° 5'45.32"E
15	DRI Product House Area	Chatim Green buttonwood Neem Arjun Bakul	4-5ft 9-10ft 6-8ft 4-5ft 6-7ft	1593.57	23°41'54.85"N 87° 5'45.94"E 23°41'54.16"N 87° 5'45.91"E 23°41'54.14"N 87° 5'46.76"E 23°41'54.40"N 87° 5'46.79"E 23°41'54.41"N 87° 5'47.46"E 23°41'53.30"N 87° 5'47.36"E 23°41'53.30"N 87° 5'48.03"E 23°41'54.65"N 87° 5'48.17"E 23°41'54.77"N 87° 5'47.69"E

16	New Canteen Area	Green buttonwood Sirish Neem Sonajhri Gulmohor Mahogany	7-8ft 6-7ft 5-6ft 5-6ft 7-8ft 4-6ft	699.77	23°41'55.46"N 87° 5'48.22"E 23°41'54.99"N 87° 5'48.22"E 23°41'55.02"N 87° 5'49.14"E 23°41'54.64"N 87° 5'49.11"E 23°41'54.67"N 87° 5'48.45"E 23°41'54.80"N 87° 5'48.30"E 23°41'54.90"N 87° 5'47.93"E 23°41'55.47"N 87° 5'47.80"E
17	Near DRI Product Seperation House	Green buttonwood Neem Sonajhri Gulmohor Arjun Kadam	9-10ft 6-7ft 7-8ft 6-7ft 4-5ft 5-6ft	794.02	23°41'54.23"N 87° 5'45.15"E 23°41'52.44"N 87° 5'45.23"E 23°41'51.48"N 87° 5'45.35"E 23°41'51.44"N 87° 5'45.63"E 23°41'52.62"N 87° 5'45.55"E 23°41'52.74"N 87° 5'45.66"E 23°41'52.94"N 87° 5'45.65"E 23°41'53.27"N 87° 5'45.53"E 23°41'54.27"N 87° 5'45.51"E
18	Near pellet Yard Weigh Bridge	Bakul Green buttonwood	7-8ft 5-6ft	932.59	23°41'54.90"N 87° 5'40.87"E 23°41'55.33"N 87° 5'40.74"E 23°41'55.39"N 87° 5'43.26"E 23°41'54.96"N 87° 5'43.23"E
19	Near Ferro Raw Material Yard	Green buttonwood	8-9ft	452.08	23°41'51.76"N 87° 5'49.84"E 23°41'51.76"N 87° 5'52.27"E 23°41'51.55"N 87° 5'52.25"E 23°41'51.55"N 87° 5'49.89"E
20	Near Ferro Weigh Bridge Area	Sirish Green bottonwood	3-4ft 6-7ft	178.09	23°41'49.82"N 87° 5'50.58"E 23°41'49.68"N 87° 5'50.59"E 23°41'49.75"N 87° 5'52.28"E 23°41'49.87"N 87° 5'52.26"E
21	DRI Daybin Area	Sonajhuri Sirish Sishu Kadam Green Bottowood Gulmohor Neem Mahogony	4-5ft 5-6ft 6-7ft 5-6ft 9-10ft 7-8ft 6-7ft 4-5ft	2330.3	23°41'52.06"N 87° 5'42.57"E 23°41'52.10"N 87° 5'42.87"E 23°41'54.45"N 87° 5'42.92"E 23°41'54.48"N 87° 5'43.27"E 23°41'53.29"N 87° 5'43.28"E 23°41'53.24"N 87° 5'43.58"E 23°41'54.53"N 87° 5'43.53"E 23°41'54.55"N 87° 5'44.34"E 23°41'54.09"N 87° 5'44.28"E 23°41'54.10"N 87° 5'44.53"E 23°41'52.94"N 87° 5'44.51"E 23°41'52.87"N 87° 5'44.55"E 23°41'52.86"N87° 5'44.95"E 23°41'53.98"N 87° 5'45.01"E 23°41'54.89"N 87° 5'44.69"E 23°41'54.93"N 87° 5'43.96"E

					23°41'54.77"N 87° 5'43.33"E
					23°41'54.68"N 87° 5'42.53"E
22	Near Batching Plant	Sonajhuri Kadam Sirish Sishu Segun Kadam Green Bottowood Gulmohor Neem Mahogony	5-6ft 5-6ft 5-6ft 5-6ft 5-6ft 5-6ft 5-6ft 5-6ft 5-6ft 5-6ft	1479.02	23°41'44.22"N 87° 5'37.55"E 23°41'44.91"N 87° 5'38.16"E 23°41'46.31"N 87° 5'37.09"E 23°41'45.54"N 87° 5'36.42"E
23	Near Old Central Store	Green Bottowood Arjun Sonajhuri Sirish Sishu Neem Jarul Kadam	9-11ft 4-5ft 4-5ft 4-5ft 4-5ft 4-5ft 4-5ft 4-5ft	7089.72	23°41'54.06"N 87° 5'39.39"E 23°41'54.35"N 87° 5'40.81"E 23°41'52.01"N 87° 5'40.64"E 23°41'52.04"N 87° 5'41.01"E 23°41'50.28"N 87° 5'40.89"E 23°41'50.23"N 87° 5'39.74"E 23°41'47.62"N 87° 5'39.75"E 23°41'44.88"N 87° 5'39.81"E 23°41'44.91"N 87° 5'39.35"E 23°41'49.35"N 87° 5'39.34"E
24	Near Coal Shed Area	Green Bottowood Arjun Sonajhuri Segun	8-9ft 4-5ft 4-5ft 4-5ft	1018.13	23°41'52.41"N 87° 5'36.32"E 23°41'53.13"N 87° 5'36.63"E 23°41'52.94"N 87° 5'37.00"E 23°41'52.46"N 87° 5'36.80"E 23°41'50.47"N 87° 5'36.69"E 23°41'50.53"N 87° 5'36.29"E
25	Old HR/Admin Office Area	Mango Kajubadam Sishu Green Bottonwood krishnachura	6-7ft 14-16ft 6-7ft 9-10ft 7-8ft	1787.42	23°41'50.59"N 87° 5'37.18"E 23°41'50.53"N 87° 5'37.45"E 23°41'47.98"N 87° 5'37.44"E 23°41'47.93"N 87° 5'37.64"E 23°41'47.77"N 87° 5'37.66"E 23°41'47.70"N 87° 5'37.83"E 23°41'47.53"N 87° 5'37.92"E 23°41'47.44"N 87° 5'37.16"E 23°41'47.22"N 87° 5'37.08"E 23°41'46.96"N 87° 5'37.16"E 23°41'47.05"N 87° 5'37.47"E 23°41'47.20"N 87° 5'37.43"E 23°41'47.18"N 87° 5'37.80"E 23°41'47.20"N 87° 5'38.60"E 23°41'46.83"N 87° 5'38.75"E 23°41'46.75"N 87° 5'38.19"E 23°41'46.50"N 87° 5'37.46"E 23°41'46.44"N 87° 5'36.87"E

					23°41'47.32"N 87° 5'37.02"E
					23°41'47.88"N 87° 5'37.19"E
					23°41'48.21"N 87° 5'37.08"E
					23°41'48.27"N 87° 5'36.86"E
					23°41'48.30"N 87° 5'36.51"E
					23°41'48.50"N 87° 5'36.77"E
					23°41'48.64"N 87° 5'37.23"E
26	Between Cooler Discharge & Daybin of DRI under Conveyor Belt	Green Bottonwood Sonajhuri Neem Jarul	8-10ft 6-7ft 6-7ft 6-7ft	1306.86	23°41'52.45"N 87° 5'43.62"E
					23°41'52.43"N 87° 5'44.48"E
					23°41'50.70"N 87° 5'44.40"E
					23°41'50.72"N 87° 5'43.54"E
27	In front of New Admin Office	Green Bottowood Bakul Sonajhuri Golmohor	11-12ft 6-7ft 5-6ft 12-13ft	535.8	23°41'41.06"N 87° 6'0.64"E
					23°41'41.54"N 87° 6'0.10"E
					23°41'42.07"N 87° 6'0.08"E
					23°41'42.07"N 87° 6'0.67"E
					23°41'41.05"N 87° 6'0.68"E
					23°41'40.86"N 87° 6'0.56"E
					23°41'40.84"N 87° 6'1.08"E
					23°41'41.34"N 87° 6'1.07"E
					23°41'41.62"N 87° 6'0.91"E
					23°41'41.65"N 87° 6'0.80"E
					23°41'42.19"N 87° 6'0.84"E
					23°41'42.21"N 87° 5'59.90"E
					23°41'41.55"N 87° 5'59.93"E
28	GMPL 1beside admin office 3536sqm n23°41.729' e87°06.007'.kml	Golmohor Mango Sonajhuri Sishu Green Bottowood Kajubadam Bakul	15-35 ft	3536	23°41.729'N 87°06.007'E
29	GMPL 3 between admin office to hanuman temle 5863sqm n23°41.821'e87°06.002'.kml	Sirish Arjun Neem Sonajhuri Sishu Green Bottowood Jarul Kadam	20-40 ft	5863	23°41.821'N 87°06.002'E

30	GMPL 4 near water body 4285sqm n23°41.922' e87°05.969'.kml	Sirish Neem Sonajhri Mahogany Gulmohor Green buttonwood	20-50 ft	4285	23°41.922'N 87°05.969'E
31	GMPL 5 near water body 7285sqm n23°41.961' e87°05.988'.kml	Green buttonwood Neem Sonajhri Gulmohor Arjun Kadam	15-35 ft	7285	23°41.961'N 87°05.988'E
32	GMPL 6 near central canteen 10048sqm n23°41.929' e87°05.858'.kml	Green buttonwood Sonajhuri Chatim Golmohor Neem Jarul	15-25 ft	10048	23°41.929'N 87°05.858'E
33	GMPL 7 between canteen and pellet yard n23°41.936' e87°05.766'.kml	Karanj Green buttonwood Sishu Chatim Golmohor Neem	15-25 ft	5187	23°41.936'N 87°05.766'E
34	GMPL 8 near pellet yard 3722sqm n23° 41.965' e87°05.711'.kml	Mahogany Neem Sonajhuri Sirish Chatim Gulmohor	20-30 ft	3722	23° 41.965'N 87°05.711'E
35	GMPL 9 north side boundary gate 9207sqm n23°41.899' e87°05..kml	Green Bottowood Arjun Sonajhuri Segun	30-40	9207	23°41.899'N 87° 05.649'E

36	GMPL 10 near batching point 10824 sqm n23°41.707' e87°05.649'.kml	Green Bottonwood Sonajhuri Neem Jarul Arjun Sirish	30-50	10824	23°41'707'N 87° 0.649'E
37	GMPL 11 near south side boundary wall 6489sqm n23°41.691' e87v05.868'.kml	Sonajhuri Golmohor Green Bottonwood Mahogany Neem	8-15	6489	23°41.691'N 87° 05.868'E

Remarks:

1. The unit has planted new saplings in good nos. in different places within the premises.
2. They have carried out plantations on boundary side as well as road side.
3. Apart from greenery development within the premises, the unit has developed plantations immediately outside the boundary wall.
4. The current plantation is found dense with variety species.
5. There are some areas for further improvement for plantation and representative of Giridhan Metal Private Limited is committed to plantation on those areas.

Furnace – 1

Furnace - 2

Qualissure Laboratory Services

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Email : qualissure@gmail.com; info@qualissure.com ; Mob.No. 98312 87086 ; 9830093976 TC-6271

DOC NO : QLS/SAMP/08-8/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/23-24/C/959
	Date	: 30.01.2024
	Sample No.	: QLS/MR/A/23-24/959
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 20.01.2024-30.01.2024
	Sample Mark	: CFBC Boiler
	Ref No. Date	: WS23715-001, Dt.15.07.2023

Analysis Result

Date & Time of Sampling : 16.01.2024 at 13:15 hrs. Sampling done by : S.Ghosh		Sampling Procedures : EPA/IS	
A : General Information of Stack:			
1 Stack connected to	: CFBC Boiler		
2 Emission due to	: Combustion of Coal		
3 Material of construction of Stack	: RCC		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: 32 TPH		
B : Physical Characteristic of Stack:			
1 Height of Stack from ground level	: 80.0 m		
2 Diameter of Stack at bottom	: ----		
3 Diameter of Stack at sampling point	: 2.0 m		
4 Height of the sampling point from ground level	: 35.0 m		
5 Area of Stack	: 3.14 m^2		
C : Analysis/Characteristic of Stack:			
1 Fuel used : Coal	2. Fuel consumption : ----		
D : Results of Sampling & Analysis of gaseous Emission:	**RESULT**	**METHOD**	**LIMIT**
1 Temperature of emission (°C)	: 111	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 747	EPA Part 2	---
3 Velocity of gas (m/sec)	: 8.36	EPA Part 2	---
4 Quantity of gas flow (Nm^3/hr)	: 70473	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
6 Concentration of Carbon dioxide(%v/v)	: 11.2	IS:13270-1992, Reaf : 2017	---
7 Concentration of Sulphur dioxide (mg/Nm^3)	: 89.5at 6% O_2	EPA Part-6	100
8 Concentration of Oxides of Nitrogen (mg/Nm^3)	: 57.6 at 6% O_2	EPA Part-7	100
9 Concentration of Mercury ($\mu g/Nm^3$)	: <0.1	EPA Part-29	30
10 Concentration of Particulate Matters (mg/Nm^3)	: 21 at 6% O_2	EPA Part 5	30
E : Pollution Control Device :			
Details of pollution control devices attached with the stack	: ESP		
F : Remarks: Nil			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 07.08.2024		

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

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TC-6271

DOC NO : QLS/SAMP/08-B/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No. Date Sample No. Sample Description Date of Performance(s) Sample Mark Ref No. Date	: QLS/MR/A/23-24/C/960 : 30.01.2024 : QLS/MR/A/23-24/960 : Stack Flue Gas : 20.01.2024-30.01.2024 : DRI-350 TPD & 600 TPD : WS23715-001, Dt.15.07.2023

Analysis Result

Date & Time of Sampling : 17.01.2024 at 11:10 hrs. | Sampling Procedures : EPA/IS
Sampling done by : S.Ghosh

A : General Information of Stack:				
1	Stack connected to	: 600 TPD & 350 TPD DRI attached with common stack through WHRB		
2	Emission due to	: Combustion of Coal & Reduction of Fe Ore		
3	Material of construction of Stack	: RCC		
4	Shape of Stack	: Circular		
5	Whether stack is provided with permanent platform	: Yes		
6	Generation Capacity	: Rated-350 TPD, Running 297 TPD		
B : Physical Characteristic of Stack:				
1	Height of Stack from ground level	: 80.0 m		
2	Diameter of Stack at bottom	: ----		
3	Diameter of Stack at sampling point	: 4.0 m		
4	Height of the sampling point from ground level	: 35.0 m		
5	Area of Stack	: 12.57 m^2		
C : Analysis/Characteristic of Stack:				
1	Fuel used : Coal	2. Fuel consumption : ----		
D : Results of Sampling & Analysis of gaseous Emission:		**RESULT**	**METHOD**	**LIMIT**
1	Temperature of emission (°C)	: 85	EPA Part 2	---
2	Barometric pressure (mm of Hg)	: 747	EPA Part 2	---
3	Velocity of gas (m/sec)	: 6.67	EPA Part 2	---
4	Quantity of gas flow (Nm^3/hr)	: 241317	EPA Part 2	---
5	Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
6	Concentration of Carbon dioxide(%v/v)	: 9.2	IS:13270-1992, Reaf : 2017	---
7	Concentration of Sulphur dioxide (mg/Nm^3)	: 79.3	EPA Part-6	100
8	Concentration of Oxides of Nitrogen (mg/Nm^3)	: 48.2	EPA Part-7	100
9	Concentration of Particulate Matters (mg/Nm^3)	: 18 at 12% CO_2	EPA Part 5	30

E : Pollution Control Device :
Details of pollution control devices attached with the stack : ESP

F : Remarks: DRI 350 TPD was running during sampling.

Note:		
1)	Equipment Name/ID	: Stack Sampler & Velocity Monitor
2)	Model No	: APM-160
3)	Make-	: Lata Envirotech Services
4)	Sl No-	: 82-DTF-2016
5)	Calibration valid Up to	: 07.08.2024

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
[Authorized Signatory]

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DOC NO : QLS/SAMP/08-B/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No. Date Sample No. Sample Description Date of Performance(s) Sample Mark Ref No. Date	: QLS/MR/A/23-24/C/961 : 30.01.2024 : QLS/MR/A/23-24/961 : Stack Flue Gas : 20.01.2024-30.01.2024 : SEAF-1 (9MVA X 2) : WS23715-001, Dt.15.07.2023

Analysis Result

Date & Time of Sampling : 17.01.2024 at 12:20 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
A : General Information of Stack:			
1 Stack connected to	: SEAF -1 (9MVA X 2)		
2 Emission due to	: Reduction Of Mn Ore & Quartz		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: ---		
B : Physical Characteristic of Stack:			
1 Height of Stack from ground level	: 40.0 m		
2 Diameter of Stack at bottom	: ---		
3 Diameter of Stack at sampling point	: 2.5 m		
4 Height of the sampling point from ground level	: 27.0 m		
5 Area of Stack	: 4.9107 m^2		
C : Analysis/Characteristic of Stack:			
1 Fuel used : ---	2. Fuel consumption : ---		
D : Results of Sampling & Analysis of gaseous Emission:	**RESULT**	**METHOD**	**LIMIT**
1 Temperature of emission (°C)	: 63	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 747	EPA Part 2	---
3 Velocity of gas (m/sec)	: 7.09	EPA Part 2	---
4 Quantity of gas flow (Nm^3/hr)	: 56502	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
7 Concentration of Sulphur dioxide (mg/Nm^3)	: 19.8	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm^3)	: 33.8	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm^3)	: 6	EPA Part 5	30
E : Pollution Control Device :			
Details of pollution control devices attached with the stack	: Bag Filter		
F : Remarks: Nil			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 07.08.2024		

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

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TC-6271

DOC NO : QLS/SAMP/08-B/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/23-24/C/962
	Date	: 30.01.2024
	Sample No.	: QLS/MR/A/23-24/962
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 20.01.2024-30.01.2024
	Sample Mark	: Product Handling & Separation House
	Ref No. Date	: WS23715-001, Dt.15.07.2023

Analysis Result

Date & Time of Sampling : 17.01.2024 at 14:30 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
A : General Information of Stack:			
1 Stack connected to	: Product Handling & Separation House		
2 Emission due to	: Process Activity		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: ----		
B : Physical Characteristic of Stack:			
1 Height of Stack from ground level	: 30.0 m		
2 Diameter of Stack at bottom	: ----		
3 Diameter of Stack at sampling point	: 1.7 m		
4 Height of the sampling point from ground level	: 25.0 m (Approx)		
5 Area of Stack	: 2.2707 m^2		
C : Analysis/Characteristic of Stack:			
1 Fuel used : ----	2. Fuel consumption : ----		
D : Results of Sampling & Analysis of gaseous Emission:	**RESULT**	**METHOD**	**LIMIT**
1 Temperature of emission (°C)	: 34	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 747	EPA Part 2	---
3 Velocity of gas (m/sec)	: 12.58	EPA Part 2	---
4 Quantity of gas flow (Nm^3/hr)	: 98192	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
7 Concentration of Sulphur dioxide (mg/Nm^3)	: ----	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm^3)	: ----	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm^3)	: 26	EPA Part 5	30
E : Pollution Control Device :			
Details of pollution control devices attached with the stack	: Bag Filter		
F : Remarks: Nil			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 07.08.2024		

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

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TC-6271

DOC NO : QLS/SAMP/08-B/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No. Date Sample No. Sample Description Date of Performance(s) Sample Mark Ref No. Date	: QLS/MR/A/23-24/C/963 : 30.01.2024 : QLS/MR/A/23-24/963 : Stack Flue Gas : 20.01.2024-30.01.2024 : SMS : WS23715-001, Dt.15.07.2023

Analysis Result

Date & Time of Sampling : 18.01.2024 at 12:30 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
A : General Information of Stack:			
1 Stack connected to	: SMS		
2 Emission due to	: Melting of Scrap Materials		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: 20 X 3 Ton		
B : Physical Characteristic of Stack:			
1 Height of Stack from ground level	: 30.0 m		
2 Diameter of Stack at bottom	: ---		
3 Diameter of Stack at sampling point	: 3.79 m		
4 Height of the sampling point from ground level	: 18.0 m (Appx.)		
5 Area of Stack	: 11.28 m^2		
C : Analysis/Characteristic of Stack:			
1 Fuel used : ---	2. Fuel consumption : ---		
D : Results of Sampling & Analysis of gaseous Emission:	**RESULT**	**METHOD**	**LIMIT**
1 Temperature of emission (°C)	: 32	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 748	EPA Part 2	---
3 Velocity of gas (m/sec)	: 9.94	EPA Part 2	---
4 Quantity of gas flow (Nm^3/hr)	: 388323	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2017	---
7 Concentration of Sulphur dioxide (mg/Nm^3)	: ---	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm^3)	: ---	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm^3)	: 5	EPA Part 5	30
E : Pollution Control Device :			
Details of pollution control devices attached with the stack	: Bag Filter		
F : Remarks: Nil			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 07.08.2024		

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

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CIN: U27320WB2019PTC234675

GIRIDHAN METAL PRIVATE LIMITED

Registered Office: 'Premlata', 39, Shakespeare Sarani, 3rd Floor, Kolkata – 700 017, West Bengal, India.
Telefax- +91 33 22892734 / 35 / 36, E-Mail : giridhanmetal@gmail.com

ANNEXURE – 1

- **Technical Specifications of Bag Filter:**

SN	Technical Parameter (Bag Filter)	Unit	Technical Description
1	Model No.	-	IAEC BF 6-12x15-4.88
2	Location	-	Sub-merged Arc Furnace
3	Cleaning type	offline / online	Offline
4	Emission Level	mg/Nm³	Below 30 guarantee
5	Pressure drop across unit (max.)	mm WC	150 (Max)
6	Gas Volume	Am³/hr	1,75,000
7	Designed dust load	gm/Nm³	100
8	Gas Temp. at inlet	deg. C	125
9	Air to cloth ratio (net)	m³/min/m²	1.09
10	Air to cloth ratio (gross)	m³/min/m²	1.31
11	Filtration Efficiency	%	99.97
12	Compressed Air Quantity (FAD)	m³/hr	35
13	Gauge pressure	Kg/cm²	6-8(Dry)
14	Compartment arrangement	-	Box type/Panel
15	Total No. of Bags	Nos.	1080
16	No. of Solenoid Valves & Size	Nos./NB	90/40
17	Housing – Casing/ No.	-	Box Type/6
18	No. of hoppers	-	6
19	Hopper type/ Valley Angle	-	Pyramid / 60 Deg.
20	Thickness of casing /MOC	mm	5 / IS:2062
21	Thickness of Top Cover /MOC	mm	3.15 / IS:2062
22	Hopper thickness	mm	5 / IS:2062
23	Tube sheet thickness	mm	5 / IS:2062
24	Bag fixing arrangement	-	Snap Band type
25	Bag dia.	mm	160
26	Length	mm	4880
27	Filter area per Bag	m²	2.47
28	Filtration area (total)	m²	2668
29	Filer bag fabric with treatment	-	Non-woven PNF with PTFE membrane finish
30	Weight of fabric	Gm/m²	600±5 %
31	Max. Temp. filter fabric with stand	deg. C	150
32	No. of Cage for Filter Bags	Nos.	1080
33	Cage Type	-	Single

34	Cage material	-	G.I.
35	Painting	-	Aluminum
36	Knife Gates	-	6+2
SN	**Technical Parameter (Rotary Air Lock Valve)**	**Unit**	**Technical Description**
1	RAL Below BF Hopper	-	Considered
2	RAL Quantity / Size	mm	9 / 250 X250 sq.
3	Make	-	IAEC
4	Speed	rpm	31
5	Drive arrangement	-	Direct through coupling
6	Drive motor power	KW	0.37
7	MOC of Housing and Rotor / Shaft	-	IS: 2062 / EN-8
SN	**Technical Parameter (ID Fan)**	**Unit**	**Technical Description**
1	Location	-	After Bag filter
2	Model No.	-	IAEC-ACB-160-199-7
3	Type	-	Single inlet Single width Centrifugal Fan
4	Make	-	IAEC
5	Capacity	Am^3/Hr	1,92,500
6	Qty.	-	1
7	Operating Temp	deg. C	125
8	Static pressure at specified temperature	mm WC	350 at 125 Deg. C.
9	Total pressure at 20 Deg. C	mm WC	475 at 20 Deg. C
10	Shaft Power at specified temperature	BKW	222 at 125 Deg. C.
11	Shaft Power at 20 Deg C	BKW	310 at 20 Deg. C.
12	Static efficiency	%	76
13	Speed	rpm	980
14	Type of Drive arrangement	-	Coupling
15	Rating	KW / Pole	300 /6
16	Casing/ Scroll (thk) & MOC	mm	6 / 6 & IS: 2062
17	Impeller (B. Plate/Blade/ Shroud) & MOC	mm	8/6 /5 & IS: 2062
18	Shaft (MOC)	-	EN8
SN	**Technical Parameter (Chimney)**	**Unit**	**Technical Description**
1	Diameter of the Chimney	mm	2000
2	Height of the Chimney	meter	30

ISGEC HEAVY ENGINEERING LTD.
IJT BOILERS
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Fax: +91-120-4085100
www.isgec.com

Project Name : M/s. Giridhan Metal Private Limited (JB1171)

Sox formation and it's Reduction method in CFB boiler

Sox formation

Sulfur oxides are the gaseous products of the oxidation of sulfur (mainly from fuel) by oxygen (from combustion air). The primary product of oxidation of the fuel sulfur is SO2.

Descriptions and Features De SO_2 System in CFB Technology:

CFB has been proven to be quite effective in the reduction of SO2 emissions. Reduction of SO2 emissions, in CFB is accomplished by the injection of limestone into the furnace. The CFB boiler is suitable for SO2 reduction of 98% with the following features by injecting lime stone in the CFB furnace

- Appropriate Furnace temperature (Typically 870- 910Deg.C) is maintained throughout the furnace which is effective temperature range for better sulphur capture.
- Furnace is designed with adequate height to have adequate gas and sorbent residence time.
- The time of contact between the formed SO2 and the capturing Ca is taken into account via the furnace residence time and the separator.
- Limestone feed system is designed to have even distribution of limestone over the furnace cross section.
- Optimum particle size distribution of sorbent (Lime stone) shall be maintained for effective sulphur capture.
- Compact separator of CFB boiler which collects the unburnt solids particle and un reacted limestone particles of size above 63 microns which are sent back to furnace for effective utilization of limestone and capture

Process Description:

- The sorbent (Limestone) is calcined using a small amount of the heat generated by combustion of the fuel and can then react with gaseous sulphur to generate a solid sulphate ($CaSO_4$) which is either captured in the ESP or it is retained in the bed material and removed as bottom ash.
- The primary reactions involved in the generation and reduction of SO_2 emissions with calcium-based sorbents are:
  - ✓ $S + O_2 \rightarrow SO_2$ — formation of SO_2
  - ✓ $CaCO_3 + heat \rightarrow CaO + CO_2$ — calcination of limestone
  - ✓ $SO_2 + CaO + 2O_2 \rightarrow CaSO_4$ — sulphur capture

Due to proven state of art CFB combustion technology with above method, the Sox produced is lesser than the permissible limit.

ISGEC
BOILERS
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Noida 201 301 (U. P.) India

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NOx Emission control in CFB boiler

NOx emissions from CFB boilers are much lower when compared with emissions from other combustion technology.

NOx Formation and it's control method:

- **Combustion temperature** : At higher temperatures (in excess of 1100 °C) a fraction of the nitrogen in the combustion air also reacts with oxygen to form Nox. However, Due to the lower combustion temperature 870 – 910 °C found in fluidized bed combustion as opposed to temperatures in excess of 1100 °C encountered in other combustion systems, very little thermal NOx is formed which will be negligible.

- **Extent of air staging** : Reduction in NOx emissions results from the staged combustion utilized in CFB boilers. Staged combustion will take place effectively by means of Secondary air provided in Front & Rear walls of Combustor with multiple locations to avoid any Nox formation in flue gases.

- **Excess air level** : In addition to the Stoichiometric air required for Combustion of CFB Boilers, excess air is supplied for complete fuel oxidation in order to ensure proper combustion in Furnace to eliminate NOx.

Due to proven state of art CFB combustion technology with above precautions the Nox produced is lesser than the permissible limit.

ISGEC
BOILERS
Engineering Ltd
(U. P.) India

NOC NO164560

WEST BENGAL POLLUTION CONTROL BOARD

Paribesh Bhawan
10A, Block – LA, Sector III, Bidhannagar
Kolkata - 700 106

Memo No. 477 -2N-51/2003(E)-Pt.-I Dated 28/06/2021

From :
Member Secretary,
West Bengal Pollution Control Board

To : M/s. Giridhan Metal Private Limited,
'Premtala', 39, Shakespeare Sarani, 3rd Floor, Kolkata -700 017.

Sub : Consent to Establish (NOC) from Environmental Point of View

Ref : i) Your letter No. Nil Dated 05.05.2021
ii) Env. Clearance issued by MoEF&CC vide F.No.-J-11011/366/2010-IA.II.(I) dtd.08.04.2021

WEST BENGAL

Dear Sirs,

In response to the application for Consent to Establish (NOC) for proposed Unit of M/s Giridhan Metal Private Limited for expansion of their existing steel plant by expanding Sponge iron plant from 1,20,000TPA to 3,18,000TPA, M.S. Billete from 1,05,000TPA to 3,72,300TPA, Rolling Mill from 1,00,000TPA to 3,00,000TPA Submerged Arc Furnace(SAF) from 15,000TPA to 30,000TPA & Captive Power Plant from 19 MW to 42 MW including Waste Heat Recovery Boiler(WHRB) at Jamuria Industrial Estate, Vill.-Ikra,Mouza-, Tehsil-Jamuria, Dist.-Paschim Bardhaman, West Bengal. The details of the expansion project are*

this is to inform you that this Board hereby grants the Consent to Establish (NOC) from the environmental point of the above subject to the following conditions and special conditions annexed.

1. The quality of sewage and trade effluent to be discharged from your factory shall satisfy the permissible limits as prescribed in IS : 2490 (Pt. I) of 1974, and/or its subsequent amendment and Environment (Protection) Rules 1986.

* given as Annexure - A.

2. Suitable measures to treat your effluent shall be adopted by you in order to reduce the pollutional load so that the quality of the effluent satisfies the standards mentioned above.

3. You shall have to apply to this Board for its consent to operate and discharge of sewage and trade effluent according to the provisions of the water (Prevention & Control of Pollution) Act, 1974. No sewage or trade effluent shall be discharged by you without prior consent of this Board.

4. All emission from your factory shall conform to the standards as laid down by this Board.

5. No emission shall be permitted without prior approval of this Board and you shall apply to this Board for its consent to operate and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act, 1981.

6. No industrial plant, furnace, flues, chimneys, control equipment, etc. shall be constructed/reconstructed/erected/re-erected without prior approval of this Board.

NOC/HO/104306

7. You shall comply with
   (i) Water (Prevention and Control of Pollution) Cess Act, 1977, if applicable.
   (ii) Water (Prevention and Control of Pollution) Cess Act, 1978, if applicable.
   (iii) Environment (Protection) Act, 1986
   (iv) Environment (Protection) Rules, 1986
   (v) Hazardous Wastes (Management and Handling) Rules, 1989 and Amended Rules, 2000
   (vi) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and Amended Rules, 2000
   (vii) Manufacture, Use, Import and Storage and Hazardous Micro-Organisms, Genetically Engineered Organisms or Cell Rules, 1989
   (viii) The Public Liability Insurance Act, 1991 and Amended Act, 1992
   (ix) The Public Liability Insurance Rules, 1991 and Amended Rules 1993
   (x) Biomedical Wastes (Management & Handling) Rules, 1998 and Amended Rules 2000 if applicable.
   (xi) Recycled Plastics Manufacture and Usage Rules 1999, if applicable and
   (xii) Ozone Depleting Substances (Regulation & Control) Rules, 2000, if applicable

8. You will have to abide by any other stipulations as may be prescribed by any authority/local bodies/Government Departments etc.

SPECIAL CONDITION :

The total capital cost of the projects(including expansion) is Rs.996.69 crores.

Please refer to Annexure - B

Any violation of the aforesaid conditions shall entail cancellation of this Consent to Establish (NOC)

Yours faithfully,

28/6/2004

Member Secretary/ SR. ENV. ENGR.
West Bengal Pollution Control Board (ENV CELL)
Sr. Environmental Engineer
W. B. Pollution Control Board
Dept. of Environment, GoWB

Memo No. 477 -2N-51/2003(E)-Pt.-I dtd. 28/06/2004 Dated

Copy forwarded for information to :

1. Chief Inspector of Factories, Government of West Bengal, N. S. Building, Kolkata-700 001
2. Director of Industries/Director of Cottage & Small Scale Industries, Government of West Bengal, N. S. Building, Kolkata-700 001
3. Guard file, West Bengal Pollution Control Board.
4. Environmental Engineer, I/II/Alipur R.O./Howrah R.O./Hooghly R.O./B.R.O./D.R.O./Haldia R.O./S.R.O./ Asansol/ Sub-R.O./WBPC Board

Himalaya Bhawan
Delhi Road, Dankuni
Dist. Hooghly

Vill, Panpur
Kalyani Expressway
P.O. Narayanpur
Dist. 24 Pgs. (N)

Sahid Khudiram Sarani
City Centre, Durgapur-16
Dist. Burdwan

10, Camac Street
2nd Floor
Kolkata-700 017

Paribesh Bhawan
10A, LA-Block, Sector-III
Salt Lake City,
Kolkata - 700 098

Block-05 at 40
Flats Complex
Adjacent to Priyambada
Housing Estate
P.O. : Khanjanchak,
P.S. Durgachak
Haldia-721602
Dist. : Purba Medinipur

Paribahan Nagar
Matigara, Siliguri
Dist.-Darjeeling

Satya Chowdhury
Indoor Stadium
Balurchar Bandh Road

Asansol Sub-Regional Office
ADDA Commercial Market (2nd Floor)
Opposite Asansol Fire Station

28/6/2004

Member Secretary./ SR. ENV. ENGR.
West Bengal Pollution Control Board (ENV CELL)

Annexure A to NOC Sl. No. **NO164560**

Special conditions issued to **M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)**

S. No.		Existing Unit		Proposed Unit		Total (Existing + Proposed)		Stack Height (m)
	Name	Configuration	Production (TPA)	Configuration	Production (TPA)	Configuration	Production (TPA)	
1.	Sponge Iron (DRI Plant)	1X 350 TPD	120000 TPA	1X 600 TPD	198000 TPA	1x 350 & 1X 600 TPD DRI Plant	318000 TPA	60
2.	MS Billets (Induction Furnace with LF & CCM)	2X15 Ton IF (Induction Furnace)* & 1X30 Ton LF (Ladle Furnace)	105000 TPA	6X15 Ton IF * (Induction Furnace)	267300 TPA	6X20 Ton IF * (Induction Furnace) & 1X30 Ton LF (Ladle Furnace)	372300 TPA	40
3.	Rolling Mill	310 TPD of rolled / bars / light structure	100000 TPA	625 TPD of rolled / bars / light structure	200000 TPA	310 TPD & 625TPD of rolled / bars / light structure	300000 TPA	Nil
4.	Submerged Arc Furnace (SAF)	1 X 9 MVA of Fe-Mn / Si-Mn	15000 TPA	1X9 MVA of Fe-Mn / Si-Mn	15000 TPA	2X9 MVA of Fe-Mn / Si-Mn	30000 TPA	40
5.	Waste Heat Recovery Boiler (WHRB) based CPP	35 TPH	7 MW	70 TPH	14 MW	35 TPH & 70 TPH	21 MW	Connected with DRI
6.	Captive Power Plant (FBC boiler)	1 X 32 TPH FBC boiler	9 MW	50 TPH FBC boiler	12 MW	1X 32 TPH & 50 TPH FBC boiler	21 MW	80
7.	Billet Caster	1 X 350 TPD DRI Plant	120000 TPA	-	2X2 Strand	2X2 Strand	-	NA
8.	Railway Siding with Wagon Tippler							

Note: *instead of 2x15 Ton IF and proposed 6x15 Ton IF (Induction Furnace) (6x20 Ton IF) will be installed as a part of proposed expansion.

Note: Presently only 15000 TPA Sponge Iron Plant (50 TPD DRI Plant) is installed which is currently on-operational and will be dismantled after commissioning of 1x350 TPD)

28/6/2021

Sr. Environmental Engineer
W. B. Pollution Control Board
Dept. of Environment, GoWB

Annexure B to NOC Sl. No. **NO164560**

Special conditions issued to **M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)**

A) Specific Conditions :

i. Green belt shall be developed in 31.38 acres of land (40%) including the gap filling in the existing green belt with a tree density of 2500 trees per hectare.

ii. Closed type submerged Arc Furnace with 4th hole extraction system shall be installed.

iii. 1 x350 TPD and lx600 TPD DRI kiln shall be installed. Remaining DRI kilns as per the existing EC accorded by MoEF&CC shall not be in talJed and 50 TPD DRI kiln existing at the site shall be dismantled.

iv. Project proponent shall meet the particulate matter emission norms in all the stacks less than 30 mg/Nm3.

v. The project proponent shall comply with emission norms of PM, SOx, NOx and mercury for captive power plant as stipulated in the gazette notification no. S.O. 3305 (E) dated 7/1212015.

vi. Jigging and briquetting Plant shall be installed.

B) Emission:-

1. Stacks should have sampling port, platform and ladder as per the Emission Regulation Part-III of CPCB. Continuous stack monitoring facilities should be provided with sponge iron units, ferro-alloy plant & CPP.
2. New Standards for sponge iron plant issued by MoEF vide G.S.R 414(E) dated 30th May,2008 shall be complied with.
3. The National Ambient Air Quality Emission Standards issued by MoEF vide G.S.R 826(E) dated 16th November, 2009 should be complied with.
4. As proposed the unit shall not operate DRI kilns without WHRB-ESP operation.
5. Dry fog system and water sprinklers to be installed to arrest fugitive emission.

C) Effluent :-

1. Process – Any process effluent generated will be treated in properly designed ETP. Treated effluent to be utilized within the plant premises. Zero Discharge Principle should be strictly adhered to.
2. Cooling water to be recycled.
6. Domestic - to be discharged after treatment in adequately designed STP.

D) Solid Waste : -

1. Fly ash to be sold to cement manufacturing units.
2. Dolo-char to be used in AFBC.
3. Bottom ash and slag form induction furnace and SEAF to be used for land filling and road making.

Sr. Environmental Engineer
W. B. Pollution Control Board
Dept. of Environment, GoWB

consent to operate and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act 1981.

Annexure B to NOC Sl. No. **NO164560**
Special conditions issued to **M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)**

4. Hazardous Waste to be collected and disposed of as per the Hazardous Wastes (Handling and Trans-boundary Movement) Rules, 2016 and as amended thereafter.

E) General :-

1. Noise Control – Ambient noise & D.G.Set noise level not to exceed the permissible limit.
2. No additional machinery / equipments can be installed without permission from this board.
3. Adequate arrangement for dust suppression in raw material handling section to be provided.
4. At least 40% of the project area should be under green belt.
5. Rain water harvesting must be done however recharging of harvested rain water is not allowed under any circumstances.
6. Conditions laid down in the Environmental Clearance obtained for the expansion project from MoEF, GoI vide no. J-11011/366/2010-IA II (I) dated 08.04.2021 must be strictly followed.
7. The conveyor belt for transferring materials to day bins & skip hoist to be covered.
8. Good house-keeping to be maintained.
9. Land conversion certificate, if applicable, should be obtained from the competent authority.
10. Permission for extracting ground water must be obtained from the competent authority.
11. Project proponent should not undertake any activity on any portion of land which is not under their possession
12. This NOC is valid up to **31.05.2028** for setting up the expansion project.

28/6/2024

Member Secretary / Sr. Environmental Engineer (EIM Cell)
West Bengal Pollution Control Board

Sr. Environmental Engineer
W. B. Pollution Control Board
Dept. of Environment, GoWB

Effluent Treatment Plant (1540 KLD)

Garland Drain

Annexure – 10

Jigging Plant

Annexure-B1

Type text her

पश्चिमबंग पश्चिम बंगाल WEST BENGAL 56AB 940576

Before the Notary Govt. of West Bengal Burdwan District Durgapur

BEFORE THE LD. NOTARY PUBLIC, GOVERNMENT OF WEST BENGAL

AT DURGAPUR.

AFFIDAVIT

I, **Mr. Sanjay Agarwal,** son of Late Om Prakash Agarwal, resident of Flat No. - 4D, Block-9 BD-37, Rabindra Pally, Kestopur, District - North Twenty Four Parganas, West Bengal 700101; the Board of Directors of the **M/s Giridhan Metal Private Limited** having its Registered Office at 39, Shakespeare Sarani, 3rd Floor, P.S. - Shakespeare Sarani, Kolkata – 700017, West Bengal; do here by solemnly affirm and declare as follows :-

NOTARY Mrs. A Banerjee Durgapur, Burdwan Regn. No. 1/2007 Exp. 31.12.2022 GOVT. OF WEST BENGAL

27 JUL 2021

27 JUL 2021

Serial No. 2001 Date

Sold to J. Sarkar

Address Dgp

Value of Stamps C9

Date of Purchase of this Stamp Paper 24 JUN 2021

from the Treasury

Name of the Treasury from where Purchased, DURGAPUR.

Subrata Kumar Chakraborty
Stamp Vendor
A. D. S. R. Office, Durgapur-16
Licence No. 5 of 1989

1. That Environment Clearance issued by the Ministry of Environment, Forest and Climate Change, New Delhi vide letter No. -11011/366/2010-IA. II(I) dated 2nd April 2012 and J-11011/366/2010-IA. II(I) dated 29th January 2020 (Transfer of Environment Clearance from M/s Damodar Ispat Limited. to M/s Giridhan Metal Private Limited) and Environment Clearance validity extension issued on 24th May, 2019 extended till 1st April, 2022 in favour of erstwhile company M/s Damodar Ispat Ltd. and now transferred in the name of our company that is the M/s Giridhan Metal Private Limited having its Registered Office at 39, Shakespeare Sarani, 3rd Floor, P.S. - Shakespeare Sarani, Kolkata – 700017, West Bengal.

2. That the project was monitored by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India and Dr. Sudeshna Biswas, Research Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India on 29.01.2021 and during monitoring, I, Shri Sanjay Agarwal, Director, M/s Giridhan Metal Private Limited along with Shri J. N. Mukerjee, HOD (Environment), Shri C. C. Ghosh, Manager (Environment) and other Officials of M/s Giridhan Metal Private Limited were present at the site visit of the project and discussions held during monitoring and the Project Authorities (PAs) provided information accordingly. The Project is under process and is expected to be completed within validity period i.e. before 1st April, 2022.

3. That Certified Compliance Report with some observations issued by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India vide letter No. 102-410/20/EPE/07 dated 05.02.2021.

4. That I (Shri Sanjay Agarwal, Director, M/s Giridhan Metal Private Limited) am herewith submitting the point wise reply of the observations made by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India vide letter No. 102-410/20/EPE/07 dated 05.02.2021 as follows:-

SL. NO.	OBSERVATIONS BY REGIONAL OFFICE AND INTEGRATED REGIONAL OFFICE, MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE	SUBMISSION ON BEHALF OF M/S GIRIDHAN METAL PRIVATE LIMITED AND PRAYER FOR CONSIDERATION
1.	**Specific condition (v)** : It is mentioned in that dust suppression system and bag filters shall be installed to control the fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points, but it is observed the same is being partially complied by the PA.	The former company had only one 50 TPD DRI production unit. After transfer of EC (Environment Clearance) from M/s Damodar Ispat Limited to M/s Giridhan Metal Private Limited, the new management has stopped the 50 TPD DRI production since 04.02.2020 and the same has been intimated to The Chairman, CPCB and Eastern Regional Office, Ministry of Environment, Forest and Climate Change, Bhubaneswar. The letter is enclosed as Annexure-1. The project is now in construction phase for the present EC and company ensures dust suppression system and bag filters will be installed to control fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points.

NOTARY Mrs. A Banerjee Durgapur, Burdwan Regn. No.- 48/2007 Exp. DL-21.2.2023 GOVT. OF WEST BENGAL

27 JUL 2021

2.	**Specific condition (xvi) :** As proposed, green belt shall be developed in 33% of plant area. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO. Though the project proponent has done some plantation along the boundary line of the plant, it is not 33% yet.	33% of the existing plant area i.e., 13.34 acres (5.4 ha) has been earmarked and is being developed under greenbelt & plantation. Presently, 5533 trees i.e. ~1000 trees/ha have been planted. The company has also proposed expansion in their existing EC and as a part of expansion approx. 40% of the total plant area i.e. 31.38 acres (12.7 ha) will be developed under greenbelt & plantation by planting trees to the tune of 2500 trees/ha. Plantation schedule is enclosed as Annexure 2.
3.	**General condition (xi) :** The copy of the letter with respect to environment clearance letter marked to concerned Panchayat, Zila Parishad, Municipal Corporation / Urban Local Body, local NGO may be submitted to the Regional Office, Kolkata.	After taking over the assets of the former company, GMPL could not locate the submission receipts of letter w.r.t. EC marked to concerned authority. The company ensures that on receipt of Environment Clearance of proposed expansion the letter will be positively marked to concerned Panchayat, Zila Parishad, Municipal Corporation/Urban Local Body, local NGO may be submitted to the Regional Office, Kolkata.

5. That by virtue of this Affidavit, may consider my prayer in view of above submissions, kindly issue us a formal closure report on the observations marked in issued Certified Compliance Report.

6. That on behalf of the company assures to abide by the Rules & Regulations w.r.t. Environment and to comply all conditions stipulated in our Environment Clearance issued by Ministry of Environment, Forest and Climate Change, New Delhi.

7. That we hereby further state that we know that relying on the above representation and believing the same to be true.

That the above statements are true to the best of my knowledge and I sign and swear this affidavit on the 27th day of July, 2021, at Durgapur Court.

Identified by me,

(JAYANTA SARKAR)
Advocate
District Courts of Paschim Bardhaman

Jayanta Sarkar
Advocate
Durgapur Court

GIRIDHAN METAL PRIVATE LIMITED

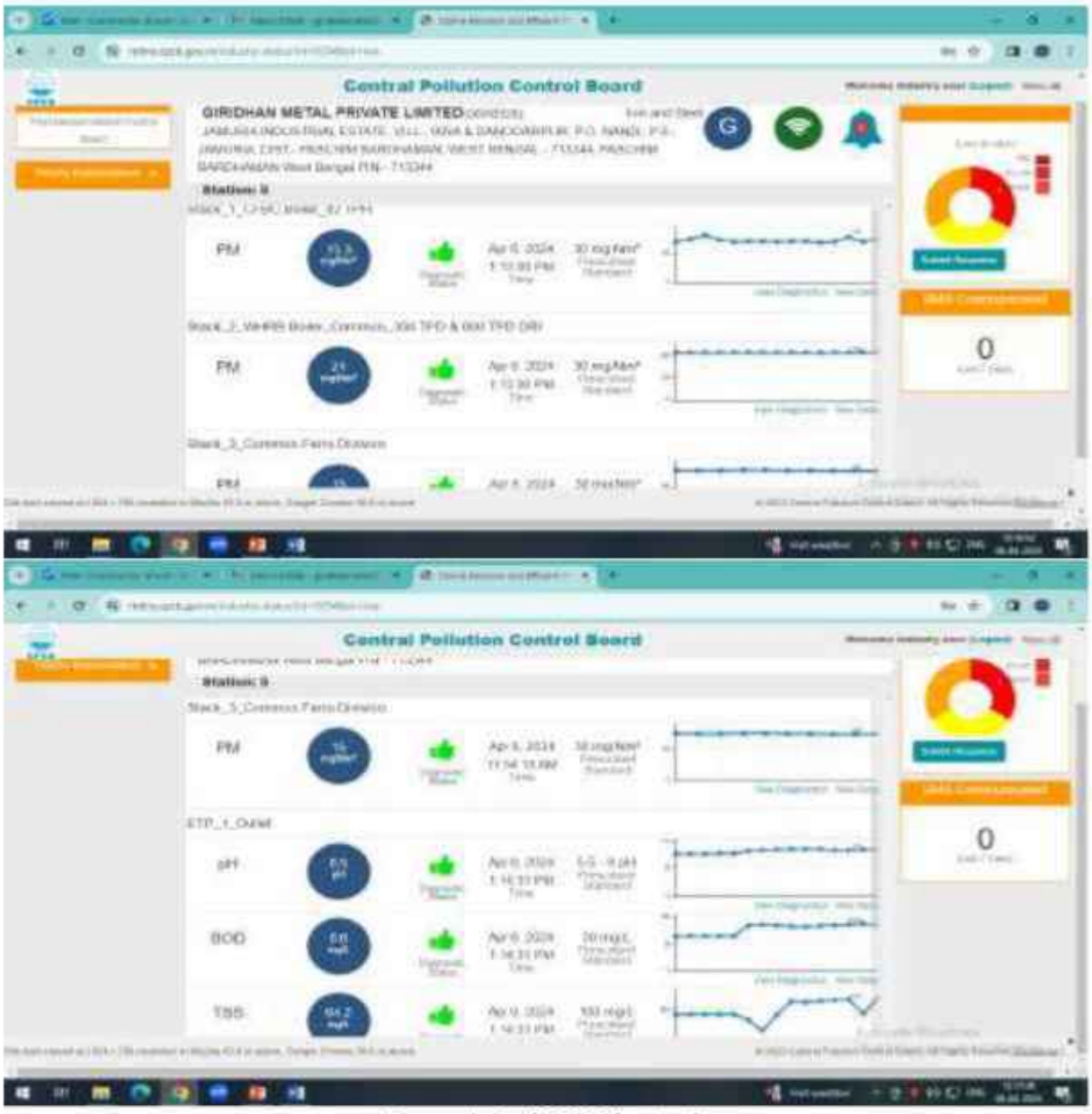
Authorised Signatory

(SANJAY AGARWAL)
Director
M/s Giridhan Metal Private Limited

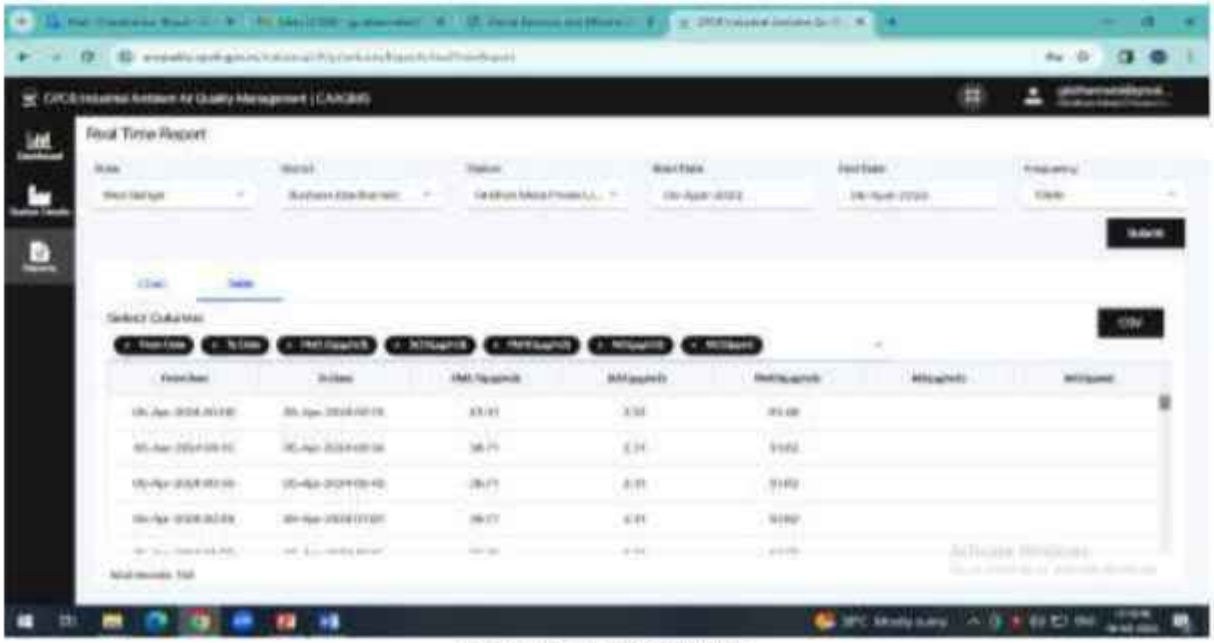
NOTARY
Mrs. A Banerjee
Durgapur, Burdwan
Regn. No.- 40/2007
Exp. Dt.-21.2.2022
GOVT. OF WEST BENGAL

Solemnly Affirmed & Declared
before me on Identification
Mrs. A. Banerjee, Notary
Durgapur, Burdwan, W.B.
Regn. No -40/2007 Govt. of W.B.

27 JUL 2021



Screenshot of CEMS for stack



Screenshot of CAAQMS

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
Email : qualissure@gmail.com; info@qualissure.com ; Mob.No. 98312 87086 ; 9830093976

TC-6271

DOC NO : QLS/SAMP/08-A/00

Annexure-12A

TEST REPORT

Name & Address Of the Customer :	Report No.	: QLS/MR/A/23-24/C/1141
M/s. Giridhan Metal Pvt. Ltd.	Date	: 13.03.2024
Jamuria Industrial Estate,	Sample No.	: QLS/MR/A/23-24/1141
Damodarpur,Jamuria	Sample Description	: Ambient Air
P.O.- Nandi,	Date of Performance(s)	: 06-13.03.2024
Paschim Bardhaman,	Sample Mark	: Old Admin Building
Pin : 713 344	Ref No. Date	: Verbal Confirmation.

Analysis Result

Location : Old Admin Building	Date of sampling : 04-05.03.2024
Sampling Done by: J.Sahana/P.Mandal	Sampling done as per : CPCB Guidelines (Volume-1)
Environmental Condition : Cloudy	

Sl. No.	POLLUTANT	RESULT	LIMIT	METHOD OF TEST REFERENCE
1	Particulate matter (<10µm) in µg/m³	73	100	IS: 5182 (Part-23)- (RA-2017)
2	Particulate matter (<2.5µm) in µg/m³	45	60	USEPA CFR-40,Part-50, Appendix-L
3	Sulphur dioxide (SO_2) in µg/m³	6.9	80	IS: 5182 (Part-2)-2001, (RA-2017)
4	Nitrogen dioxide (NO_2) in µg/m³	28.7	80	IS: 5182 (Part- 6)- 2001, (RA-2017)
5	Carbon Monoxide (CO) in mg /m³	0.995	2	IS: 5182 (Part- 10):1999, (RA-2014)
6	Ammonia (NH_3) in µg/m³	13.8	400	Air Sampling , 3rd Edn -Method-401
7	Ozone (O_3) in µg/m³	<19.62	180	Air Sampling , 3rd Edn -Method-411
8	Lead (Pb) in µg/m³	0.03	1	EPA IO-3.2 & 5.0
9	Nickel (Ni) in ng/m³	5.5	20	EPA IO-3.2
10	Arsenic (As) in ng/m³	<1.0	6	Air Sampling , 3rd Edn.Method 402 and APHA 22nd Edition Part 3114B
11	Benzene (C_6H_6) in µg/m³	<2.08	5	IS: 5182 (Part- 11)
12	Benzo (a) pyrene in ng/m³	<0.4	1	IS: 5182 (Part- 12)

NOTE: Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.

Report Prepared By :

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

—— End of the Report——

- *The results relate only to the item(s) tested.*
- *This Test Report shall not be reproduced without the permission of Qualissure Laboratory Services.*
- *The reserved part of sample(s), except perishable sample(s), shall be retained for 30 days from the date of issue of the Test Report.*

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
Email : qualissure@gmail.com; info@qualissure.com ; Mob.No. 98312 87086 ; 9830093976

TC-6271

DOC NO : QLS/SAMP/08-A/00

TEST REPORT

Name & Address Of the Customer :	Report No.	: QLS/MR/A/23-24/C/1142
M/s. Giridhan Metal Pvt. Ltd.	Date	: 13.03.2024
Jamuria Industrial Estate,	Sample No.	: QLS/MR/A/23-24/1142
Damodarpur,Jamuria	Sample Description	: Ambient Air
P.O.- Nandi,	Date of Performance(s)	: 06-13.03.2024
Paschim Bardhaman,	Sample Mark	: New Admin Office
Pin : 713 344	Ref No. Date	: Verbal Confirmation

Analysis Result

Location : New Admin Office	Date of sampling : 04-05.03.2024
Sampling Done by: J.Sahana/P.Mandal	Sampling done as per : CPCB Guidelines (Volume-1)
Environmental Condition : Cloudy	

Sl. No.	POLLUTANT	RESULT	LIMIT	METHOD OF TEST REFERENCE
1	Particulate matter (<10µm) in µg/m³	78	100	IS: 5182 (Part-23)- (RA-2017)
2	Particulate matter (<2.5µm) in µg/m³	43	60	USEPA CFR-40,Part-50, Appendix-L
3	Sulphur dioxide (SO_2) in µg/m³	7.1	80	IS: 5182 (Part-2)-2001, (RA-2017)
4	Nitrogen dioxide (NO_2) in µg/m³	27.4	80	IS: 5182 (Part- 6)- 2001, (RA-2017)
5	Carbon Monoxide (CO) in mg /m³	0.904	2	IS: 5182 (Part- 10):1999, (RA-2014)
6	Ammonia (NH_3) in µg/m³	16.1	400	Air Sampling , 3rd Edn -Method-401
7	Ozone (O_3) in µg/m³	20.7	180	Air Sampling , 3rd Edn -Method-411
8	Lead (Pb) in µg/m³	0.02	1	EPA IO-3.2 & 5.0
9	Nickel (Ni) in ng/m³	4.6	20	EPA IO-3.2
10	Arsenic (As) in ng/m³	<1.0	6	Air Sampling , 3rd Edn.Method 402 and APHA 22nd Edition Part 31148
11	Benzene (C_6H_6) in µg/m³	2.21	5	IS: 5182 (Part- 11)
12	Benzo (a) pyrene in ng/m³	<0.4	1	IS: 5182 (Part- 12)

NOTE: Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.

Report Prepared By :

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Benimadhab Goral, Chemist
(Authorized Signatory)

----- End of the Report-----

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
Email : qualissure@gmail.com; info@qualissure.com ; Mob.No. 98312 87086 ; 9830093976

TC-6271

DOC NO : QLS/SAMP/08-A/00

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur,Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No. Date Sample No. Sample Description Date of Performance(s) Sample Mark Ref No. Date	: QLS/MR/A/23-24/C/1143 : 13.03.2024 : QLS/MR/A/23-24/1143 : Ambient Air : 06-13.03.2024 : Near Central Canteen : Verbal Confirmation.

Analysis Result

Location : Near Central Canteen		Date of sampling : 04-05.03.2024		
Sampling Done by: J.Sahana/P.Mandal		Sampling done as per : CPCB Guidelines (Volume-1)		
Environmental Condition : Cloudy				
Sl. No.	**POLLUTANT**	**RESULT**	**LIMIT**	**METHOD OF TEST REFERENCE**
1	Particulate matter (<10µm) in µg/m³	76	100	IS: 5182 (Part-23)- (RA-2017)
2	Particulate matter (<2.5µm) in µg/m³	40	60	USEPA CFR-40,Part-50, Appendix-L
3	Sulphur dioxide (SO_2) in µg/m³	6.3	80	IS: 5182 (Part-2)-2001, (RA-2017)
4	Nitrogen dioxide (NO_2) in µg/m³	29.0	80	IS: 5182 (Part- 6)- 2001, (RA-2017)
5	Carbon Monoxide (CO) in mg /m³	0.824	2	IS: 5182 (Part- 10):1999, (RA-2014)
6	Ammonia (NH_3) in µg/m³	12.4	400	Air Sampling , 3rd Edn -Method-401
7	Ozone (O_3) in µg/m³	<19.62	180	Air Sampling , 3rd Edn -Method-411
8	Lead (Pb) in µg/m³	<0.02	1	EPA IO-3.2 & 5.0
9	Nickel (Ni) in ng/m³	<4.0	20	EPA IO-3.2
10	Arsenic (As) in ng/m³	<1.0	6	Air Sampling , 3rd Edn.Method 402 and APHA 22nd Edition Part 31148
11	Benzene (C_6H_6) in µg/m³	<2.08	5	IS: 5182 (Part- 11)
12	Benzo (a) pyrene in ng/m³	<0.4	1	IS: 5182 (Part- 12)
NOTE: Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.				

Report Prepared By :

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

----- End of the Report-----

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
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TC-6271

DOC No. -QLS/SAMP/01-A/00

Annexure-13

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No. Date Sample No. Date of Performance(s) Sample Description Ref No. Date	: QLS/MR/A/23-24/C/964 : 30.01.2024 : QLS/MR/A/23-24/964-969 : 20.01.2024-30.01.2024 : Fugitive Air : WS23715-001, Dt.15.07.2023

Analysis Result of Fugitive Air

Sampling Done by: S.Ghosh/J.Sahana | Sampling done as per : CPCB Guidelines (Volume-1)

Environmental Condition : Clear & Sunny

Sample No.	Location	Date of Sampling	(RPM) in µg/m³
964	NEAR I BIN AREA (350 TPD DRI)	16.01.2024	266
965	COOLER DISCHARGE AREA (350 TPD DRI)		619
966	CFBC BOILER AREA	17.01.2024	1011
967	FERRO FURNACE AREA	18.01.2024	572
968	PRODUCTION HOUSE AREA (COMMON WITH 350 TPD & 600 TPD DRI)		286
969	CHP AREA (CPP)	17.01.2024	847

NOTE:- Nil

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

----- *End of the Report*-----

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5 field ESP connected with 350 TPD DRI through WHRB

5 field ESP connected with 600 TPD DRI through WHRB

Annexure – 14

Bag Filter connected with 2x9 MVA SEAF

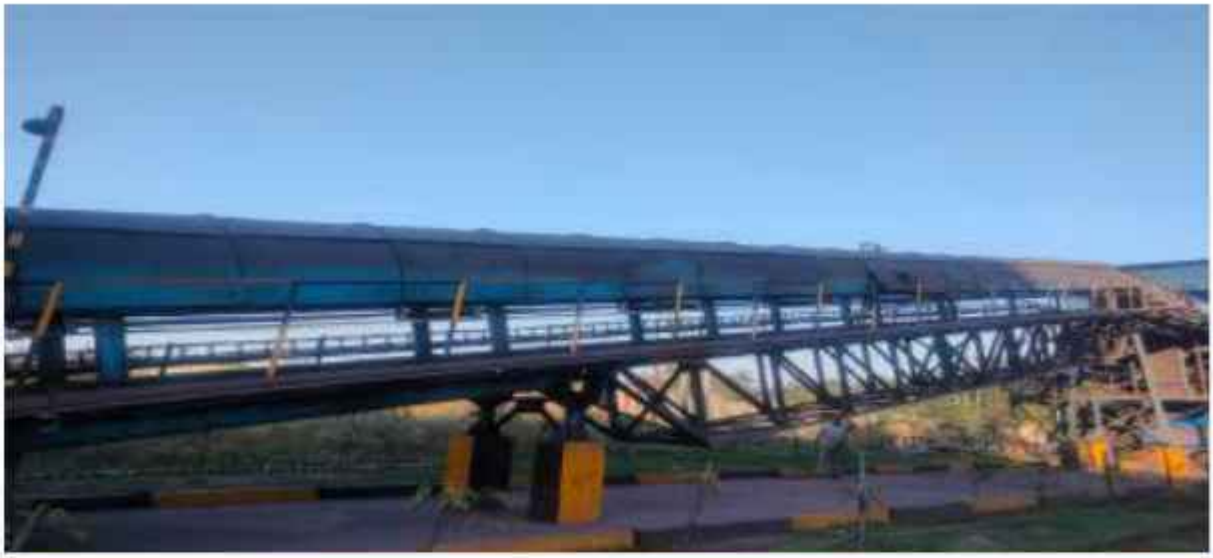
5 field ESP for CFBC Boiler

Bag Filter for Steel Smelting Shop

Bag filter connected with CD & I-Bin of 300 TPD DRI

Bag filter connected with CD & I-bin of 600 TPD DRI

Bag Filter Connected with DRI 300 & 600 TPD (product separation & dispatch



Closed Conveyor for raw materials handling

Pneumatic dust conveying system for fine dust

Dry fog system installed in coal handling system

Road sweeping machine to control fugitive dust from road during transportation

Raw material storage shed

Water tanker for sprinkling on road of project site

Water Sprinkler on road of plant site

Annexure – 15

Covered raw material handling

Primary & Secondary Extraction System connected with 06x20T Induction Furnace

Bag filter with chimney connected with 6x20T Induction Furnace

Induction furnace connected with primary hood

Primary & secondary suction connected with induction


SUMP TANK


Central Pollution Control Board
Station: 5
ETP_1_Outlet
BOD
TSS
COD
pH
0

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
Email : qualissure@gmail.com; info@qualissure.com ; Mob No. 98312 87086 ; 9830093976

TC-6271

DOC NO : QLS/SAMP/08-0/00

Annexure-18

TEST REPORT

Name & Address Of the Customer : **M/s. Giridhan Metal Pvt. Ltd.** Jamuria Industrial Estate, Damodarpur,Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.	: TC627123000001959F
	Report No.	: QLS/MR/W/23-24/C/667
	Date	: 30.12.2023
	Sample No.	: QLS/MR/W/23-24/667
	Sample Description	: Ground Water
	Sample Mark/Location	: Damodarpar Village Borewell 2 (23°42'13.2"N;87°5'7.95"E)
	Sample Drawn On	: 18.12.2023
	Date of Performance(s)	: 19.12.2023-28.12.2023
	Sampling Method	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date	: WS23715_001, Dated - 15.07.2023

Analysis Result

(A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185-2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185-2016	Not Detected
3.	Faecal Coliform/100ml	---	IS 1622-1981 (RA 2019)	<2

(B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard : IS:10500, 2012 Amd. 1 , 2& 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4): 1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA 2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 : Part 8 : 1984 (RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.37
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<1.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	586
7.	Aluminium (as Al) in mg/l	IS 15302: 2003 (RA 2019)	0.03	0.2	<0.01
8.	Ammonia as NH_3 in mg/l	IS 3025 (Part 34): 1988 RA:2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA:2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA:2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40): 1991, RA: 2019	75	200	97.6
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988, RA: 2019	250	1000	84.1
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42): 1992 ; RA 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition 2023, 4500 F D	1.0	1.5	0.22
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	0.2	1.0	<0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53) 1988 RA: 2019	1.0	No Relaxation	1.92
17.	Magnesium(as Mg) in mg/l	APHA 24th Edition- 2023, 3500 Mg	30	100	38.8
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24th Edition, 2023, 3113B	0.07	No Relaxation	<0.05
21.	Nitrate (as NO_3) in mg/l	IS 3025 (Part 34)-1988, RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C_6H_5OH) in mg/l	IS 3025 (Part 43)-1992, RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA : 2013	0.01	No Relaxation	<0.01
24.	Sulphate (as SO_4) in mg/l	IS 3025 (Part 24)-1986, RA: 2022	200	400	56.5
25.	Alkalinity(as $CaCO_3$)in mg/l	IS 3025 (Part 23)- 1986, RA: 2019	200	600	315.4
26.	Total Hardness (as $CaCO_3$) in mg/l	IS 3025 (Part 21)-2009, RA: 2019	300	600	404.0
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992,RA: 2019	0.003	No Relaxation	<0.002
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986,RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994,RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994,RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988, RA: 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994,RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52): 2019	0.05	No Relaxation	<0.05

Report Prepared By:

for **Qualissure Laboratory Services**
Reviewed & Authorized By

S. Chakraborty
Soumy Chakraborty, Microbiologist
(Authorized Signatory)

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Bishnupriya Banerjee, Chemist
(Authorized Signatory)

------End of the Report------

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Qualissure Laboratory Services

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TC-6271

DOC NO : QLS/SAMP/08-D/00

TEST REPORT

Name & Address Of the Customer : **M/s. Giridhan Metal Pvt. Ltd.** Jamuria Industrial Estate, Damodarpur,Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.	: TC627123000001968F
	Report No.	: QLS/MR/W/23-24/C/666
	Date	: 30.12.2023
	Sample No.	: QLS/MR/W/23-24/666
	Sample Description	: Ground Water
	Sample Mark/Location	: Ikra Village Borewell 1 (23°41'7.1"N,87°6'33.1"E)
	Sample Drawn On	: 18.12.2023
	Date of Performance(s)	: 19.12.2023-28.12.2023
	Sampling Method	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date	: WS23715-001, Dated - 15.07.2023

Analysis Result

(A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012 Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185-2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185-2016	Not Detected
3.	Faecal Coliform/100ml	—	IS 1622-1981 (RA 2019)	<2

(B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard : IS:10500, 2012 Amd. 1 , 2& 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4): 1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA:2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 : Part 8 : 1984 (RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.08
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<1.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	494
7.	Aluminium (as Al) in mg/l	IS 15302: 2003 (RA 2019)	0.03	0.2	<0.01
8.	Ammonia as NH_3 in mg/l	IS 3025 (Part 34): 1988;RA:2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA:2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA:2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40)-1991, RA: 2019	75	200	86.4
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988, RA: 2019	250	1000	84.8
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42): 1992 ; RA 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition 2023, 4500 F D	1.0	1.5	0.17
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	0.2	1.0	<0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53)-1988 RA: 2019	1.0	No Relaxation	1.08
17.	Magnesium(as Mg) in mg/l	APHA 24th Edition- 2023, 3500 Mg	30	100	40.3
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24th Edition, 2023, 3113B	0.07	No Relaxation	<0.05
21.	Nitrate (as NO_3) in mg/l	IS 3025 (Part 34)-1988, RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C_6H_5OH) in mg/l	IS 3025 (Part 43)-1992, RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA : 2013	0.01	No Relaxation	<0.01
24.	Sulphate (as SO_4) in mg/l	IS 3025 (Part 24)-1986, RA: 2022	200	400	44.9
25.	Alkalinity(as $CaCO_3$)in mg/l	IS 3025 (Part 23)- 1986, RA: 2019	200	600	277.6
26.	Total Hardness (as $CaCO_3$) in mg/l	IS 3025 (Part 21)-2009, RA: 2019	200	600	384.0
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992; RA: 2019	0.003	No Relaxation	<0.002
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986;RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994; RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994;RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988, RA- 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994 RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52):2019	0.05	No Relaxation	<0.05

Report Prepared By:

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Soumy Chakraborty, Microbiologist
(Authorized Signatory)

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Bishnupriya Banerjee, Chemist
(Authorized Signatory)

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Qualissure Laboratory Services

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TC-6271

DOC NO : QLS/SAMP/08-D/00

TEST REPORT

Name & Address Of the Customer : **M/s. Giridhan Metal Pvt. Ltd.** Jamuria Industrial Estate, Damodarpur,Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.	: TC627123000001970F
	Report No.	: QLS/MR/W/23-24/C/668
	Date	: 30.12.2023
	Sample No.	: QLS/MR/W/23-24/668
	Sample Description	: Ground Water
	Sample Mark/Location	: Mondalpur Village Borewell (23°41'4.9"N;87°5'13.1"E)
	Sample Drawn On	: 18.12.2023
	Date of Performance(s)	: 19.12.2023-28.12.2023
	Sampling Method	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date	: WS23715_001, Dated - 15.07.2023

Analysis Result

(A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185:2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185:2016	Not Detected
3.	Faecal Coliform/100ml	---	IS 1622:1981,(RA 2019)	<2

(B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard : IS:10500, 2012 Amd. 1 , 2& 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4): 1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA:2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 : Part 8 : 1984 (RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.14
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<1.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	686
7.	Aluminium (as Al) in mg/l	IS 15302: 2003 (RA 2019)	0.03	0.2	<0.01
8.	Ammonia as NH_3 in mg/l	IS 3025 (Part 34): 1988,RA:2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA:2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA: 2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40)-1991, RA: 2019	75	200	113.6
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988, RA: 2019	250	1000	98.6
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42): 1992 ; RA 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition: 2023, 4500 F D	1.0	1.5	0.28
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	0.2	1.0	<0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53)-1988 RA: 2019	1.0	No Relaxation	1.94
17.	Magnesium(as Mg) in mg/l	APHA 24th Edition- 2023, 3500 Mg	30	100	40.3
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24th Edition, 2023, 3113B	0.07	No Relaxation	<0.05
21.	Nitrate (as NO_3) in mg/l	IS 3025 (Part 34)-1988, RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C_6H_5OH) in mg/l	IS 3025 (Part 43)-1993 RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA : 2013	0.01	No Relaxation	<0.01
24.	Sulphate (as SO_4) in mg/l	IS 3025 (Part 24)-1986, RA: 2022	200	400	76.8
25.	Alkalinity(as $CaCO_3$)in mg/l	IS 3025 (Part 23)- 1986, RA: 2019	200	600	395.2
26.	Total Hardness (as $CaCO_3$) in mg/l	IS 3025 (Part 21)-2009, RA: 2019	200	600	452.0
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992;RA: 2019	0.003	No Relaxation	<0.002
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986,RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994;RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994;RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988, RA: 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994;RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52): 2019	0.05	No Relaxation	<0.05

Report Prepared By:

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Soumy Chakraborty, Microbiologist
(Authorized Signatory)

for **Qualissure Laboratory Services**
Reviewed & Authorized By

Bishnupriya Banerjee, Chemist
(Authorized Signatory)

------End of the Report------

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Annexure – 19


Central Pollution Control Board
Station: S
ETP_1_Outlet
BOD
TSS
COD
pH
0

Qualissure Laboratory Services

361, Prantick Pally, 45/361, Bose Pukur Road, Kolkata -700107
Email : qualissure@gmail.com; info@qualissure.com ; Mob.No. 98312 87086 ; 9830093976
TC-6271

DOC NO : QLS/SAMP/08-C/00

Annexure-20

TEST REPORT

Name & Address Of the Customer :		
M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O.: Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/23-24/C/970
	Date	: 30.01.2024
	Sample No.	: QLS/MR/A/23-24/970(A-D)
	Sample Description	: Noise Monitoring
	Date of Performance(s)	: 20.01.2024-30.01.2024
	Ref No. Date	: WS23715-001, Dt.15.07.2023

Monitoring Result of Noise

Sampling Done By: S.Ghosh/J.Sahana

Sampling Guideline : As per IS: 9876: 1981 (RA-2001)

Sample No	Date of Monitoring	Location	Leq dB (A) Day Time	Leq dB (A) Night Time
970A	16-17.01.2024	Near CPP Area	59.7	49.3
970B		Near Ferro Plant	61.8	48.5
970C	17-18.01.2024	Near Main Gate	59.2	45.3
970D		Near 600 TPD DRI	62.7	50.1

Code/ Category	Leq dB Day Time(A)	Leq dB Night Time(A)
A/Industrial	75	70
B/Commercial	65	55
C/Residential	55	45
D/Ecological Sensitive	50	40

NOTE:
Day Time : 06.00 Hr. – 22.00 Hr.
Night Time : 22.00 Hr. – 06.00 Hr.

Report Prepared By :

for Qualissure Laboratory Services
Reviewed & Authorized By

Benimadhab Gorai, Chemist
(Authorized Signatory)

----- End of the Report-----

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Type text here

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(Formerly Emami Cement Limited)

NUVOCO
Shaping a new world

To
The Director
Giridhan Metal Private Limited
Jamuria Industrial Estate, Po. Nandi,
Ps. Jamuria, Dist. Paschim Bardhaman,
West Bengal - 713344

Sub: MoU for procurement of Fly Ash @ 45400 MT/Annum and Bottom Ash 19500 MT/Annum for production of Cement.

Respected Sir / Madam,

With reference to the above subject, our management has decided to procure Fly Ash @ 45400 MT/Annum and Bottom Ash 19500 MT/Annum w.e.f 01st January 2025 for production of Cement as per our multiple discussions had with you and after analysis of fly ash and bottom ash generated through your Power Plant.

This will be cost effective for both of us as your plant is located within the distance of 50 Km radius.

Thanking you in anticipation for your extended co-operation to execute this MoU that will be helpful for both of us in terms of cost benefit and availability of RM for us and disposal of fly ash for yours.

Looking forward for better relationship in future as well.

Yours faithfully,

M/s NU Vista Limited'
(Formerly Emami Cement Limited)
Panagarh Cement Division.
Panagarh Industrial Park,
West Bengal-713148.

Mobile : 7063281706
7908160258

Maa RakhaKali Enterprise

GST IN : - 19ABLFM8725A1Z4

Vill. - Monoharbohal, P.O.- Ethora, P.S.- Barabani, Dist.- Paschim Bardhaman - 713359

Ref. No. ..... *Date* 05/01/2024

To,
The Giridhan Metal Private Limited
Jamuria Industrial Estate, P.O.: Nandi
P.S. Jamuria, Dist.- Paschim Bardhaman
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02nd January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Olant Bed Materials – 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at MANOHARBOHAL.

Thanking you
With Regards,
For Maa Rakhakali Enterprise

Maa Rakhakali Enterprise

GSTIN: 19AALIFM2450O1ZE

Mob 9732239603, 9933551352

M/S MICO ASH BRICKS

Manufacturer of Fly Ash Bricks

Gourangdi(Rupnarayanpur Road), Panuria, Burdwan,Pin- 713315, W.B.

email : rajuchodhury@gmail.com

Dated: 05/01/2024

To,
The Giridhan Metal Private Limited
Jamuria Industrial Estate, P.O.: Nandi
P.S. Jamuria, Dist.- Paschim Bardhaman
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02nd January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash - 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Olant Bed Materials - 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at PANURIA.

Thanking you
With Regards,
For Mico Ash Bricks

(Authorized Signatory)

M/S. MICO ASH BRICKS

Partner

JEO FLY ASH BRICKS

GSTIN: 19AASFJ6037A1Z9

VILL.: MANOHARBAHAL, P.O.: ETHORA, P.S.: ASANSOL NORTH
DIST.: PASCHIM BURDWAN, PIN:713359,

MOBILE: +91-99335-51352

Dated: 05/01/2024

To,
The Giridhan Metal Private Limited
Jamuria Industrial Estate, P.O.: Nandi
P.S. Jamuria, Dist.- Paschim Bardhaman
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02nd January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Olant Bed Materials – 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at MANOHARBOHAL.

Thanking you
With Regards,
For Jeo Fly Ash Bricks

(Authorized Signatory)

JEO FLY ASH BRICKS
Subrata Ukil

SHREE SWASTICK INDUSTRIES

39 G.T. Road, Bansra More P.O. Searsole Rajbari - 713358, Raniganj, Dist. Burdwan (W.B.)
Contact: (+91) 94340 34806 | shree_swastick@yahoo.com | www.shreeswastick.com

Manufacturers of cement bricks, paver blocks, designer tiles and precast products

Ref: SSI/23-24/APR/21-3
Date: 21-04-2023

To,
M/s. Giridhan Metal Private Limited
Jamuria Industrial Estate, Po. Nandi
P.s. Jamuria, Dist- Paschim Burdwan
(W.B) Pincode-713344

Kind. Attn: Director

Dear Sir,

As Discussed with you we are desirous of purchasing the following materials from your upcoming project as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – Forty Five to Fifty thousand tons per annum.

We would request you that whenever your plant commenced production we should be given priority to lift the aforesaid material.

Thanking You
Yours Faithfully

For Shree Swastick Industries

STUDY REPORT

ON

DE-CARBONISATION PROGRAM

FOR

EXISTING Steel Plant
by
M/s GIRIDHAN METAL PVT LIMITED
At

Jamuria Industrial Area,
Village-Ikra and Damodarpur
Tehsil-Jamuria, Dist- Paschim Bardhaman,
West Bengal

PREPARED BY

RECYCLING AND ENVIRONMENT INDUSTRY ASSOCIATION OF INDIA

Email: reiarecycle@gmail.com
Mobile:+919818049505 / 01144781917
Aug , 2023

TABLE OF CONTENTS

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PART I

1.1 Introduction

United Nations Intergovernmental Panel on Climate Change (IPCC) has issued warning that the Climate Resilient Development is difficult at the present levels of temperature of the globe. If the global warming results in temperature increase beyond 1.5°C (2.7°F), further energy intensive development will be extremely difficult. This significant conclusion emphasizes the need for a climate policy that prioritizes equity and justice, adequate finance, technology transfer and interventions, political commitment, and collaboration, which necessarily shall contribute to more successful climate change adaptation and emissions reductions.

Steel plays a crucial role in building a sustainable global economy, but its manufacturing is the fifth largest contributor to global GHG emissions. De-carbonization of the steel sector is therefore a global concern and a big challenge. This industry is under tremendous pressure to improve upon its energy intensity to reduce GHG emissions and to further utilize CO_2 captured for useful purposes or go for long term sequestration to fix it in nature's cycle.

This report describes the methods for GHG inventorisation for an existing steel plant of M/s Girdhan Metals Private Limited at Jamuria WB and the measures proposed to be adopted to mitigate GHG emissions from the project along with the carbon capture, storage and CO_2 sequestration strategies.

1.2 Carbon Emissions: different scopes of emissions

According to the Organizational Foot Printing Standard -ISO 14064-1, GHG emissions are categorised into 3 scopes :

Scope 1 emissions:

This includes the direct emissions that result from activities within the organization's control, e.g., on-site electricity generation, combustion in furnaces, heating/cooling operations at site; company-owned vehicles, fugitive emissions (e.g., refrigerants,emissions from fire extinguishers, refrigerators, circuit breakers etc).

Scope 2 emissions:

This includes indirect emissions from any electricity or heat or compressed air consumed that has been imported from outside the factory.

Scope 3 emissions:

This includes all of the indirect emissions that occur in the value chain, weighted according to the company's contribution. e.g., purchased goods and

services, employee commuting, business travel, upstream emissions from fuel extraction, waste management, T&D losses and electricity consumption and Ozone Depleting Substances refill for Work from Home. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels & raw materials and use of products and services from outside. There are generally following categories of activities under Scope 3 ;

Category 1: Purchased goods and services,
Category 2: Capital goods purchased,
Category 3: Upstream transportation and distribution,
Category 4: Solid Waste disposal outside plant premises,
Category 5: Business travel,
Category 6: Employee commuting,
Category 7: Upstream leased assets,
Category 8: Downstream transportation and distribution,
Category 9: Processing of sold products,
Category 10: Use of sold products,
Category 11: End-of-life treatment of sold products,
Category 12: Downstream leased assets,
Category 13: Franchises,
Category 14: Investments,
Category 15: Emissions during "Work from Home", etc.

According to the GHG Corporate Protocol, all organizations should quantify Scope 1 and 2 emissions when reporting and disclosing GHG emissions, while quantification of Scope 3 emissions is voluntary and may be reported by companies to identify the greatest GHG reduction opportunities across their value chain which in turn makes business activities more sustainable and competitive. Latest trend in the industry is to quantify GHG emissions for Scope 3 as far as possible.

1.3 Methodologies for GHG Emission calculations as:

Scope 1

The methodology used for GHG emissions calculations for use of fossil fuels and refrigerants is briefly described in IPCC emission factor guide book available on IPCC website and or GHG protocol website for different types of fuels ie, coal, coke, liquid fuels, NG, LPG, LNG, ODS etc. Emission Factors are available from the following reference attached as Annexure I;

https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf

Scope 2: External Electricity Consumption:

This may be noted that emission factor for electricity, can be obtained from CEA web site given below (Attached as Annexure II); The average grid factor for India for 2020-21 is 0.790 tCO2 per MWH.

https://cea.nic.in/wp-content/uploads/tpecc/2022/02/User_Guide_ver_17_2021.pdf

For imported steam and compressed air, the supplier of these utilities should provide information on CO_2 emission per NM^3 of steam or compressed air.

Scope 3:

Upstream Transportation and Distribution: Emissions due to upstream transportation in tCO_2e = "Total distance travelled * Emission Factor".The emission Factors are available in Annexure III; Downstream Transportation and Distribution: Emissions due to downstream transportation of products in tCO_2e = "Total distance travelled * Emission Factor" but the same has not been considered in present scope as the destinations for the products after leaving the factory gate are not available. Scope 3 emissions for employees commute based on certain assumptions are presented in spreadsheets attached.

1.4 Carbon Neutrality

Carbon neutrality refers to a balance between carbon emissions and carbon absorption from the atmosphere in carbon sinks. General strategy to be adopted by the project proponent to reduce GHG emissions and absorb carbon is defined below;

Scope 1 Emissions Reduction

a. **Reduce fuel consumption and improve operational energy efficiency.**
b. **Capital investments in newer, more energy-efficient equipment/technologies to lower operating costs while also lowering emissions.**
c. **Conducting energy audits at workplaces where electricity and fuel consumption is high in order to identify better alternatives and save money on energy consumption.**
d. **For carbon neutrality, CER may be considered to be purchased based on calculated footprint. CERs are electronic certificates issued for greenhouse gas emission reductions from CDM project activities or programmes of activities (PoAs) in accordance with CDM rules and requirements.**

Scope 2 Emissions Reduction

It may be noted that when Project Proponent buy Renewable Energy credits (RECs), they would enable more clean energy projects to supply power to the grid where they operate. Grid operators want to buy the cheapest power possible because energy from wind and solar plants is frequently less expensive than energy from coal-burning plants. As a result, by purchasing RECs, Project Proponent shall effectively be reducing carbon emissions by reducing brown power intake from the grid.

Scope 3 Emission Reduction

Optimisation of employee commute, business travel, rail transport, local Out sourcing are some of the measures taken to reduce scope 3 emissions. Vocal for local is the business policy of Proponent.

******

PART II

PROJECT DETAILS

2.1 TYPE OF THE PROJECT

The company GMPL is having an existing Integrated Steel Plant (Sponge Iron - 3,18,000 TPA ; MS Billets -3,72,300 TPA , Rolling Mill -3,00,000 TPA; Submerged Arc Furnaces (SAF) - 30,000 TPA (Fe-Mn/Si-Mn) , Captive Power Plant 42 MW including Waste Heat Recovery Boiler (WHRB) (21 MW) at Jamuria Industrial Estate, Village Ikra & Damodarpur, Tehsil Jamuria, District Paschim Bardhaman, West Bengal.

The existing plant area is 31.75 hectares (78.44 acres);

2.2 MAGNITUDE OF THE OPERATION

Size or magnitude of operation for the project and its expansion project is given below:

Table: 2.1 Details of expansion

	Existing Units as per EC J-11011/366/2010-IA. II(I) dated 8th April, 2021 as amended on 16th Jan, 2023		Capacity as per Granted CTO
Name	Configuration	Production (TPA)	Production (TPA)
Sponge Iron (DRI Plant)	1 x 350 &1 x 600 TPD DRI Plant	3,18,000 TPA	3,18,000 TPA (330 days/365 days)
MS Billets (Induction Furnace with LF & CCM)	6 x 20 Ton IF (Induction Furnace) & 1X30 Ton LF (Ladle Furnace)	3,72,300 TPA	3,72,300 TPA
Rolling Mill	Rolled bars/light structure	3,00,000 TPA	3,00,000 TPA
Submerged Arc Furnace (SAF)	2 x 9 MVA of Fe-Mn/Si-Mn	30,000 TPA	30,000 TPA
Waste Heat Recovery	35 TPH & 70 TPH	21 MW	35 TPH & 70 TPH

Boiler (WHRB)			
Captive Power Plant	1x 32 TPH & 50 TPH FBC boiler	21 MW	21 MW (1x82 TPH FBC boiler)
Billet Caster	2x2 Strand	-	2x2 Strand

Source: *Pre-feasibility Report*

2.3 Material Requirements for the Project

The project requirement such as raw material, water, power, manpower with source of supply is described in the section below:

2.3.1 Raw Material Requirement for the Project

The basic raw material for the manufacturing of Steel is Iron Ore Lumps/Fines which is being/will be sourced from nearby markets by rail/road. Details regarding quantity of raw materials required their source along with mode of transportation for expansion project have been tabulated below:

Table 2.2 Raw Material Requirement

S. No.	Required raw material	Quantity and Source of raw material TPA		Mode of transportation	Distance from plant site,Km
I	Sponge Iron				
1.	Iron Ore	4,77,000	Odisha & Jharkhand	Rail/Road	250-280
2.	Coal Imported	2,00,340	Overseas	Road/Rail from Port	300
	Indian Coal for DRI	85,860	ECL,	Rail/Road	60-80
3	Dolomite	11,130	Bhutan	Rail/Road	900-920

II	Steel Meting Shop				
1	Pig Iron	53,000	TATA Steel, SAIL,	Rail/Road	150-170
2	Sponge Iron (DRI)- In house	318000	Own	Own	Nil
3	Sponge Iron (DRI)- Purchased	47000	Nearby Mills	Road	50
4	Scrap	32180	Market	Rail/Road	300
5	Ferro Alloys	4,840	Own	Own	Own
III	Caster				
1	Liquid Steel	3,72,300	Own Production		
IV	Ferro Alloys				
1	Mn Ore	75,000	Odisha	Rail/Road	900-950
2	Coal	12600			
3	Coke	12600	Local	Road	50
3	Electrode Paste	600	Maharashtra	Road	500
4	Dolomite	8,000	Bhutan	Rail/Road	900-920
V	Power Plant				
7	Coal for CPP	75,000	CIL	Rail/Road	60-80

2.3.2 Water Requirement

Total make-up water requirement for Existing plant is 4178 KLD which will be sourced from Surface Water (River Damodar) through Damodar Valley Corporation (DVC)) and Asansol Municipal Corporation. The water is being/will be supplied from Damodar river.

2.3.3 Power Requirement & D.G set Details

The existing power requirement is 84.3 MW. Own generation is 42 MW. 14.4 MW is connected with Ferro Alloy plant.

DG Set Details

Three Numbers 2000 KVA DG Sets with 10 m stack height above roof level have been installed in existing plant. DG set are used only as an emergency back-up system.

2.3.4 Manpower Requirement

Manpower of the existing plant is 2003 persons (408 persons regular & 1595 persons contractual).

2.4 MAJOR EQUIPMENT AND MACHINERIES

2.4.1 TECHNOLOGY &PROCESS DESCRIPTION

Plant consists of following unit operation steps:

- Direct Reduced Iron (DRI) in DRI Plant
- SMS - Induction Furnace (IF) , LRF and Continuous Caster
- Rolling Mills
- Ferro Alloy Plant
- Power Plant

A. DRI Plant (1 x 350 +3 x 600 TPD)

Table 2.3 Material Balance for DRI Kilns (Maximum for all Kilns)

Input in PA		Output in TPA	
Pellet/Iron Ore	4,77,000	DRI	3,18,000

Imported coal (70%)	2,00,340	Char	47,700
Indian coal (30%)	85,860	APC Dust	51,675
Combustion air	13,64,220	Flue gas	17,19,225
Dolomite	11,130	Kiln Accretion	1,950
Total	21,38,550	Total	21,38,550

B. Steel Melt Shop (SMS)

6 Nos of Induction furnaces of capacity 20 T each have been installed.

LRF of Capacity 30 T for treatment and temperature adjustment of liquid steel tapped from induction furnaces is installed..

Double Strand Medium Speed Modular Billet Caster (4 x 2 Strand). In general 130 mm billets shall be processed.

Table 2.4 Material Balance for Induction Furnace

Existing: 6 x 20 T IF (Max)

Input in TPA		Output in TPA	
Pig Iron	53,000	Liquid steel	3,72,300
DRI (Captive)	3,18,000	Slag	52,120
DRI Purchased	47000		
Ferro Alloys (Si-Mn)	4,800	Fume	30,560
Scrap	32,180	-	-
Total	4,54,980	Total	4,54,980

C. Rolling Mills

Major Equipment & Specifications/Scope of Supply –

Rebar Mill –1 x 3,00,000 TPA

D. Ferro Alloys (2x9MVA)

Table 2.5 Material Balance for Fe-Mn/Si-Mn production

Mn Ore	75,000	Ferrol Alloys	30,000
Dolomite	8,000	Slag	28,500
Coke	12,600	Gaseous Emission	50,440
Coal	12,600		
Electrode Paste	600		
Total	1,08,940	Total	1,08,940

2.5. Solid & Hazardous Waste Management

The details are tabulated below: -

Table 2..7- Solid & Hazardous Waste Quantity & Management Scheme

Solid& Hazardous waste	Generated from	Quantity (TPA) Existing	Utilization Measures
CPP Fly ash	Captive Power plant	45,267	Used for making fly ash brick in nearby bricks manufacturing unit.
CPP Bottom ash		19,400	Use for making paver block. Supplied to cement plant to make Portland cement production.
Fe-Mn Slag	Ferro Alloy Plant	28500	Used for Si-Mn production.
IF slag	Induction furnace	54192	River sand substitute, land fill after iron separation.
Dolochar	Sponge Iron Plant	47700	Use in FBC for power generation & in sister concerned company
Kiln Accretion	Sponge Iron	1950	Road Making & Land fill
Mill scale & scrap	Rolling Mill	12210	To be fully consumed in plant
APC Dust	DRI Kilns	46,215	Dumped in abandoned OCP of Eastern coalfields Limited (ECL)
ETP Sludge	ETP	10	Disposed off at Secured landfill site through authorized and approved vendor
Used oil and grease	Maintenance	10	Sold to Authorized vendor.

No hazardous waste is being /will be generated except the Used oil and oily waste which is being/will be collected in drums, temporarily stored at earmarked place stored as per Hazardous & Other Waste (Management & Trans-boundary Movement) Rules,2016 and is being /will be sold to the authorized CPCB recyclers/pre-processors. ETP Sludge will be disposed off

at Secured land fill site through authorized and approved vendor. Contaminated cotton and wiping clothes collected from all units will be incinerated in the CPP as fuel.

2.6. Greenbelt Development & Plantation

Existing green belt is developed in 10.42 hectares (32.82% of the total area) by planting trees to the tune of 2500 trees/ha.

2.7 HSD Consumption

Estimated HSD consumption per year

Particulars	Existing
Consumption in Charging, RM handling by heavy vehicles inside the plant	148600 L
Consumption in DG set testing	1296 L
Actual consumption on DG when power is unavailable	14240 L
DRI – Light up	20000 L
CFBC – Start up	6000 L
Total	190136 L

2.8 Fire Extinguisher (CO_2)

Capacity of Cylinder	Quantity (Nos.)
10 Kgs	4
9.50 Kgs	6
6.50 Kgs	41
2 Kgs	2
9 Kgs	25

2.9 Refrigerant Consumption

- GMPL do not use SF6 in their Breakers. All breakers are 11 KV.
- There are no chillers in the plant.
- Installed capacity of Air conditioners - 612 Tonnes
  Gas R-410A, R-407 is being used in ACs

****

PART III - GHG INVENTORISATION AND MITIGATION STRATEGY

3.1 Identification of GHG Sources in the Plant

3.1.1 The GHG emission and removal activities of the existing plant in general, are presented in the table below:

S. No.	GHG Emission related Activity	Scope
1	Coal, LPG, FO, LDO, Diesel consumption in furnaces and Diesel/Petrol consumption in internal vehicles.	Scope 1
2	LAM Coke and other reducing agents and raw materials consumption in process	Scope 1
3	Coal used in Thermal Power generation and DRI at site	Scope 1
4	Diesel Consumption in DG Sets and start up for Boilers	Scope 1
5	Fugitive emissions from chillers if installed	Scope 1
6	CO2 type fire extinguishers refilled	Scope 1
7	Use of Refrigerants in AC and Refrigerators.	Scope1
8	HF6 consumption (if used in HV breakers)	Scope 1
9	Electricity purchased from grid	Scope 2
10	Steam, Compressed air purchased from outside	Scope 2
11	Employees Commute	Scope 3
12	Transportation of Raw materials from nearest Source to the Plant	Scope 3
13	Any other activity from Section 2 Scope 3 of Part I of this report	Scope 3
14	Renewable Energy Purchase	Scope 2
15	Green Belt credits	Scope 1
16	Plantation outside	Scope 3

3.1.2 Likely Credits/Removal Activities

a) Green Belt Development.
b) 100 % Solid Waste utilisation as Substitute to valuable minerals
c) Use of Renewable Energy (5% REC credits)
d) Hot charging of billets/slabs
e) Waste heat recovery from SAFs
f) Plantation out side the factory premises.
g) Rainwater harvesting.
h) CO2 Capture and Storage.

3.2 Selection of GHG Quantification Methodology

The methodologies used are based on factors presented in the Inter governmental Panel on Climate Change (IPCC) 2006 "Guidelines for National Greenhouse Gas Inventories, 2006" and subsequent revisions. The report is based on calculation "GHG activity data multiplied by GHG emission factor". The Plant has identified its GHG emission sources and sinks according to scope of emissions i.e. Scope 1, Scope 2 and Scope 3 from its organisation boundary which are categorised as follows:

The links for accessing the emission factors are given in Part I of this report.

3.3 Summary of GHG Emissions from the Existing Plant

SUMMARY OF GHG EMISSIONS FROM EXISTING PLANT OF GIRDHAN METAL PVT LIMITED

A- STEEL MAKING AND ROLLING INCLUDING CPP AND UTILITIES

	Unit- T CO2 /Year Existing Plant
Scope 1 Process Emissions	847699
Scope 1 Fuel at Site	490950
Scope 1 Air conditioning	498
Scope 2 Grid Electricity	166630
TOTAL	1505777
Credits	106419
Net Emissions	1401358
Crude Steel Production TPA MTPA	372300
Specific CO2 Emission, tCO2/tcs	3.76

B. FERRO ALLOYS PRODUCTION

Scope 1 Process Emissions	68164
Scope 2 Grid Electricity	86003
TOTAL	154167
FA Production, MTPA	30000
Specific CO2 Emission, tCO2/tcs	5.1

C. SCOPE 3 EMISSIONS.

Employees Commute	5.4

Transport of Raw Materials to Plant	**Steel**	**34**
Transport of Raw Materials to Plant	**FA**	**11.6**

3.4 GHG Emission Reduction Strategy

A. The facilities for GHG mitigation by resource conservation, energy recovery and GHG reduction are suggested as follows;

a. **Heat Recovery from flue gases of SAF for pre heating of the charge.**
b. **Dry gas cleaning of SAF Flue gases and recovery of Heat.**
c. **4th Hole extraction system in the SAF helps increase the energy efficiency of the furnaces.**
d. **Increased hot charging of billets to minimize the heat requirement for rolling.**
e. **Installation of Recuperator in RHF**
f. **100 % solid waste utilization to conserve resources by installation of briquetting and micro pelletising facilities for fines collected from PCDs and road /floor sweeping.**
g. **Carbon capture shall be explored subject to end user/ identification of storage locations and collaboration.**

OBSERVATIONS:

h. **Coal Consumption in DRI is on higher side , specifically when 70% imported coal having low ash is being used.**
i. **Pellet/Iron ore consumption per ton of DRI is around 1.6 T/ton of DRI. This is higher than the current practices in good operation plants.**
j. **Coke/Coal consumption in FAP is on higher side. Specific CO2 emission from FA Plant is high.**

B. Green Belt Credit

The plantation and green belt development will also be taken care in the plant and the space reserved for plantation will be more than 40% of the total plant area i.e. >34 Acres. Project Proponent will take-up extensive green belt development by planting about 1000 trees per Ac. it has been proposed to develop 15 meters wide green belt along the periphery inside the factory premises.

On an average, one acre of new forest can sequester about 2.5 tons of carbon annually. Young trees absorb CO2 at a rate of 6 kg per tree each year. Trees reach their most productive stage of carbon storage at about 10 years at which point they are estimated to absorb 22 kg of CO2 per year. At that rate, they release enough oxygen back into the atmosphere to support two human beings. Planting 100 million trees could reduce an estimated 18

million tons of carbon per year and consequently save American consumers $4 billion each year on utility bills.

http://urbanforestrynetwork.org/benefits/air%20quality.htm

C. Energy Transition from Fossil Fuel to Green Energy

The use of green hydrogen as fuel could help phase out coal, and enable India to move towards net-zero emissions. India has announced its commitment to reach net-zero greenhouse gas (GHG) emissions by 2070. GMPL will take necessary steps to adopt hydrogen based steel making technology as soon as the same is available at affordable cost.

D. GHG Emission Reduction, Carbon Capture & Storage and Utilisation of CO2.

a. GHG Emission Reduction

The existing plant has been implemented using state-of-the art technologies for optimum consumption of fossil fuel based energy and other resources. In addition, a very compact layout has been planned for the project to minimise in plant transportation and handling of raw materials and products. All raw materials and utilities shall be purchased from vendors/partners after ensuring that they also follow sustainable environment and energy management practices. GMPL plant shall be certified to ISO 14001 and ISO 50001 Management Systems.

The fines and scrap generated during the process are being recycled within the plant for use in the production process. Water consumption would also be optimised to reduce pumping energy consumption. Energy conservation and energy recovery facilities to be installed along with main plant and equipment shall be commissioned with the main plant. These facilities are summarised below:

1. **Hot charging of billets to minimise the heat requirement for rolling.**
2. **Waste heat recovery from SAF**
3. **Use of high pressure steam from WHRB to maximise power recovery in DRI kilns .**
4. **Installation of LED lights and solar power generation on Roof Tops.**
5. **Use of variable speed drives to reduce power consumption in units operating on variable loads.**
6. **Use of large capacity loaders, dumpers, ladles and transport vehicles to reduce fuel consumption.**
7. **Maximum solid waste utilisation to conserve resources by installation of briquetting facilities for fines collected from PCDs and road /floor sweeping.**

8. **Use of Slag in cement plants to enhance circular economy and reduce the emissions in cement sector thereby PP can claim credits for such sold quantities as per applicable emission factors).**
9. **Additional measures planned to reduce carbon dioxide emissions are elaborated in Section below;**

b. Carbon Capture and Use

Carbon Capture practice is picking up in steel industry. DRI flue gases could be explored for CO_2 recovery using absorption or adsorption technologies and potentially used in downstream industry and also in the steel plant for following purposes;

1. **Conditioning of SMS slag in presence of steam to convert the slag into concrete or slag sand for use in construction industry.**
2. **Conditioning of SMS slag with CO_2 to make it suitable for use in Cement making.**
3. **Sale to companies manufacturing CO_2 extinguishers.**
4. **Sale to companies making precipitated Calcium Carbonate used as base for most of the medicine tablets.**
5. **Synthesis of CO_2 into ethanol > This technology has been studied and pilot facility being set up by ArcelorMittal, Europe. Upon successful demonstration and commercial scale up, can be explored by PP**

c. Carbon Sequestration

Carbon sequestration offers greater hope for addressing the issue of controlling Global Warming. The following practices shall be adopted by PP to initiate carbon sequestration:

1. **In immediate future 40 % percent of the plant area shall be covered under green belt with tree density of 2500 trees per ha.**
2. **In collaboration with local forest department trees shall be planted by PP in degraded forest land.**

GMPL remains committed to the nation's pledge of achieving carbon neutrality by 2070. Even after 2030, we will continue our efforts to bring down the emission intensity at the same or much faster rate.

3.5 Quality Assurance /Quality Control

To ensure the credibility of the inventory, rigorous QA/QC procedures shall be followed to ensure the accuracy, transparency, and verifiability of the estimates.

The following issues shall be addressed:

1. **GMPL shall ensure that the best and most accurate emission**

factors are being used. Custom emission factors shall be calculated as far as possible. The methodology used to compute the company or plant specific custom emission factors shall be documented and strictly followed with necessary QA/QC checks, in line with IPCC guidelines.

2. If plant-specific information on the amount of coke used as reducing agent is available, this information shall be used. However, if this is not available, coke and petroleum consumption on a company-wide basis shall be used to estimate the mass of reducing agent.

3. **Plant and company-wide activity data shall be checked to ensure that there is no double accounting.**
4. **Experts involved in GHG accounting shall be trained to account for energy consumption as per WSA and BEE guidelines.**

3.6 Reporting and Documentation

GMPL is interested in auditing and certifying their GHG emissions. In order to ensure that estimates are verifiable, quantitative input data used to develop emission estimates shall be clearly documented, including listing of the relevant year. Records shall be maintained. Standard Operating Procedure shall be developed for calculations and data collection for verification and auditing of GHG inventory.

Emission Factors for Greenhouse Gas Inventories

Last Modified: 1 April 2021

Red text indicates an update from the 2020 version of this document.

Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Gases are converted to CO_2e by multiplying by their global warming potential (GWP). The emission factors listed in this document have not been converted to CO_2e. To do so, multiply the emissions by the corresponding GWP listed in the table below.

Gas	100-Year GWP
CH_4	25
N_2O	298

Source: Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4), 2007. See the source note to Table 11 for further explanation.

Table 1 Stationary Combustion

Fuel Type	Heat Content (HHV)	CO_2 Factor	CH_4 Factor	N_2O Factor	CO_2 Factor	CH_4 Factor	N_2O Factor
	mmBtu per short ton	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per short ton	g CH_4 per short ton	g N_2O per short ton
Coal and Coke							
Anthracite Coal	25.09	103.69	11	1.6	2,602	276	40
Bituminous Coal	24.93	93.28	11	1.6	2,325	274	40
Sub-bituminous Coal	17.25	97.17	11	1.6	1,676	190	28
Lignite Coal	14.21	97.72	11	1.6	1,389	156	23
Mixed (Commercial Sector)	21.39	94.27	11	1.6	2,016	235	34
Mixed (Electric Power Sector)	19.73	95.52	11	1.6	1,885	217	32
Mixed (Industrial Coking)	26.28	93.90	11	1.6	2,468	289	42
Mixed (Industrial Sector)	22.35	94.67	11	1.6	2,116	246	36
Coal Coke	24.80	113.67	11	1.6	2,819	273	40
Other Fuels - Solid							
Municipal Solid Waste	9.95	90.70	32	4.2	902	318	42
Petroleum Coke (Solid)	30.00	102.41	32	4.2	3,072	960	126
Plastics	38.00	75.00	32	4.2	2,850	1,216	160
Tires	28.00	85.97	32	4.2	2,407	896	118
Biomass Fuels - Solid							
Agricultural Byproducts	8.25	118.17	32	4.2	975	264	35
Peat	8.00	111.84	32	4.2	895	256	34
Solid Byproducts	10.39	105.51	32	4.2	1,096	332	44
Wood and Wood Residuals	17.48	93.80	7.2	3.6	1,640	126	63
	mmBtu per scf	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per scf	g CH_4 per scf	g N_2O per scf
Natural Gas							
Natural Gas	0.001026	53.06	1.0	0.10	0.05444	0.00103	0.00010
Other Fuels - Gaseous							
Blast Furnace Gas	0.000092	274.32	0.022	0.10	0.02524	0.000002	0.000009
Coke Oven Gas	0.000599	46.85	0.48	0.10	0.02806	0.000288	0.000060
Fuel Gas	0.001388	59.00	3.0	0.60	0.08189	0.004164	0.000833
Propane Gas	0.002516	61.46	3.0	0.60	0.15463	0.007548	0.001510
Biomass Fuels - Gaseous							
Landfill Gas	0.000485	52.07	3.2	0.63	0.025254	0.001552	0.000306
Other Biomass Gases	0.000655	52.07	3.2	0.63	0.034106	0.002096	0.000413
	mmBtu per gallon	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per gallon	g CH_4 per gallon	g N_2O per gallon
Petroleum Products							
Asphalt and Road Oil	0.158	75.36	3.0	0.60	11.91	0.47	0.09
Aviation Gasoline	0.120	69.25	3.0	0.60	8.31	0.36	0.07
Butane	0.103	64.77	3.0	0.60	6.67	0.31	0.06
Butylene	0.105	68.72	3.0	0.60	7.22	0.32	0.06
Crude Oil	0.138	74.54	3.0	0.60	10.29	0.41	0.08
Distillate Fuel Oil No. 1	0.139	73.25	3.0	0.60	10.18	0.42	0.08
Distillate Fuel Oil No. 2	0.138	73.96	3.0	0.60	10.21	0.41	0.08
Distillate Fuel Oil No. 4	0.146	75.04	3.0	0.60	10.96	0.44	0.09
Ethane	0.068	59.60	3.0	0.60	4.05	0.20	0.04
Ethylene	0.058	65.96	3.0	0.60	3.83	0.17	0.03
Heavy Gas Oils	0.148	74.92	3.0	0.60	11.09	0.44	0.09
Isobutane	0.099	64.94	3.0	0.60	6.43	0.30	0.06
Isobutylene	0.103	68.86	3.0	0.60	7.09	0.31	0.06
Kerosene	0.135	75.20	3.0	0.60	10.15	0.41	0.08
Kerosene-Type Jet Fuel	0.135	72.22	3.0	0.60	9.75	0.41	0.08
Liquefied Petroleum Gases (LPG)	0.092	61.71	3.0	0.60	5.68	0.28	0.06
Lubricants	0.144	74.27	3.0	0.60	10.69	0.43	0.09
Motor Gasoline	0.125	70.22	3.0	0.60	8.78	0.38	0.08
Naphtha (<401 deg F)	0.125	68.02	3.0	0.60	8.50	0.38	0.08
Natural Gasoline	0.110	66.88	3.0	0.60	7.36	0.33	0.07
Other Oil (>401 deg F)	0.139	76.22	3.0	0.60	10.59	0.42	0.08
Pentanes Plus	0.110	70.02	3.0	0.60	7.70	0.33	0.07
Petrochemical Feedstocks	0.125	71.02	3.0	0.60	8.88	0.38	0.08
Propane	0.091	62.87	3.0	0.60	5.72	0.27	0.05
Propylene	0.091	67.77	3.0	0.60	6.17	0.27	0.05
Residual Fuel Oil No. 5	0.140	72.93	3.0	0.60	10.21	0.42	0.08
Residual Fuel Oil No. 6	0.150	75.10	3.0	0.60	11.27	0.45	0.09
Special Naphtha	0.125	72.34	3.0	0.60	9.04	0.38	0.08
Unfinished Oils	0.139	74.54	3.0	0.60	10.36	0.42	0.08
Used Oil	0.138	74.00	3.0	0.60	10.21	0.41	0.08
Biomass Fuels - Liquid							
Biodiesel (100%)	0.128	73.84	1.1	0.11	9.45	0.14	0.01
Ethanol (100%)	0.084	68.44	1.1	0.11	5.75	0.09	0.01
Rendered Animal Fat	0.125	71.06	1.1	0.11	8.88	0.14	0.01
Vegetable Oil	0.120	81.55	1.1	0.11	9.79	0.13	0.01
Biomass Fuels - Kraft Pulping Liquor, by Wood Furnish							
North American Softwood		94.4	1.9	0.42			
North American Hardwood		93.7	1.9	0.42			
Bagasse		95.5	1.9	0.42			
Bamboo		93.7	1.9	0.42			
Straw		95.1	1.9	0.42			

Source:
Federal Register EPA; 40 CFR Part 98; e-CFR, (see link below). Table C-1, Table C-2 (as amended at 81 FR 89252, Dec. 9, 2016), Table AA-1 (78 FR 71965, Nov. 29, 2013).
[illegible]
Note: Emission factors are per unit of heat content using higher heating values (HHV). If heat content is available from the fuel supplier, it is preferable to use that value. If not, default heat contents are provided.

Table 2 Mobile Combustion CO_2

Fuel Type	kg CO_2 per unit	Unit
Aviation Gasoline	8.31	
Biodiesel (100%)	9.45	gallon
Compressed Natural Gas (CNG)	0.05444	scf
Diesel Fuel	10.21	gallon
Ethanol (100%)	5.75	gallon
Kerosene-Type Jet Fuel	9.75	gallon
Liquefied Natural Gas (LNG)	4.50	gallon
Liquefied Petroleum Gases (LPG)	5.68	gallon
Motor Gasoline	8.78	gallon
Residual Fuel Oil	11.27	gallon

Source:
Federal Register EPA; 40 CFR Part 98; e-CFR, (see link below). Table C-1 (as amended at 81 FR 89252, Dec. 9, 2016).
[illegible]
LNG: The factor was developed based on the CO_2 factor for Natural Gas factor and LNG fuel density from GREET1_2020.xlsm Model, Argonne National Laboratory.

Table 3 Mobile Combustion CH_4 and N_2O for On-Road Gasoline Vehicles

Vehicle Type	Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)
Gasoline Passenger Cars	1973-74	0.1696	0.0197
	1975	0.1423	0.0443
	1976-77	0.1406	0.0458
	1978-79	0.1389	0.0473
	1980	0.1326	0.0499
	1981	0.0802	0.0626
	1982	0.0795	0.0627
	1983	0.0782	0.0630
	1984-93	0.0704	0.0647
	1994	0.0617	0.0603
	1995	0.0531	0.0560
	1996	0.0434	0.0503
	1997	0.0337	0.0446
	1998	0.0240	0.0389
	1999	0.0215	0.0355
	2000	0.0175	0.0304
	2001	0.0105	0.0212
	2002	0.0102	0.0207
	2003	0.0095	0.0181
	2004	0.0078	0.0085
	2005	0.0075	0.0067
	2006	0.0076	0.0075
	2007	0.0072	0.0052
	2008	0.0072	0.0049
	2009	0.0071	0.0046
	2010	0.0071	0.0046
	2011	0.0071	0.0046
	2012	0.0071	0.0046
	2013	0.0071	0.0046
	2014	0.0071	0.0046
	2015	0.0068	0.0042
	2016	0.0065	0.0036
	2017	0.0054	0.0018
	2018	0.0052	0.0016
Gasoline Light-Duty Trucks (Vans, Pickup Trucks, SUVs)	1973-74	0.1908	0.0218
	1975	0.1634	0.0513
	1976	0.1594	0.0555
	1977-78	0.1614	0.0534
	1979-80	0.1594	0.0555
	1981	0.1479	0.0660
	1982	0.1442	0.0681
	1983	0.1368	0.0722
	1984	0.1294	0.0764
	1985	0.1220	0.0806
	1986	0.1146	0.0848
	1987-93	0.0813	0.1035
	1994	0.0646	0.0982
	1995	0.0517	0.0908
	1996	0.0452	0.0871
	1997	0.0452	0.0871
	1998	0.0412	0.0787
	1999	0.0333	0.0618
	2000	0.0340	0.0631
	2001	0.0221	0.0379
	2002	0.0242	0.0424
	2003	0.0221	0.0373
	2004	0.0115	0.0088
	2005	0.0105	0.0064
	2006	0.0108	0.0080
	2007	0.0103	0.0061
	2008	0.0095	0.0036
	2009	0.0095	0.0036
	2010	0.0095	0.0035
	2011	0.0096	0.0034
	2012	0.0096	0.0033
	2013	0.0095	0.0035
	2014	0.0095	0.0033
	2015	0.0094	0.0031
	2016	0.0091	0.0025
	2017	0.0084	0.0018
	2018	0.0081	0.0015
Gasoline Heavy-Duty Vehicles	<1981	0.4604	0.0497
	1982-84	0.4492	0.0538
	1985-86	0.4090	0.0515
	1987	0.3675	0.0849
	1988-1989	0.3492	0.0933
	1990-1995	0.3246	0.1142
	1996	0.1278	0.1680
	1997	0.0924	0.1726
	1998	0.0655	0.1750
	1999	0.0648	0.1724
	2000	0.0630	0.1660
	2001	0.0577	0.1468
	2002	0.0634	0.1673
	2003	0.0602	0.1553
	2004	0.0298	0.0164
	2005	0.0297	0.0082
	2006	0.0299	0.0241
	2007	0.0322	0.0015
	2008	0.0340	0.0015
	2009	0.0339	0.0015
	2010	0.0320	0.0015
	2011	0.0304	0.0015
	2012	0.0313	0.0015
	2013	0.0313	0.0015
	2014	0.0315	0.0015
	2015	0.0332	0.0021
	2016	0.0321	0.0061
	2017	0.0329	0.0084
	2018	0.0326	0.0082
Gasoline Motorcycles	1960-1995	0.0899	0.0087
	1996-2018	0.0672	0.0069

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018. All values are calculated from Tables A-105 through A-110.

Table 4 Mobile Combustion CH_4 and N_2O for On-Road Diesel and Alternative Fuel Vehicles

Vehicle Type	Fuel Type	Vehicle Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)
Passenger Cars	Diesel	1960-1982	0.0039	0.0073
		1983-1995	0.0018	0.0010
		1996-2006	0.0018	0.0010
		2007-2018	0.0035	0.0126
Light-Duty Trucks	Diesel	1960-1982	0.0011	0.0017
		1983-1995	0.0009	0.0014
		1996-2006	0.0010	0.0015
		2007-2018	0.0018	0.0014
Medium- and Heavy-Duty Vehicles	Diesel	1960-2006	0.0051	0.3049
		2007-2018	0.0035	0.3407
Light-Duty Cars	Methanol		0.0080	0.0080
	Ethanol		0.0080	0.0080
	CNG		0.0820	0.0080
	LPG		0.0080	0.0080
	Biodiesel		0.0200	0.0130
Light-Duty Trucks	Ethanol		0.2720	0.2110
	CNG		0.1230	0.0710
	LPG		0.0720	0.0730
	LNG		0.1230	0.0710
	Biodiesel		0.0200	0.0270
Medium-Duty Trucks	CNG		4.2000	0.2670
	LPG		0.0140	0.0240
	LNG		4.2000	0.2408
	Biodiesel		0.2000	0.2810
Heavy-Duty Trucks	Methanol		0.0750	0.0280
	Ethanol		0.0750	0.0280
	CNG		2.7500	0.2670
	LPG		0.0730	0.0280
	LNG		2.7500	0.2670
	Biodiesel		0.2000	0.2408
Buses	Methanol		0.0220	0.0120
	Ethanol		0.0220	0.0120
	CNG		0.0900	0.2670
	LPG		0.0240	0.0170
	LNG		0.0900	0.2670
	Biodiesel		0.0900	0.2408

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. All values are calculated from Tables A-115 through A-119.

Table 5 Mobile Combustion CH_4 and N_2O for Non-Road Vehicles

Vehicle Type	Fuel Type	CH_4 Factor (g / gallon)	N_2O Factor (g / gallon)
Ships and Boats	Residual Fuel Oil	0.55	0.55
	Gasoline (2 stroke)	9.54	0.08
	Gasoline (4 stroke)	4.58	0.23
	Diesel	0.21	0.95
Locomotive	Diesel	0.80	0.26
Aircraft	Jet Fuel	0	0.80
	Aviation Gasoline	7.95	0.11
Agricultural Equipment[a]	Gasoline (2 stroke)	12.96	0.08
	Gasoline (4 stroke)	7.24	0.21
	Diesel	0.26	0.93
	LPG	0.19	0.39
Agricultural Offroad Trucks	Gasoline	7.24	0.21
	Diesel	0.13	0.93
Construction/Mining Equipment[b]	Gasoline (2 stroke)	12.43	0.08
	Gasoline (4 stroke)	5.58	0.20
	Diesel	0.20	0.47
	LPG	0.26	0.47
Construction/Mining Offroad Trucks	Gasoline	5.58	0.20
	Diesel	0.12	0.93
Lawn and Garden Equipment	Gasoline (2 stroke)	15.87	0.08
	Gasoline (4 stroke)	5.84	0.19
	Diesel	0.33	0.47
	LPG	0.28	0.47
Airport Equipment	Gasoline	2.58	0.24
	Diesel	0.17	0.93
	LPG	0.23	0.47
Industrial/Commercial Equipment	Gasoline (2 stroke)	15.14	0.08
	Gasoline (4 stroke)	5.48	0.20
	Diesel	0.23	0.47
	LPG	0.44	0.47
Logging Equipment	Gasoline (2 stroke)	12.03	0.08
	Gasoline (4 stroke)	5.71	0.19
	Diesel	0.13	0.93
Railroad Equipment	Gasoline	5.58	0.19
	Diesel	0.19	0.93
	LPG	0.26	0.47
Recreational Equipment	Gasoline (2 stroke)	7.51	0.03
	Gasoline (4 stroke)	9.48	0.19
	Diesel	0.47	0.47
	LPG	0.28	0.39

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. All values are calculated from Tables A-117 through A-118.

Notes:

[a] Includes equipment such as tractors and combines, as well as fuel consumption from trucks that are used off-road in agriculture.

[b] Includes equipment such as cranes, dumpers, and excavators, as well as fuel consumption from trucks that are used off-road in construction.

Table 6 Electricity

eGRID Subregion	Total Output Emission Factors: CO_2 Factor (lb / MWh)	Total Output Emission Factors: CH_4 Factor (lb / MWh)	Total Output Emission Factors: N_2O Factor (lb / MWh)	Non-Baseload Emission Factors: CO_2 Factor (lb / MWh)	Non-Baseload Emission Factors: CH_4 Factor (lb / MWh)	Non-Baseload Emission Factors: N_2O Factor (lb / MWh)
AKGD (ASCC Alaska Grid)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AKMS (ASCC Miscellaneous)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AZNM (WECC Southwest)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CAMX (WECC California)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ERCT (ERCOT All)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FRCC (FRCC All)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HIMS (HICC Miscellaneous)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HIOA (HICC Oahu)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MROE (MRO East)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MROW (MRO West)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NEWE (NPCC New England)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NWPP (WECC Northwest)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NYCW (NPCC NYC/Westchester)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NYLI (NPCC Long Island)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NYUP (NPCC Upstate NY)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New Region: PRMS (Puerto Rico Miscellaneous)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RFCE (RFC East)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RFCM (RFC Michigan)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RFCW (RFC West)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RMPA (WECC Rockies)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SPNO (SPP North)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SPSO (SPP South)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SRMV (SERC Mississippi Valley)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SRMW (SERC Midwest)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SRSO (SERC South)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SRTV (SERC Tennessee Valley)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SRVC (SERC Virginia/Carolina)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
US Average	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source: EPA eGRID2019, February 2021

Note: Total output emission factors can be used as default factors for estimating GHG emissions from electricity use when developing a carbon footprint or emissions inventory. Annual non-baseload output emission factors should not be used for those purposes, but can be used to estimate GHG emissions reductions from reductions in electricity use.

Table 7 Steam and Heat

	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)
Steam and Heat	[illegible]	1.250	0.125

Note: Emission factors are per mmBtu of steam or heat purchased. These factors assume natural gas fuel is used to generate steam or heat at 80 percent thermal efficiency.

Scope 3 Emission Factors

Scope 3 emission factors provided below are aligned with the Greenhouse Gas Protocol Technical Guidance for Calculating Scope 3 Emissions, version 1.0 (Scope 3 Calculation Guidance). Where applicable, the specific calculation method is referenced. Refer to the Scope 3 Calculation Guidance for more information (http://www.ghgprotocol.org/scope-3-technical-calculation-guidance).

Table 8 Scope 3 Category 4: Upstream Transportation and Distribution and Category 9: Downstream Transportation and Distribution

These factors are intended for use in the distance-based method defined in the Scope 3 Calculation Guidance. If fuel data are available, then the fuel-based method should be used, with factors from Tables 2 through 5.

Vehicle Type	CO_2 Factor (kg / unit)	CH_4 Factor (g / unit)	N_2O Factor (g / unit)	Units
Medium- and Heavy-Duty Truck	1.457	0.013	0.033	vehicle-mile
Passenger Car [A]	0.341	0.008	0.006	vehicle-mile
Light-Duty Truck [B]	0.464	0.012	0.010	vehicle-mile
Medium- and Heavy-Duty Truck	0.211	0.0020	0.0049	ton-mile
Rail	0.022	0.0017	0.0005	ton-mile
Waterborne Craft	0.036	0.0178	0.0015	ton-mile
Aircraft [C]	1.160	0.0000	0.0367	ton-mile

Source:
CO_2, CH_4, and N_2O emissions data for road vehicles are from Table 2-13 of the EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.
Vehicle-miles and passenger-miles data for road vehicles are from Table VM-1 of the Federal Highway Administration Highway Statistics 2018.
CO2e emissions data for non-road vehicles are based on Table A-124 of the EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018, which are distributed into CO2, CH4, and N2O emissions based on fuel-vehicle emission factors.
Freight ton-mile data for non-road vehicles are from Table 1-50 of the Bureau of Transportation Statistics, National Transportation Statistics for 2020 (Data based on 2018).

Notes:
Vehicle-mile factors are appropriate to use when the entire vehicle is dedicated to transporting the reporting company's product. Ton-mile factors are appropriate when the vehicle is shared with products from other companies.
[A] Passenger car: includes passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches).
[B] Light-duty truck: includes full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches).
[C] Aircraft: updates due to a methodology change.

Table 9 Scope 3 Category 5: Waste Generated in Operations and Category 12: End-of-Life Treatment of Sold Products

These factors are intended for use in the waste-type-specific method or the average-data method defined in the Scope 3 Calculation Guidance for category 5 and category 12. Choose the appropriate material and disposal method from the table below. For the average-data method, use one of the mixed material types, such as mixed MSW.

Material	Metric Tons CO_2e / Short Ton Material					
	Recycled[1]	Landfilled[2]	Combusted[3]	Composted[4]	Anaerobically Digested (Dry Digestate with Curing)	Anaerobically Digested (Wet Digestate with Curing)
Aluminum Cans	0.06	0.02	0.01	NA	NA	NA
Aluminum Ingot	0.04	0.02	0.01	NA	NA	NA
Steel Cans	0.32	0.02	0.01	NA	NA	NA
Copper Wire	0.18	0.02	0.01	NA	NA	NA
Glass	0.05	0.02	0.01	NA	NA	NA
HDPE	0.21	0.02	2.80	NA	NA	NA
LDPE	NA	0.02	2.80	NA	NA	NA
PET	0.23	0.02	2.05	NA	NA	NA
LLDPE	NA	0.02	2.80	NA	NA	NA
PP	NA	0.02	2.80	NA	NA	NA
PS	NA	0.02	3.02	NA	NA	NA
PVC	NA	0.02	1.26	NA	NA	NA
PLA	NA	0.02	0.01	0.17	NA	NA
Corrugated Containers	0.11	0.89	0.05	NA	NA	NA
Magazines/Third-class mail	0.02	0.42	0.05	NA	NA	NA
Newspaper	0.02	0.35	0.05	NA	NA	NA
Office Paper	0.02	1.29	0.05	NA	NA	NA
Phonebooks	0.04	0.35	0.05	NA	NA	NA
Textbooks	0.04	1.29	0.05	NA	NA	NA
Dimensional Lumber	0.08	0.17	0.05	NA	NA	NA
Medium-density Fiberboard	0.15	0.07	0.05	NA	NA	NA
Food Waste (non-meat)	NA	0.58	0.05	0.15	0.14	0.11
Food Waste (meat only)	NA	0.58	0.05	NA	0.14	0.11
Beef	NA	0.58	0.05	0.15	0.14	0.11
Poultry	NA	0.58	0.05	0.15	0.14	0.11
Grains	NA	0.58	0.05	0.15	0.14	0.11
Bread	NA	0.58	0.05	0.15	0.14	0.11
Fruits and Vegetables	NA	0.58	0.05	0.15	0.14	0.11
Dairy Products	NA	0.58	0.05	0.15	0.14	0.11
Yard Trimmings	NA	0.33	0.05	0.15	0.11	NA
Grass	NA	0.25	0.05	0.15	0.08	NA
Leaves	NA	0.29	0.05	0.15	0.13	NA
Branches	NA	0.62	0.05	0.15	0.38	NA
Mixed Paper (general)	0.07	0.55	0.05	NA	NA	NA
Mixed Paper (primarily residential)	0.07	0.57	0.05	NA	NA	NA
Mixed Paper (primarily from offices)	0.03	0.75	0.05	NA	NA	NA
Mixed Metals	0.23	0.02	0.01	NA	NA	NA
Mixed Plastics	0.22	0.02	2.34	NA	NA	NA
Mixed Recyclables	0.09	0.05	0.11	NA	NA	NA
Food Waste	NA	0.58	0.05	0.15	NA	NA
Mixed Organics	NA	0.48	0.05	0.17	NA	NA
Mixed MSW	NA	0.57	0.43	NA	NA	NA
Carpet	NA	0.02	1.68	NA	NA	NA
Desktop CPUs	NA	0.02	0.40	NA	NA	NA
Portable Electronic Devices	NA	0.02	0.89	NA	NA	NA
Flat-panel Displays	NA	0.02	0.74	NA	NA	NA
CRT Displays	NA	0.02	0.64	NA	NA	NA
Electronic Peripherals	NA	0.02	2.23	NA	NA	NA
Hard-copy Devices	NA	0.02	1.92	NA	NA	NA
Mixed Electronics	NA	0.02	0.87	NA	NA	NA
Clay Bricks	NA	0.02	NA	NA	NA	NA
Concrete	0.01	0.02	NA	NA	NA	NA
Fly Ash	0.01	0.02	NA	NA	NA	NA
Tires	0.10	0.02	2.21	NA	NA	NA
Asphalt Concrete	-	0.02	NA	NA	NA	NA
Asphalt Shingles	0.03	0.02	0.70	NA	NA	NA
Drywall	NA	0.02	NA	NA	NA	NA
Fiberglass Insulation	0.05	0.02	NA	NA	NA	NA
Vinyl Flooring	NA	0.02	0.29	NA	NA	NA
Wood Flooring	NA	0.18	0.08	NA	NA	NA

Source: EPA, Office of Resource Conservation and Recovery (February 2016) Documentation for Greenhouse Gas Emission and Energy Factors used in the Waste Reduction Model (WARM). Factors from tables provided in the Management Practices Chapters and Background Chapters. WARM Version 15, November 2020 Update. Additional data provided by EPA WARM v15 Background Data.

Notes: These factors do not include any avoided emissions impact from any of the disposal methods. All the factors presented here include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility. AR4 GWPs are used to convert all waste emission factors into CO_2e.

[1] Recycling emissions include transport to recycling facility and sorting of recycled materials at material recovery facility.

[2] Landfilling emissions include transport to landfill, equipment use at landfill and fugitive landfill CH_4 emissions. Landfill CH_4 is based on typical landfill gas collection practices and average landfill moisture conditions.

[3] Combustion emissions include transport to combustion facility and combustion-related non-biogenic CO_2 and N_2O.

[4] Composting emissions include transport to composting facility, equipment use at composting facility and CH_4 and N_2O emissions during composting.

Table 10 Scope 3 Category 6: Business Travel and Category 7: Employee Commuting

These factors are intended for use in the distance-based method defined in the Scope 3 Calculation Guidance. If fuel data are available, then the fuel-based method should be used, with factors from Tables 2 through 5.

Vehicle Type	CO_2 Factor (kg / unit)	CH_4 Factor (g / unit)	N_2O Factor (g / unit)	Units
Passenger Car[A]	0.341	0.009	0.008	vehicle-mile
Light-Duty Truck[B]	0.464	0.013	0.010	vehicle-mile
Motorcycle	0.190	0.070	0.007	vehicle-mile
Intercity Rail - Northeast Corridor[C]	0.058	0.0055	0.0007	passenger-mile
Intercity Rail - Other Routes[C]	0.150	0.0117	0.0036	passenger-mile
Intercity Rail - National Average[C]	0.113	0.0092	0.0026	passenger-mile
Commuter Rail[D]	0.141	0.0112	0.0025	passenger-mile
Transit Rail (i.e. Subway, Tram)[E]	0.100	0.0087	0.0012	passenger-mile
Bus	0.056	0.0200	0.0009	passenger-mile
Air Travel - Short Haul (< 300 miles)	0.207	0.0064	0.0066	passenger-mile
Air Travel - Medium Haul (>= 300 miles, < 2300 miles)	0.129	0.0006	0.0041	passenger-mile
Air Travel - Long Haul (>= 2300 miles)	0.163	0.0006	0.0052	passenger-mile

Source:

CO_2, CH_4, and N_2O emissions data for highway vehicles are from Table 2-13 of the EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018.

Vehicle-miles and passenger-miles data for highway vehicles are from Table VM-1 of the Federal Highway Administration Highway Statistics 2018.

Fuel consumption data and passenger-miles data for rail are from Tables A.14 to A.16 and C.9 to C.11 of the Transportation Energy Data Book: Edition 38. Fuel consumption was converted to emissions by using fuel and electricity emission factors presented in the tables above.

Intercity Rail factors from personal communication with Amtrak (Laura Fotiou, March 2020). These are based on 2019 values.

Air Travel factors from 2020 Guidelines to Defra / BEIS's GHG Conversion Factors for Company Reporting. Version 1.0 July 2020.

Notes:

[A] Passenger car: includes passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches).

[B] Light-duty truck: includes full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches).

[C] Intercity rail: Amtrak long-distance rail between major cities. Northeast Corridor extends from Boston to Washington D.C. Other Routes are all routes outside the Northeast Corridor.

[D] Commuter rail: rail service between a central city and adjacent suburbs (also called regional rail or suburban rail).

[E] Transit rail: rail typically within an urban center, such as subways, elevated railways, metropolitan railways (metro), streetcars, trolley cars, and tramways.

Red text indicates an update from the 2020 version of this document.

Global Warming Potentials

Table 11 Global Warming Potentials (GWPs)

Gas	100-Year GWP
N_2O	298
HFC-23	14,800
HFC-32	675
HFC-41	92
HFC-125	3,500
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-143a	4,470
HFC-152	53
HFC-152a	124
HFC-161	12
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-245fa	1,030
HFC-365mfc	794
HFC-43-10mee	1,640
SF_6	22,800
NF_3	17,200
CF_4	7,390
C_2F_6	12,200
C_3F_8	8,830
$c\text{-}C_4F_8$	10,300
C_4F_{10}	8,860
C_5F_{12}	9,160
C_6F_{14}	9,300
$C_{10}F_{18}$	>7,500

Source:
100-year GWPs from IPCC Fourth Assessment Report (AR4), 2007. IPCC AR4 was published in 2007 and is among the most current and comprehensive peer-reviewed assessments of climate change. AR4 provides revised GWPs of several GHGs relative to the values provided in previous assessment reports, following advances in scientific knowledge on the radiative efficiencies and atmospheric lifetimes of these GHGs and of CO_2. Because the GWPs provided in AR4 reflect an improved scientific understanding of the radiative effects of these gases in the atmosphere, the values provided are more appropriate for supporting the overall goal of organizational GHG reporting than the Second Assessment Report (SAR) GWP values previously used in the Emission Factors Hub.
While EPA recognizes that Fifth Assessment Report (AR5) GWPs have been published, in an effort to ensure consistency and comparability of GHG data between EPA's voluntary and non-voluntary GHG reporting programs (e.g. GHG Reporting Program and National Inventory), EPA recommends the use of AR4 GWPs. The United States and other developed countries to the UNFCCC have agreed to submit annual inventories in 2015 and future years to the UNFCCC using GWP values from AR4, which will replace the current use of SAR GWP values. Utilizing AR4 GWPs improves EPA's ability to analyze corporate, national, and sub-national GHG data consistently, enhances communication of GHG information between programs, and gives outside stakeholders a consistent, predictable set of GWPs to avoid confusion and additional burden.

Table 12 Global Warming Potentials (GWPs) for Blended Refrigerants

ASHRAE #	100-year GWP	Blend Composition
R-401A	16	53% HCFC-22, 34% HCFC-124, 13% HFC-152a
R-401B	14	61% HCFC-22, 28% HCFC-124, 11% HFC-152a
R-401C	19	33% HCFC-22, 52% HCFC-124, 15% HFC-152a
R-402A	2,100	38% HCFC-22, 6% HFC-125, 2% propane
R-402B	1,330	6% HCFC-22, 38% HFC-125, 2% propane
R-403B	3,444	56% HCFC-22, 39% PFC-218, 5% propane
R-404A	3,922	44% HFC-125, 4% HFC-134a, 52% HFC 143a
R-406A	0	55% HCFC-22, 41% HCFC-142b, 4% isobutane
R-407A	2,107	20% HFC-32, 40% HFC-125, 40% HFC-134a
R-407B	2,804	10% HFC-32, 70% HFC-125, 20% HFC-134a
R-407C	1,774	23% HFC-32, 25% HFC-125, 52% HFC-134a
R-407D	1,627	15% HFC-32, 15% HFC-125, 70% HFC-134a
R-407E	1,552	25% HFC-32, 15% HFC-125, 60% HFC-134a
R-408A	2,301	47% HCFC-22, 7% HFC-125, 46% HFC 143a
R-409A	0	60% HCFC-22, 25% HCFC-124, 15% HCFC-142b
R-410A	2,088	50% HFC-32, 50% HFC-125
R-410B	2,229	45% HFC-32, 55% HFC-125
R-411A	14	87.5% HCFC-22, 11 HFC-152a, 1.5% propylene
R-411B	4	94% HCFC-22, 3% HFC-152a, 3% propylene
R-413A	2,053	88% HFC-134a, 9% PFC-218, 3% isobutane
R-414A	0	51% HCFC-22, 28.5% HCFC-124, 16.5% HCFC-142b
R-414B	0	5% HCFC-22, 39% HCFC-124, 9.5% HCFC-142b
R-417A	2,346	46.6% HFC-125, 5% HFC-134a, 3.4% butane
R-422A	3,143	85.1% HFC-125, 11.5% HFC-134a, 3.4% isobutane
R-422D	2,729	65.1% HFC-125, 31.5% HFC-134a, 3.4% isobutane
R-423A	2,280	47.5% HFC-227ea, 52.5% HFC-134a,
R-424A	2,440	50.5% HFC-125, 47% HFC-134a, 2.5% butane/pentane
R-426A	1,508	5.1% HFC-125, 93% HFC-134a, 1.9% butane/pentane
R-428A	3,607	77.5% HFC-125, 2% HFC-143a, 1.9% isobutane
R-434A	3,245	63.2% HFC-125, 16% HFC-134a, 18% HFC-143a, 2.8% isobutane
R-500	32	73.8% CFC-12, 26.2% HFC-152a, 48.8% HCFC-22
R-502	0	48.8% HCFC-22, 51.2% CFC-115
R-504	325	48.2% HFC-32, 51.8% CFC-115
R-507	3,985	5% HFC-125, 5% HFC-143a
R-508A	13,214	39% HFC-23, 61% PFC-116
R-508B	13,396	46% HFC-23, 54% PFC-116

Source:
100-year GWPs from IPCC Fourth Assessment Report (AR4), 2007. See the source note to Table 11 for further explanation. GWPs of blended refrigerants are based on their HFC and PFC constituents, which are based on data from http://www.epa.gov/ozone/snap/refrigerants/refblend.html.

Annexure III- Conversion Factors and Emission factors

A Conversion Factors used;

1. MMBTU per short Ton = 278x10 (-)^{6}Kcal/Kg
2. One BTU= 252 Calorie
3. One Calorie= 4.184 Joules

B. GHG emissions during Transportation by

a) Employees Travel by two wheelers;
   i. CO_2 - 0.11 gms/km
   ii. CH_4 - 0.005 gms/km
   iii. N2O- 0.0005 gms/km
b) Material Transport by Trucks of 20 T capacity
   i. CO_2- 0.90 gms/km
   ii. CH_4 -0.009 gms/km
   iii. N2O- 0.006 gms/km

C. Emission Factors tCO_2/t of material

1. Anthracite-2.86
2. Coal (Industry Sector)- 2.116 tCo2/short Ton of Coal=2.33 T/MT of Coal
3. Coking Coal- 2.819 ton/Short Ton of Coking Coal= 3.1 Ton/ton of coking Coal
4. Lime Stone - 0.44
5. Dolomite-0.47
6. Slag- 0.56

D. GHG Credits from use of: tCO_2/t

a) Iron ore tailings in Cement making- 0.56
b) Fly ash in Cement making- 0.56
c) EAF slag in Cement making-0.56

E. Emission factors for Different Fuels

S.No	Parameter	Value	Unit	Remarks/Source
1	CO_2 emission factor of diesel	74.1	tCO_2/TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html), Table 1.4 - Default CO_2 emission factors for combustion
2	CH_4 Default emissions for diesel	3	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationarycombustion in the energy industry
3	N_2O Default emissions for diesel	0.6	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationarycombustion in the energy industry
4	Effective CO_2 emission factors in coal (Thermal)	95.8	tCO_2/TJ	CEA Baseline CO_2 database for Indian Power Sector (http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf)
5	CH_4 Default emissions for coal	1	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationarycombustion in the energy industry

6	N_2O emission factor for coal	1.5	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationary combustion in the energy industry
7	CO_2 emission factor in Natural Gas	56.1	tCO_2/TJ	IPCC 2006 Guidelines for National Greenhouse GasInventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 1.4 - Default CO_2 emission factors for combustion
8	CH_4 Default Emission for NaturalGas	1	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationarycombustion in the energy industry
9	N_2O emission factors for Natural Gas	0.1	$kgCO_2/TJ$	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html) Table 2.2 - Default emission factors for stationarycombustion in the energy industry

Emission Factors for Steel Plant materials

https://www.climate-policy-watcher.org/emission-factors/choice-of-emission-factors-tier-1-method.html

Sinter Purchase- 0.20 tCO_2 /T sinter
Pig Iron- - 1.35 tCO_2 /T sinter
DRI - 0.70 tCO_2 /T DRI
Pellet - 0.03 tCO_2 /T Pellet
Scrap -0.04 tCO_2 /T scrap

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CO_2 Baseline Database for the Indian Power Sector

User Guide

Version 17.0

OCTOBER 2021

Government of India
Ministry of Power
Central Electricity Authority
Sewa Bhawan, R.K.Puram,
New Delhi-66

Revision History of the Database

Version No.	Date of Publication	Main Revisions Compared to Previous Version
1.0 Draft	October 2006	- Draft for Stakeholder Consultation
1.0	November 2006	- Added data on 10 stations which had been in exclusion worksheet of draft database - Adjusted values to latest IPCC Guidance (IPCC 2006 Guidelines for National Greenhouse Gas Inventories) where IPCC defaults are used
1.1	December 2006	- Adjusted fuel emission factor of lignite to be in line with Initial National Communication figures
2.0	June 2007	- Added data for FY 2005-06, including new stations and units commissioned during 2005-06 - Some retroactive changes to data for FY 2000-01 to 2004-05
3.0	December 2007	- Added data for FY 2006-07, including new stations and units commissioned during 2006-07 - Adapted calculations and User Guide to ensure consistency with new CDM methodologies ACM0002 Version 07, and Tool to Calculate the Emission Factor for an Electricity System (Version 01.1, EB 35 Annex 12)
4.0	October 2008	- Added data for FY 2007-08, including new stations and units commissioned during 2007-08 - Adjusted delineation of regional grids - Adjusted IPCC-based fuel emission factors to account for uncertainty in line with EB 35 Annex 12
5.0	November 2009	- Added data for FY 2008-09, including new stations and units commissioned during 2008-09
6.0	March 2011	- Added data for FY 2009-10, including new stations and units commissioned during 2009-10
7.0	January 2012	- Added data for FY 2010-11, including new stations and units commissioned during 2010-11
8.0	January 2013	- Added data for FY 2011-12, including new stations and units commissioned during 2011-12 - From FY 2011-12, scope of database is restricted to stations exceeding 25 MW - Retroactive changes: Three units in NEWNE region identified as CDM units, leading to minor change in build margin for FY 2010-11
9.0	December 2013	- Added data for FY 2012-13, including new stations and units commissioned during 2012-13 - Retroactive changes: Nine units identified as CDM units, leading to changes in build margins back to FY 2009-10 - Updated GCVs of five stations back to FY 2008-09
10.0	December 2014	- Added data for FY 2013-14, including new stations and units commissioned during 2013-14 - Introduced distinction between Indian and imported coal as from FY 2013-14 - Retroactive changes to previous FY due to: identification of CDM units, identification of waste heat recovery steam turbines, harmonization of GCV for oil used as secondary fuel - One station was reclassified from SR to NEWNE region
11.0	April 2016	- Added data for FY 2014-15, including new stations and units commissioned during 2014-15 - Introduced integrated Single Indian Grid (NEWNE and Southern are now synchronized) - Export of power to Bangladesh also considered in the Import/Export data
12.0	May 2017	- Added data for FY 2015-16, including new stations and units commissioned during 2015-16
13.0	June 2018	- Added data for FY 2016-17, including new stations and units commissioned during 2016-17 - Export of power to Myanmar also considered in the Import/Export data.
14.0	December 2018	- Added data for FY 2017-18, including new stations and units commissioned during 2017-18
15.0	December 2019	- Added data for FY 2018-19, including new stations and units commissioned during 2018-19
16.0	March 2021	- Added data for FY 2019-20, including new stations and units commissioned during 2019-20 - Some retroactive changes to data for FY 2018-19
17.0	October 2021	- Added data for FY 2020-21, including new stations and units commissioned during 2020-21

Expert Team Contributing to the Database

Central Electricity Authority:

Mr. Dhiraj Kumar Srivastava, Chief Engineer (TE&TD) Mr. J.N. Prasad Chief Engineer-In charge (TPE&CC)

Mr. Rajesh Kumar, Director (TPE&CC) Mr. K.K. Sharma, Deputy Director (TPE&CC)

Contents

Summary

Since the emergence of the Kyoto Protocol and its Clean Development Mechanism (CDM), energy projects lowering the carbon intensity of the electricity grid can generate additional revenues from carbon credits. Methodologies approved by the CDM Executive Board have to be applied to determine the resulting emission reductions, using the "baseline" CO_2 emission factor of the relevant geographical area.

In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO_2 emission reductions by CDM project developers, Central Electricity Authority (CEA) has compiled a database containing the necessary data on CO_2 emissions for all grid-connected power stations in India.

All regional grids have been integrated as a single Indian Grid covering all the states in December 2013. Small power exchanges also take place with the neighbouring countries Bhutan, Nepal, Bangladesh and Myanmar. For the unified grid, the main emission factors are calculated in accordance with the relevant CDM methodologies. CEA will continue updating the database at the end of each fiscal year.

1. The prevailing baseline emissions based on the data for the FY 2020-21 are shown in Table S-1. The calculations are based on generation, fuel consumption and fuel quality data obtained from the power stations. Typical standard data were used only for a few stations where information was not available from the station. Cross-border electricity transfers were also taken into account for calculating the CO_2 emission baseline.

Table S-1: Weighted average emission factor, simple operating margin (OM), build margin (BM) and combined margin (CM) of the Indian Grid for FY 2020-21 (adjusted for cross-border electricity transfers), in t CO_2/MWh

Average	OM	BM	CM
0.79	0.94	0.87	0.90

Average is the average emission of all stations in the grid, weighted by net generation.
OM is the average emission from all stations excluding the low cost/must run sources.
BM is the average emission of the 20% (by net generation) most recent capacity addition in the grid.
CM is a weighted average of the OM and BM (here weighted 50: 50).

1 Background and Objective

Purpose of the CO_2 Database

The Clean Development Mechanism (CDM) under the Kyoto Protocol to United Nations Framework Convention on Climate Change (UNFCCC) provides an opportunity for the Indian power sector to earn revenue through the reduction of greenhouse gas emissions (GHG), particularly carbon dioxide (CO_2). India has tremendous potential for CDM projects. Power generation based on higher efficiency technologies such as supercritical technology, integrated gasification combined cycle, and renovation and modernisation of old thermal power plants, co-generation along with renewable energy sources are some of potential candidates for CDM in the power sector. Energy efficiency and conservation projects also present themselves as eligible CDM projects, as these would also result in energy savings and displace associated CO_2 emissions which otherwise would be produced by grid-connected power stations.

The CDM has by now become an established mechanism for crediting climate friendly projects. Projects involving displacement or saving of grid electricity must calculate their emission reductions based on a grid emission factor, which needs to be determined in accordance with the rules set by the CDM Executive Board. Central Electricity Authority (CEA) accordingly took up to compile a database for all grid-connected power stations in India. The purpose of the database is to establish authentic and consistent quantification of the CO_2 emission baseline, which can be readily used by CDM project developers in the Indian power sector. This would enhance the acceptability of Indian projects and would also expedite the clearance/approval process. The baseline emissions for the Indian Grid are given in Section 5 (Results) of this User Guide. The complete updated CO_2 Database (Microsoft Excel File) and this User Guide along with all previous versions is available on the website of Central Electricity Authority: www.cea.nic.in.

The purpose of this User Guide is to provide a ready reference to the underlying calculations and assumptions used in the CO_2 database and to summarise the key results.

Official Status of the Database

The database is an official publication of the Government of India for the purpose of CDM baselines. It is based on the most recent data available with the Central Electricity Authority.

Consistency of the Database with CDM Methodologies

Under the CDM, emission reductions must be quantified using an approved methodology. Key examples of such methodologies include AMS-I.D and ACM0002 for grid-connected power generation from renewable sources in small- and large-scale projects, respectively. The latest versions of all approved CDM methodologies are available at the official CDM website, http://cdm.unfccc.int.

In addition, the CDM Executive Board has adopted a methodological tool to facilitate the calculation of baseline emission factors for electricity grids.[1] This tool, which is referred to as the Grid Tool in this user guide, has become the main reference for CDM methodologies involving baseline emission factors for power grids, such as ACM0002.

This version of the database is designed to be consistent with version 7.0 of the Tool to calculate the emission factor for an electricity system published by the CDM Executive Board.

Installed Capacity

As a result of the impressive growth attained by the Indian Power Sector, the installed capacity has grown from mere 1,713 MW in 1950 to 382,151.22 MW as on 31.03.2021. Sector-wise details of installed capacity are shown in Table 1.

Table 1: Sector- wise installed capacity (MW) as on 31.03.2021

Sector	Thermal					Nuclear	Hydro	RES	Total
	Coal	Lignite	Gas	Diesel	Total				
State	65931.50	1150.00	7087.36	236.01	74404.86	0.00	27069.50	2395.27	103869.64
Central	62570.00	3640.00	7237.91	0.00	73447.91	6780.00	15646.72	1632.30	97506.93
Private	74173.00	1830.00	10598.74	273.70	86875.45	0.00	3493.00	90406.21	180774.66
All India	202674.50	6620.00	24924.01	509.71	234728.22	6780.00	46209.22	94433.79	382151.22

Note: These capacities are not identical with those listed in the Excel database, because the database excludes renewable, few small diesel and steam units.

It is evident from Table 1 that the installed capacity is predominantly coal based and therefore, is a major source of carbon dioxide emissions in India. Hence, there exists scope for reducing the CO_2 emissions in the country by way of fuel substitution, increased use of renewable energy sources, and also by improving the thermal efficiency of power generation.

[1] Tool to calculate the emission factor for an electricity system (Version 7.0). See http://cdm.unfccc.int

Indian Grids

Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states (see Table 2). Since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid.

Power generation and supply within the Indian Grid is managed by Regional Load Dispatch Centres (RLDC). The National Power Committee (NPC) and Regional Power Committees (RPCs) provide a common platform for discussion and solution to the national and regional problems relating to the grid. Each state meets their demand with their own generation facilities and also with allocation from power plants owned by the central sector such as NTPC and NHPC etc. and IPP's being operated by private sector. Specific quotas are allocated to each state from the central sector power plants. Depending on the demand and generation, there are cross-border electricity exports and imports (e.g. from Bhutan, Nepal, Bangladesh and Myanmar).

Table 2: Geographical scope of the Indian electricity grid

INDIAN GRID				
Northern	**Eastern**	**Western**	**North-Eastern**	**Southern**
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Puducherry
Punjab	Andaman-Nicobar*	Maharashtra	Nagaland	Lakshadweep*
Rajasthan		Goa	Tripura	Telengana
Uttar Pradesh				
Uttarakhand				

**The union territories Andaman and Nicobar Islands and Lakshadweep islands are not connected to the National grid. The power generation and distribution systems of these territories is served by standalone systems.*

2 How to Use the Database

Structure of the Database

Emission reductions from CDM projects in the power sector are calculated based on the net electricity generated by the project and the difference between the emissions factors (in t CO_2/MWh) of the baseline and the project activity. The baseline emission factor reflects the carbon intensity of the displaced grid electricity. This baseline emission factor can be derived from the data provided in the CO_2 Database.

Specifically, the database contains the following elements:

- Worksheet "Data" provides the net generation and the absolute and specific CO_2 emissions of each grid-connected power station (see Section 4 for exceptions). It also indicates which stations and units were included in the operating margin and build margin, respectively.
- Worksheet "Results" provides the most commonly used aggregate emission factors. These are calculated from the station data in accordance with the most recent Grid Tool.[2] The emission factors are explained in more detail in the next section.
- Worksheet "Abbreviations" explains the abbreviations used in the "Data" worksheet.
- Worksheet "Assumptions" shows the assumptions that were used for the calculation of the CO_2 emissions at station and unit level, where the information was not provided by the station.
- Worksheet "Transfers" shows the cross-border power transfers.

Different Types of Emission Factors

The CDM methodologies which have been approved to date by the CDM Executive Board distinguish a range of different emission factors. In the Indian context, the following four are most relevant, and were therefore calculated for the Indian Grid based on the underlying station data:

Weighted average:
The weighted average emission factor describes the average CO_2 emitted per unit of electricity generated in the grid. It is calculated by dividing the absolute CO_2 emissions of all power stations by the total net generation. Net generation from so-called low-cost/must-run sources is included in the denominator. In India, hydro and nuclear stations qualify as low-cost/must-run sources.

Simple operating margin (OM):
The operating margin describes the average CO_2 intensity of the existing stations in the grid which are most likely to reduce their output if a CDM project supplies electricity to the grid (or reduces consumption of grid electricity). "Simple" denotes one out of four possible variants listed in the Grid Tool for calculating the operating margin.[3] Furthermore, option A has been selected as the required disaggregated data is available in India.

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[2] *Tool to calculate the emission factor for an electricity system* (Version 7.0). See http://cdm.unfccc.int

[3] The two variants "Simple adjusted operating margin" and "Dispatch data analysis operating margin" cannot currently be applied in India due to lack of necessary data.

The simple operating margin is the weighted average emissions rate of all generation sources *except* so-called low-cost or must-run sources (hydro and nuclear stations) and are excluded). The operating margin, therefore, can be calculated by dividing the grid's total CO_2 emissions by the net generation of all thermal stations. In other words, it represents the weighted average emissions rate of all thermal stations.

Values for operating margins given in this User Guide and the Database are always based on the "ex post" option as set out in the Grid Tool.[4]

Build margin (BM):
The build margin reflects the average CO_2 intensity of newly built power stations that will be (partially) replaced by a CDM project. In accordance with the Grid Tool, the build margin is calculated in this database as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin generally covers units commissioned in the last five years.

Combined margin (CM):
The combined margin is a weighted average of the simple operating margin and the build margin. By default, both margins have equal weights (50%). However, CDM project developers may choose to argue for different weights. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Grid Tool allows to weigh the operating margin and build margin at 75% and 25%, respectively. However, the combined margins shown in the database are calculated based on equal weights.

In line with the Grid Tool, if a station is registered as a CDM activity, it is excluded from the build margin but not from the operating margin.[5]

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[4] See *Tool to calculate the emission factor for an electricity system* (Version 7.0).

[5] See *Tool to calculate the emission factor for an electricity system* (Version 7.0), pp. 16 and pp 25 point (f)

3 Scope of Database

The database includes all grid-connected power stations having an installed capacity above 25 MW.[6] The data covers power stations of both public utilities and independent power producers (IPPs).

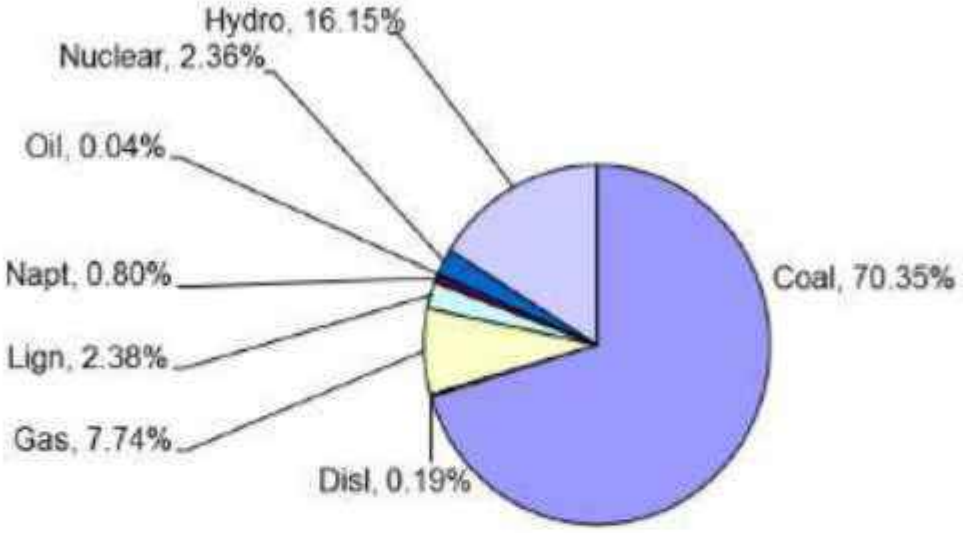

Figure 1: Breakdown of generation capacity covered by the database. The total corresponds to 287,783 MW as on 31.03.2021

The following power stations are currently not accounted for in the database:

- Small decentralised generation sets;
- Stations or units installed in Andaman and Nicobar Islands and Lakshadweep;
- Captive power stations: As on 31 March 2021, the aggregate installed capacity of captive stations in industries having demand of 1 MW and above was 77,000 MW (provisional figure). The generation of these stations in FY 2020-21 was 200,000 GWh (provisional figure). The data of captive plants could not be added in this database in absence of the data availability.
- Non-conventional renewable energy stations: These include hydro stations up to 25 MW, as well as all wind, biomass and solar photovoltaic stations. The installed, grid-connected capacity of these sources was 94,433.79 MW as on 31.03.2021.[7] The generation from these non-conventional renewable energy sources in FY 2020-21 was 144,247.51GWh.

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[6] Previously, the database covered grid-connected power stations having an installed capacity above 3 MW in case of hydro and above 10 MW for all other plant types. Monitoring of stations up to 25 MW was discontinued from FY 2011-12. For archiving and consistency reasons, 70 of these small stations will remain in the database without new data entries.

[7] Ministry of New and Renewable Energy. The capacity figure may differ from CEA reported figure of installed capacity.

4 Data and Calculation Approach

This section gives an overview on the base data, annual data as well as the approaches used to calculate station-level and unit-level CO_2 emissions.

4.1 Base Data

The following base data parameters were collected for all the stations listed in the CO_2 database:

- **S No:**

  The Station Numbers start at 1 and proceed alphabetically for all stations. All units of a station have the same station number. Numbers may change in future database versions due to insertion of new stations.

- **Station Name:**

  Name of the power station. The station names have been arranged in alphabetical order.

- **Unit Number:**

  The units of a station are numbered serially starting with 1. Stations are attributed with unit number 0 for the purpose of calculations.

- **Commissioning Date:**

  The commissioning date is provided for each unit. Commissioning dates are important for the determination of the build margin.

- **Capacity:**

  Capacity data is based on declared rated capacities in MW for each unit as of 31st March 2021.

- **State:**

  State where the power station is located.

- **Sector:**

  This denotes whether the station is operated by the central sector, the state authorities, or the private sector.

- **System:**

  A list of the systems including abbreviations and full names is provided in Appendix A.

- **Type:**

  Indicates the type of the station, viz. thermal, nuclear, and hydro.

- **Fuel:**

  Fuel 1 and Fuel 2 indicates the main fuels used for power generation at each station. For example, in coal-based stations, Coal is indicated as Fuel 1 and Oil as Fuel 2.

4.2 Annual Data

The annual data columns in the database provide the following: net generation in GWh of the station, absolute carbon dioxide emissions in metric tonnes, and specific carbon dioxide emissions in t CO_2/MWh, for the five fiscal years 2016-17 to 2020-21. In addition, there are columns to indicate whether the station is included in the operating margin in the respective year, and an additional column indicating which units are included in the build margin. If a unit is part of a registered CDM activity, it is excluded from the build margin, and the CDM registration number is indicated in the respective column.

CEA has compiled the CO_2 Database based upon generation, fuel consumption and fuel gross calorific value (GCV) data furnished by each power station. In cases where the station could not provide reliable data for all the relevant parameters, assumptions were made as described below. Further details on the assumptions made are provided in Appendix B.

a) Assumptions at Station Level

At the station level, the following assumptions were made where the relevant data could not be provided by a station:

Net generation:
For hydro stations, only gross generation was available, but not net generation data. Therefore, the CEA standard value for auxiliary power consumption in hydro units (0.5%) was applied to derive the net generation from the gross generation data reported by the stations. Likewise, CEA standard values for auxiliary power consumption had to be applied for some thermal stations.

Gross Calorific Value (GCV):
Default values were used for some thermal stations where station-specific GCVs were not available.

If the station consists just of one unit, the assumptions at unit level were applied to the station level.

b) Assumptions at Unit Level

At unit level, the following assumptions were made for those units falling into the build margin (i.e. the most recently built units comprising 20% of net generation):

Gross generation:
For some stations, gross generation data were not available at unit level. Therefore, the plant load factor of the respective station was used to derive the gross generation of the units. For units commissioned after the start of the relevant fiscal year, the gross generation was further adjusted pro rata the number of days since commissioning.

Net generation:
Net generation data is increasingly being reported at unit level by thermal stations. Two distinct approaches were applied to estimate net generation where unit level data was not available.

1. The auxiliary consumption (in % of gross generation) of the unit was assumed to be equal to that of the respective stations in the following cases:

i. All units of a station fall into the build margin; or

ii. All units of a station have the same installed capacity; or

iii. The units in the station have different capacities but do not differ with respect to the applicable standard auxiliary consumption; or

iv. If the default auxiliary power consumption for that type of generation unit is higher than the observed auxiliary power consumption of the station concerned, and the relevant unit is among the largest in that station.

2. In a few other cases, standard values for auxiliary consumption adopted by CEA were applied.

Fuel consumption and GCV:
In case fuel consumption and GCV are not reported at unit level by thermal stations, the specific CO_2 emissions of the units coming in the build margin could usually be assumed to be equal to the values of the respective station. See Section 4.3 for details.

4.3 Calculation of CO_2 Emissions

Calculation Approach – Station Level

CO_2 emissions of thermal stations were calculated using the formula below:

$$AbsCO_2(station)_y = \sum_{i=1}^{2} FuelCon_{i,y} \times GCV_{i,y} \times EF_i \times Oxid_i \qquad (1)$$

Where:

$AbsCO_{2,y}$	Absolute CO_2 emission of the station in the given fiscal year 'y'
$FuelCon_{i,y}$	Amount of fuel of type i consumed in the fiscal year 'y'
$GCV_{i,y}$	Gross calorific value of the fuel i in the fiscal year 'y'
EF_i	CO_2 emission factor of the fuel i based on GCV
$Oxid_i$	Oxidation factor of the fuel i

The emission and oxidation factors used in the CO_2 Database are provided in Appendix B.

The emission factors for Indian coal and lignite were based on the values provided in India's Initial National Communication under the UNFCCC (Ministry of Environment & Forests, 2004). The emission factor for coal is supported by the results of an analysis of approx. 120 coal samples collected from different Indian coal fields. Since the values in the National Communication are based on the NCV (Net Calorific Value), they were converted to GCV basis using a formula also furnished in the National Communication. For all other fuels as well as for imported coal, default emission factors were derived from the IPCC 2006 Guidelines.[8] In line with the Grid Tool, the low end values of the 95% confidence intervals indicated by IPCC were used.[9] The IPCC default factors were converted to GCV basis using IEA default conversion factors.

The oxidation factor for Indian coal and lignite was derived from an analysis performed with data on the unburnt carbon content in the ash from various Indian coal-fired power stations. The value of 98% is consistent with the default value provided in the IPCC 1996 Guidelines.[10] For all other fuels as well as imported coal, default values provided in the more recent IPCC 2006 Guidelines were used.

Specific CO_2 emissions of stations ($SpecCO_2\ (station)_y$) were computed by dividing the absolute emissions ($AbsCO_2\ (station)_y$) estimated above by the station's net generation ($NetGen(station)_y$).

$$SpecCO_2(station)_y = \frac{AbsCO_2(station)_y}{NetGen(station)_y} \qquad (2)$$

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[8] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Table 1.4

[9] In accordance with the *Tool to calculate the emission factor for an electricity system, Version 7.0*

[10] IPCC 1996 Revised Guidelines for National Greenhouse Gas Inventories, Volume 3 (Reference Manual), p.1.13

In FY 2020-21, fuel consumption was not available for few stations. In these cases, conservative standard values have been applied for calculation of specific emissions of the respective station.

Calculation Approach – Unit Level

Unit-level CO_2 emissions were calculated only for the units falling in the build margin.

Wherever reliable fuel consumption data was available at unit level, it was used for determining the emissions of units falling in the build margin, in the same way as for the station emissions. This applies for an increasing number of thermal units, especially new and large coal-fired stations.

In the remaining cases where unit-level fuel consumption was not available, the absolute CO_2 emissions of thermal units ($AbsCO_2\ (unit)_y$) were derived by multiplying the specific emissions ($SpecCO_2\ (unit)_y$) with the net generation of each unit ($NetGen(unit)_y$), where net generation was obtained as described in Section 4.2:

$$AbsCO_2(unit)_y = SpecCO_2(unit)_y \times NetGen\ (unit)_y \qquad (3)$$

Two distinct approaches were applied for determining the specific emissions of these units:

1. A unit was assumed to have the same specific emissions as the corresponding station in the following three cases:

   i. If all units of a station fall into the build margin;

   ii. If all units of a station have the same installed capacity;

   iii. If the default specific emissions for the respective unit is higher than the corresponding station's specific emissions, and the concerned unit is capacity-wise among the largest of the station.

The large majority of units for which fuel consumption was not reported fall in one of the above-mentioned three categories.

2. In the remaining cases, the specific emissions of the units were derived from conservative standard heat rate values (see Appendix B).

4.4 Adjustment for Cross-Border Electricity Transfers

The weighted average emission factors and operating margins of the Indian Grid were adjusted for cross-border electricity imports and exports, in line with the Grid Tool:

- The relevant amounts of electricity imported and exported are listed in the database worksheet "Transfers";
- The CO_2 emissions associated with these imports were quantified based on the simple operating margin of the exporting grid.[11]

4.5 Conservativeness

The need to ensure conservativeness of calculations in situations of uncertainty is a fundamental principle in the CDM. Assumptions are conservative if they tend to reduce the number of emission reductions being credited to a CDM project activity. The following approaches and assumptions contribute to the conservativeness of the database:

- The quality of station-level data was ensured through extensive plausibility testing and interaction with the station operators.
- In cases of data gaps at station level, standard data from CEA were used. For example, standard auxiliary power consumption was assumed for few coal-fired stations. Comparison with monitored values shows that these standard values are rather conservative, i.e. they lead to a somewhat lower heat rate and hence lower emissions than observed in many stations.
- The fuel emission factors and oxidation factors used are generally consistent with IPCC defaults and relevant EB guidance. For Indian coal, the emission factor provided in India's Initial National Communication was used (95.8 t CO_2/TJ on NCV basis). The oxidation factor of 0.98 used for Indian coal appears to be conservative in light of recent efficiency improvements in coal-fired generation. All other fuel emission factors represent the lower limits of the respective 95% confidence intervals indicated by IPCC, as required by the CDM Executive Board.[12]
- The scope of the database remains conservative because of the exclusion of captive power stations, which are generally thermal stations. As detailed in Section 3, generation from these captive stations remains far greater than the generation from non-conventional renewable energy stations, which are also excluded. The overall effect of these restrictions in scope is that the weighted average emission factor will tend to be slightly understated.

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[11] This corresponds to Options a)+b) listed in the Grid Tool, (Version 7.0), p. 10 & 11

[12] See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p.35

5 Results

Worksheet "Results" in the database provides the net generation and CO_2 emissions data and the resulting emission factors for the Indian Grid in the fiscal years 2016-17 to 2020-21. The emission factors are also reproduced in Appendix C. The values are rounded off at two decimals. See database file for additional decimals.

5.1 Results for Fiscal Year 2020-21

Table 3 indicates the development of total emissions over the last five years covered by the database.

Table 3: Total emissions of the power sector for the FY 2016-17 to 2020-21, in million tonnes CO_2

2016-17	2017-18	2018-19	2019-20	2020-21
888.34	922.18	960.90	928.14	910.02

Percent Increase or Decrease as compared to previous year:

2016-17	2017-18	2018-19	2019-20	2020-21
4.97%	3.81%	4.20%	-3.41%	-1.95%

Table 4 shows the emission factors for FY 2020-21 both excluding and including cross-border power transfers.

Table 4: Weighted average emission factor, simple operating margin (OM), build margin (BM) and combined margin (CM) of the Indian Grid for FY 2020-21 (not adjusted and adjusted for cross-country electricity transfers), in t CO_2/MWh

	Average	OM	BM	CM
Excluding cross-border power transfers	0.79	0.95	0.87	0.91
Including cross-border power transfers	0.79	0.94	0.87	0.90

Percent Increase or Decrease as compared to previous year:

	Average	OM	BM	CM
Excluding cross-border power transfers	-0.63%	-1.26%	-0.34%	-0.82%
Including cross-border power transfers	-0.90%	-1.57%	-0.34%	-0.98%

A comparison of both cases in Table 4 shows that cross border electricity transfers did not have a significant influence on the emission factors in 2020-21.

Table 5 shows the weighted average specific emissions for fossil fuel-fired power stations in the Indian Grid.

Table 5: Weighted average specific emissions for fossil fuel-fired stations in FY 2020-21, in t CO_2/MWh

Coal	Diesel	Gas*	Lignite	Oil
0.97	0.58	0.42	1.30	-

Percent Increase or Decrease as compared to previous year:

Coal	Diesel	Gas*	Lignite	Oil
-0.86%	0.08%	-2.75%	-4.64%	-

* Only gas-fired stations that do not use any other fuel. Stations that use naphtha, diesel or oil as a second fuel are excluded from the weighted average.

Note: Stations for which assumptions had to be made are included in this analysis (see Section 4 for details).

5.2 Developments over Time

Figure 2 shows the capacity additions from FY 2000-01 to FY 2020-21. The yearly additions of coal-based capacity increased significantly over the period from FY 2000-01 to FY 2015-16, whereas it decreased significantly over the period from FY 2016-17 to FY 2020-21. Hydro, & Gas-based capacity addition also decreased significantly from 2017-18 onwards in the Indian Grid, while the additions in other generation capacities is zero.

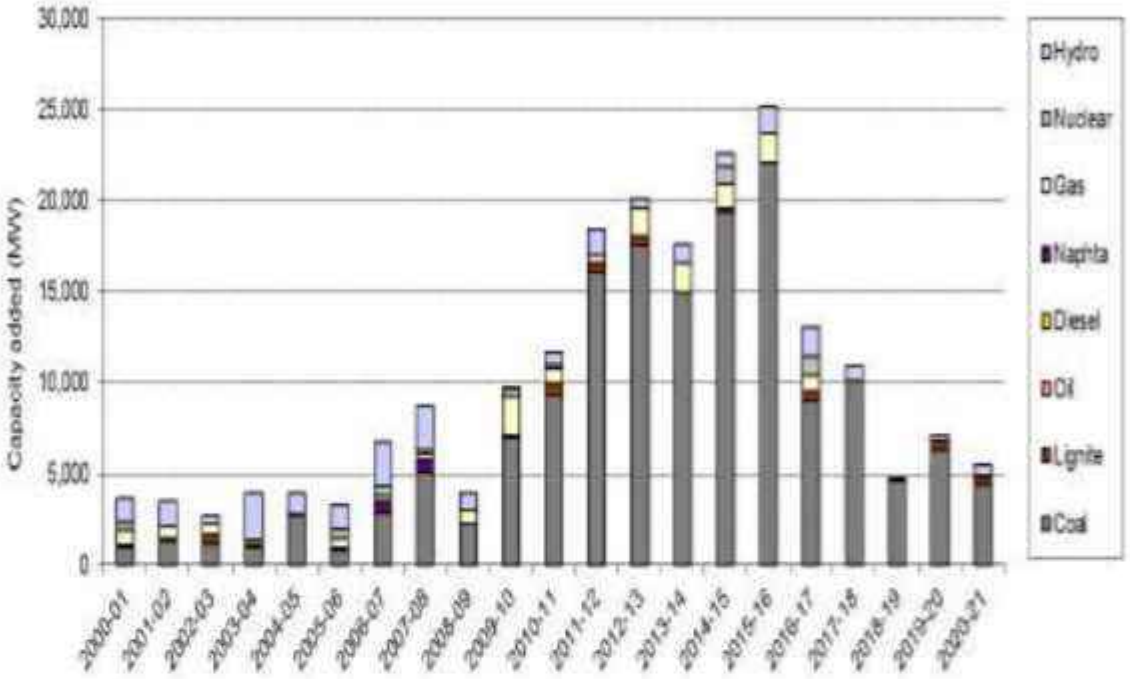

Figure 1: Breakdown of new added capacity covered by the database over the period 2000-01 to 2020-21.

Figure 2 shows the development of the weighted average emission factor over the period from FY 2016-17 to FY 2020-21 (see Appendix C for values before import adjustment). The weighted average has reduced marginally in FY 2020-21. This was mainly due to the decrease in lignite and naphtha-based generation in FY 2020-21.

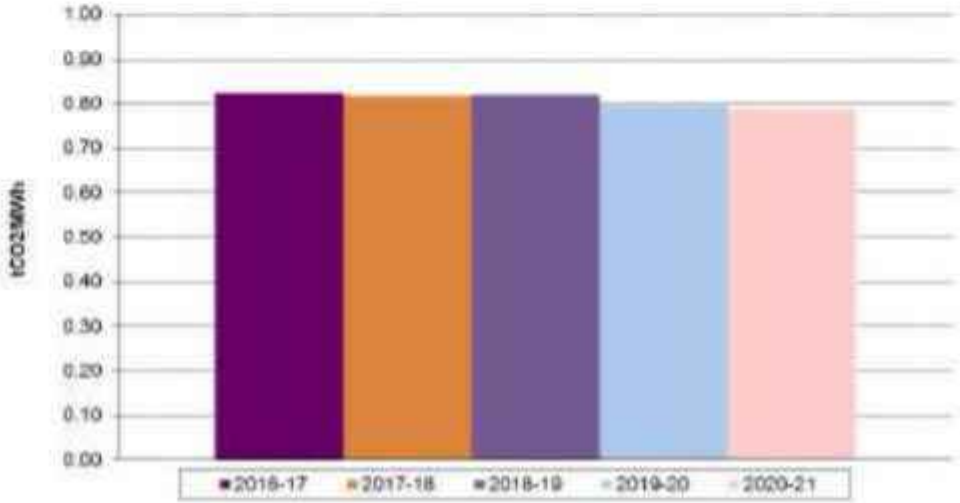

Figure 2: Development of the weighted average emission factor (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21

Figure 4 illustrates the development of the import-adjusted operating margins over the period from FY 2016-17 to FY 2020-21 (see Appendix C for values before import adjustment). In 2020-

21 the import-adjusted operating margin decreased marginally due to operationalization of many high efficiency super-critical thermal power plants.

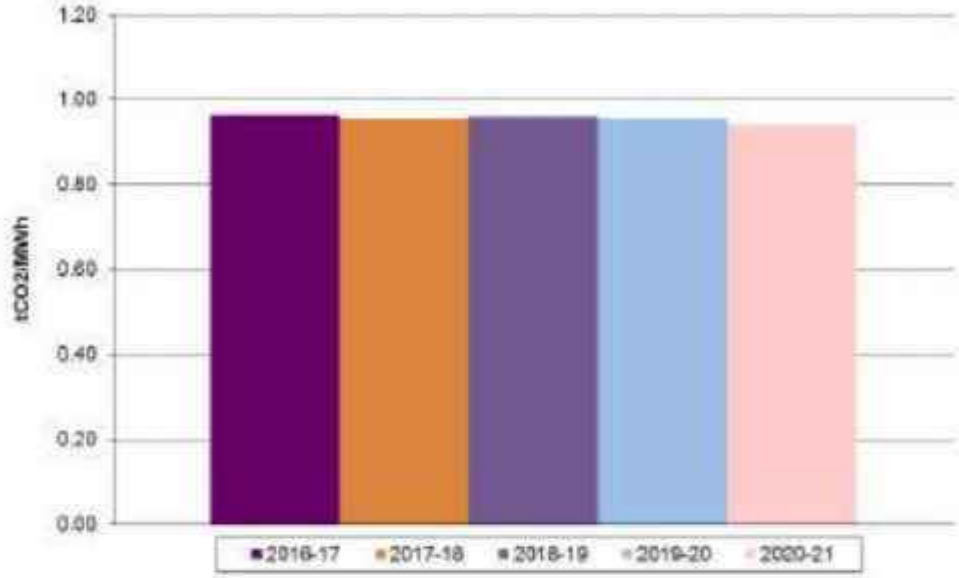

Figure3: Development of the operating margin (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21.

Figure 4 shows the build margins for the five fiscal years 2016-17 to 2020-21. The distinction between Indian and imported coal introduced from FY 2013-14 onwards led to a slight decrease in the build margin till 2017-18, due to the lower emission factor applied to imported coal in accordance with the CDM rules.

The build margin which was showing a decreasing trend till 2017-18 has increased marginally during 2018-19 due to more share of domestic coal and less share of imported coal. During 2019-20 and 2020-21 the build margin decreased marginally again due to the increase in the share of imported coal (see figure 6).

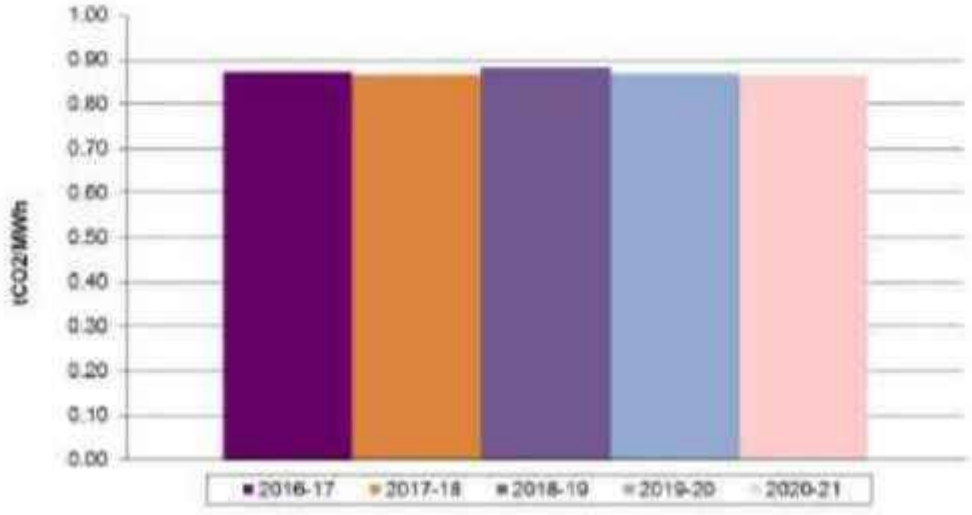

Figure 4: Development of the build margins over the period 2016-17 to 2020-21.

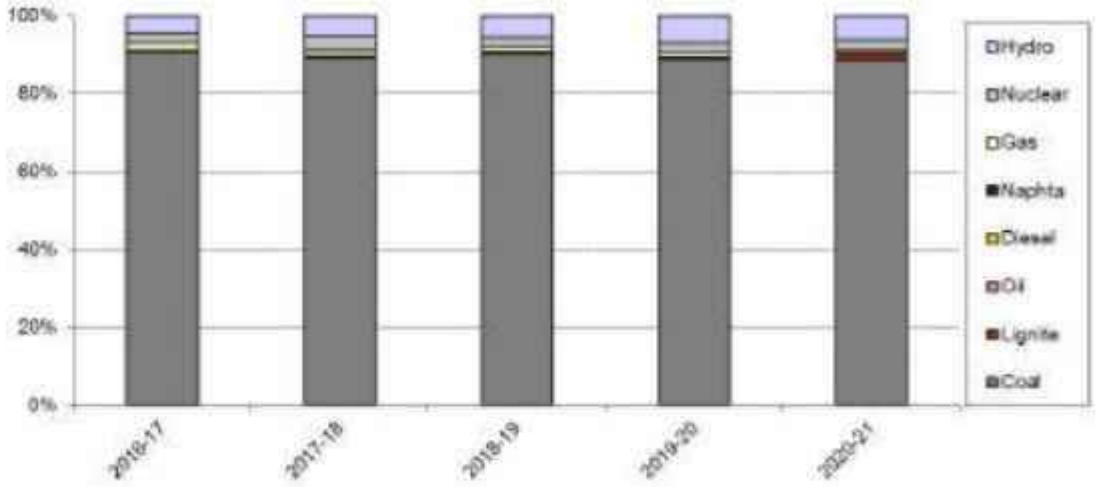

Figure 5: Breakdown of the build margins by fuel type (shares based on net generation)

Figure 6 shows the trends in the import-adjusted combined margins in the period 2016-17 to 2020-21. The combined margin decreased during 2016-17, 2017-18 and 2019-20 and 2020-21. It was mainly due to decrease in operating margin and build margin. The combined margin increased marginally during 2018-19 due to increase in both the operating and build margins

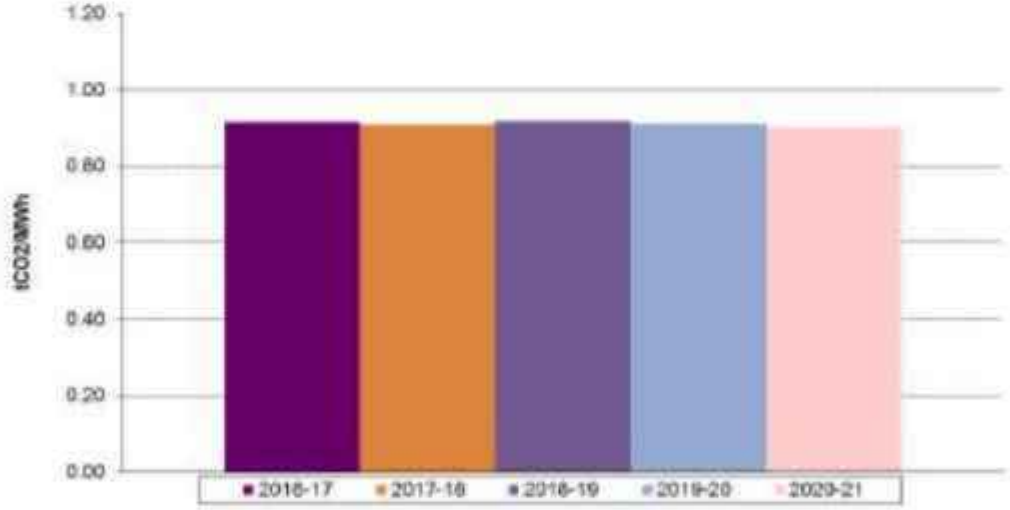

Figure 6: Development of the combined margin (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21

5.3 Changes compared to Previous Database Versions

In comparison with the previous version of the Database (Version 16.0), this updated Version 17.0 includes the following changes:

- Added data for FY 2020-21, including new stations and units commissioned during 2020-21.
- The revised emission factors are provided in Appendix C and in the Database file.

6 User Examples

This section provides two illustrative examples of how the CO_2 Database can be applied. The examples are based on hypothetical renewable energy projects

Project A is a grid-connected 5 MW small hydropower station located in the State of Assam. The station will be commissioned in 2022. Annual net generation is projected at approx. 17'500 MWh.

- The project qualifies as a small-scale CDM activity since its capacity is below the 15 MW threshold. Hence it will use the latest version of CDM methodology AMS-I.D for grid-connected renewable electricity generation.
- Methodology AMS-I.D gives two options for determining the baseline emission factor: Either the weighted average emissions, or the combined margin of the grid. In this example, it is assumed that the promoters choose the weighted average option. In addition, it is assumed that the promoters choose to adjust the weighted average emission factor for electricity imports, despite the fact that this is not mandatory under AMS-I.D.
- In the PDD, the expected emission reductions achieved by the hydro station are projected based on the expected annual generation, and the import-adjusted weighted average emission factor for the Indian Grid in the most recent year for which data is available (2020-21). The corresponding value is 0.79 t CO_2/MWh. Hence the absolute emission reductions are projected at 0.79 * 17'500 = 13,766 t CO_2/yr. The emission reductions are equal to the baseline emissions, since the project does not result in greenhouse gas emissions of its own.
- In accordance with AMS-I. D, the promoters will determine the *actual* baseline emission factor *ex post*. The actual emission reductions will then be calculated in each year of the crediting period based on the observed net generation and the weighted average emission factor for the respective year.[13] The latter would be published annually by CEA.

Project B is a 100 MW grid-connected wind farm located in the State of Tamil Nadu. The project will be commissioned in 2022. Average net supplies to the grid are projected at 312,500 MWh per year.

- The project exceeds the 15 MW threshold and thus qualifies as a large-scale CDM activity. Hence it is eligible to use the latest version of methodology ACM0002 for grid-connected power generation from renewable energy sources.
- Under ACM0002, the combined margin approach is mandatory.
- In contrast to the first example, the promoters decide to fix the baseline emission factor *ex ante*. That is, the baseline emission factor is determined based on the most recent data available, and remains fixed for the duration of the crediting period. The actual emission reductions will be calculated in each year based on the observed net generation and the predefined baseline emission factor.
- For this *ex ante*-option, the Grid Tool referred to in the methodology ACM0002 requires that the operating margin be calculated as the generation-weighted average of the three most recent years (here 2018-19 to 2020-21).[14] The operating margin to be applied thus works out to 0.953 t CO_2/MWh.

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[13] The emission factor of the previous year may be used instead. See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p.16

[14] See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p.16

- Since wind is an intermittent energy source, the promoter is allowed to assign a weight of 75% to the operating margin, and 25% to the build margin. The resulting combined margin is 0.931 t CO_2/MWh (75% x 0.953 + 25% x 0.865) for the FY 2020-21). This value is used for projecting the emission reductions in the PDD as well as for calculating the actual emission reductions.

The two CDM project activities are summarised in Table 6 below.

Table 6: Illustration on how to use the CO_2 Database for calculating the emission reductions of CDM projects

	Project A	Project B
Project Info		
Type:	Hydro station	Wind park
Size:	5 MW (small-scale according to CDM criteria)	100 MW (large-scale according to CDM criteria)
Projected Generation (net):	17'500 MWh /yr	312'500 MWh/yr
Commissioning year:	2022	2022
Year of CDM registration:	2022	2022
Grid :	Indian	Indian
CDM methodology:	AMS-I.D / Version 19	ACM0002 / Version 19.0
Baseline Emission Factor Calculation		
Calculation method:	Weighted average	Combined margin
Data vintage for projection of emission reductions:	2020-21 (most recent available at time of PDD validation)	For OM: 2018-19, 2019-20, 2020-21 (most recent 3 years available at time of PDD validation) For BM: 2020-21
Data vintage for verification of emission reductions:	Actual year of generation, i.e., 2022-23, 2023-24 etc. (emission factor fixed *ex post*)	Same as for projection (emission factor fixed *ex ante*)
Accounting of imports:	Not mandatory, but done	Mandatory
Weights for combined margin:	Not applicable	Operating margin: 75% Build margin: 25% (default for intermittent sources)
Emission Reduction Calculations		
Values in t CO_2/MWh:	0.79 Weighted average	0.953 Operating margin 0.865 Build margin 0.931 Combined margin
Projected emission reductions:	13,766 t CO_2 per year	290,938 t CO_2 per year
Actual emission reductions:	Monitored net generation x monitored weighted average	Monitored net generation x fixed combined margin

7 Updating Procedure

The CO_2 Database will be updated annually by CEA and made available on its website: www.cea.nic.in. Previous versions will be archived by CEA and the main changes relative to previous database versions will be documented.

8 Further Information

For any further information, contact by email:

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Sewa Bhawan
R. K. Puram, New Delhi-110066
Email: cdmcea-tpecc@gov.in

Appendix A – Systems in India's Grids

Abbreviation	Full name
ABAN	ABAN Power Company
ADHPL	AD Hydro Power Limited
APCPL	Aravali Power Company Limited
APGCL	Assam Power Generation Corporation Limited
APGENCO	Andhra Pradesh Power Generation Co Limited
APPDCL	Andhra Pradesh Power Development Corporation Ltd.
ASEB	Assam State Electricity Board
BBMB	Bhakra Beas Management Board
BECL	Bhavnagar Energy Co. Ltd.
BSEB	Bihar State Electricity Board
BALCO	Bharat Aluminum Co. India Pvt. Ltd.
CESC	Calcutta Electric Supply Company Limited
CSEB	Chattisgarh State Electricity Board
CSPGCL	Chattisgarh State Power Generation Co Ltd
D.B. Power Ltd	Diligent Power Limited
DANS EPL	DANS Energy Pvt. Ltd.
DPL	Durgapur projects Limited
DVC	Damodar Valley Corporation
DVC Tata JV	Damodar Valley Corporation-Tata Joint Venture
GAMA	Gama Infraprop
GIPCL	Gujarat Industries Power Company Ltd
GMDCL	Gujarat Mineral Development Corporation Limited
GMR Chattisgarh	GMR Chattisgarh
GMR Energy	GMR Energy
GMR K Ltd	GMR Kamlanga Energy Ltd.
GPEC	Gujarat Paguthan Energy Corporation Pvt. Limited
GSECL	Gujarat State Electricity Corporation Limited
GSEGL	Gujarat State Energy Generation Limited
GTE Corp	GTE Corporation

Abbreviation	Full name
GVK Ind.	GVK Power & Infrastructure Limited
GVK	GVK Group
HEGL	HEG Limited
HNPCL	Hinduja National Power Corp. Ltd.
HPGCL	Haryana Power Generation Corporation Limited
HPPCL	Himachal Pradesh Power Corporation Ltd.
HPSEB	Himachal Pradesh State Electricity Board
HIRANMAYE	Hiranmaye Energy Ltd.
IEPL	Ideal Energy Pvt. Ltd.
IL&FS TN PC Ltd.	IL&FS Tamil Nadu Power Co. Ltd.
INDSIL	Indsil Electrosmelt Ltd
IPPGCL	Indraprastha Power Generation Co Ltd
JINDAL	JSW Energy Limited
JIPL	Jas Infrastructure and Power Ltd.
JKEB	Jammu & Kashmir Electricity Board
JKPDC	Jammu & Kashmir Power Development Corp. Ltd.
JPHPL	Jai Prakash Hydro Power Limited
JPL	Jhabua Power Ltd.
JSEB	Jharkhand State Electricity Board
JSW Energy	JSW Energy Limited
JV NTPC & BSEB	Joint Venture NTPC & Bihar State Electricity Board
KPCL	Karnataka Power Corporation Limited
KSEB	Kerala State Electricity Board
KSK Ventures	KSK Energy Ventures Ltd.
LPG CO	Lalitpur Power Generation Co. Ltd.
LVS Power	LVS Power Limited
M B Power (M P)	M B Power Madhya Pradesh
Madurai P	Madurai Power Corporation Limited
MAHAGENCO	Maharashtra State Power Generation Company Limited
MAPS	Madras Atomic Power Station

Abbreviation	Full name
MEECL	Meghalaya Energy Generation Corporation Ltd.
MEGEB	Meghalaya State Electricity Board
MPDC	Manipur Power Development Corporation
MEECL	Meghalaya Energy Corporation Ltd.
MPDC	Manipur Power Development Corporation
MPGPCL	Madhya Pradesh Power Generating Co. Ltd.
NAPS	Narora Atomic Power Station
NCTPP	National Capital Thermal Power Plant
NDPL	North Delhi Power Ltd.
NEEPCO	North Eastern Electric Power Corporation Ltd
NHDC	Narmada Hydro Electric Development Corporation
NHPC	National Hydro Electric Corporation
NLC	Neyvelli Lignite Corporation Ltd
NPC	Nuclear Power Corporation of India Ltd.
NTPC	NTPC Ltd
NTPC/NTECL	NTPC Tamilnadu Energy Company Limited
OHPC	Orissa Hydro Power Corporation
OPGC	Orissa Power Generation Corporation
PPCL	Puducherry Power Corporation Limited
PPGCL	Prayagraj Generation Co. Ltd.
PPNPG	PPN Power Generating Company Pvt. Limited
PSEB	Punjab State Electricity Board
RAPS	Rajasthan Atomic Power Station
RATANAGIRI	Ratnagiri Gas & power Pvt Ltd
REL	Reliance Energy Ltd
RKM PPL	RKM Powergen Pvt. Ltd.
RPG	RP Goenka Group
RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam
Samalpatti	Samalpatti Power Company Limited
SHIRPUR	Shirpur Power Pvt. Ltd.

Abbreviation	Full name
SCPL Ltd.	Spectrum Power Limited
SJVNL	Sutluj Jal Vidyut Nigam Ltd
SKS Power	SKS Power Generation
SKPL	Sneha Kinetic Power Projects Pvt. Ltd.
SPECT. IND	Spectrum Power Generation Limited
SP&ML	Subhash Projects and Marketing Co. Ltd.
SSVNL	Sardar Sorovar Vidyut Nigam Limited
STPS	Super Thermal Power Station
Tata MAH	Tata Power Company Limited
Tata PCL	Tata Power Company Limited
THDC	Tehri Hydroelectric Development Corporation
TNEB	Tamilnadu Electricity Board
Torr. Power	Torrent Power Limited
TSECL	Tripura State Electricity Corporation Limited
TSGENCO	Telangana Power Generation Corp. Ltd.
TVNL	Tenughat Vidyut Nigam Limited
UJVNL	Uttarakhand Jal Vidyut Nigam Limited
UPCL	Uttarakhand Power Corporation Limited
UPHPC	Uttar Pradesh Hydro Power Corporation Limited
UPRVUNL	Uttar Pradesh Rajya Vidyut Utpadan Nigam
VVNL	Visvesarya Vidyut Nigam Ltd
WBPDC	West Bengal Power Development Corporation Ltd
WBSEB	West Bengal State Electricity Board

Appendix B – Assumptions for CO_2 Emission Calculations

Fuel Emission Factors (EF) (Source: for Indian Coal/Lignite - Initial National Communication; for Imported Coal/Gas/Oil/Diesel/Naphtha - IPCC 2006; for Corex - own assumption)

	Unit	Coal	Imported Coal	Lignite	Gas	Oil	Diesel	Naphtha	Corex
EF based on NCV	gCO_2 /MJ	95.6	89.5	106.2	54.3	75.5	72.6	69.3	0.0
Delta GCV NCV	%	3.6%	5.0%	3.6%	10%	5%	5%	5%	n/a
EF based on GCV	gCO_2 /MJ	92.5	85.2	102.5	49.4	71.9	69.1	66.0	0.0
Oxidation Factor	-	0.98	1.00	0.98	1.00	1.00	1.00	1.00	n/a
Fuel Emission Factor	gCO_2 /MJ	90.6	85.2	100.5	49.4	71.9	69.1	66.0	0.0

n/a = not applicable (i.e. no assumptions were needed)

Assumptions at Station Level (only where data was not provided by station)

	Unit	Coal	Lignite	Gas-CC	Gas-OC	Oil	Diesel Eng	Diesel OC	Naphtha	Hydro	Nuclear
Auxiliary Power Consumption	%	8.0	10.0	3.0	1.0	3.5	3.5	1.0	3.5	0.5	10.5
Gross Heat Rate	kcal /kWh (gross)	2,500	2,713	2,013	3150	2,117	1,975	3,213	2,117	n/a	n/a
Net Heat Rate	kcal /kWh (net)	2,717	3,014	2,075	3,182	2,193	2,047	3,330	2,193	n/a	n/a
Specific Oil Consumption	ml /kWh (gross)	2.0	3.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
GCV	kcal /kg (or m3)	3,755	n/a	8,800	n/a	10,100	10,500	10,500	11,300	n/a	n/a
Density	t /1,000 lt	n/a	n/a	n/a	n/a	0.95	0.83	0.83	0.70	n/a	n/a
Specific CO_2 emissions	tCO_2 /MWh	1.04	1.28	0.43	0.66	0.66	0.59	0.96	0.61	n/a	n/a

n/a = not applicable (i.e. no assumptions were needed)

Assumptions at Unit Level (by capacity; only for units in the BM, where data was not provided by station)

Coal	Unit	67.5 MW	120 MW	200-250 MW	300 MW	500 MW Type 1	500 MW Type 2	600 MW	660 MW Type 1	660 MW Type 2	800 MW
Gross Heat Rate	kcal /kWh	2,750	2,500	2,500	2,350	2,425	2,380	2,380	2,178	2,126	2126
Auxiliary Power Consumption	%	12.0	9.0	9.0	9.0	7.5	6.5	6.5	6.5	6.5	5.25
Net Heat Rate	kcal /kWh	3,125	2,747	2,747	2,582	2,622	2,545	2,545	2,329	2,274	2,244
Specific Oil Consumption	ml /kWh	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.5
Specific CO_2 Emissions	tCO_2 /MWh	1.19	1.05	1.05	0.99	1.00	0.97	0.97	0.89	0.87	0.85

Lignite	Unit	75 MW	125 MW	210/250 MW	500 MW
Gross Heat Rate	kcal /kWh	2,750	2,560	2,710	2713
Auxiliary Power Consumption	%	12.0	12.0	10.0	8.5
Net Heat Rate	kcal /kWh	3,125	2,909	3,014	2965
Specific Oil Consumption	ml /kWh	3.0	3.0	3.0	3.0
Specific CO_2 Emissions	tCO_2 /MWh	1.32	1.23	1.28	1.25

Gas	Unit	0-49.9 MW	50-99.9 MW	>100 MW
Gross Heat Rate	kcal /kWh	1,960	1,910	1,970
Auxiliary Power Consumption	%	3.0	3.0	3.0
Net Heat Rate	kcal /kWh	2,010	1,969	2,031
Specific CO_2 Emissions	tCO_2 /MWh	0.42	0.41	0.42

Diesel	Unit	0.1-1 MW	1-3 MW	3-10 MW	>10 MW
Gross Heat Rate	kcal /kWh	2,350	2,250	2,100	1,975
Auxiliary Power Consumption	%	3.5	3.5	3.5	3.5
Net Heat Rate	kcal /kWh	2,435	2,332	2,176	2,047
Specific CO_2 Emissions	tCO_2 /MWh	0.70	0.67	0.63	0.59

Naphtha	Unit	All sizes
Increment to Gas Heat Rate	%	2%
Gross Heat Rate	kcal /kWh	2,117
Auxiliary Power Consumption	%	3.5
Net Heat Rate	kcal /kWh	2,193
Specific CO_2 Emissions	tCO_2 /MWh	0.61

Combined Margin	Unit	
Weight OM	%	50%
Weight BM	%	50%

Conversion Factors	Unit	
Energy	kJ /kcal	4.1868
	MJ /kWh	3.6

Oil		
Specific Emission	gCO_2 /ml	2.69

Appendix C – Grid Emission Factors

Note: Values are rounded off at two decimals here. See Database (Excel File, Worksheet "Results") for additional decimals.

Table A: Values for FY 2016-17 to 2020-21, excluding cross-border electricity transfers.

Emission Factors (tCO_2/MWh) (excl. Imports)	2016-17	2017-18	2018-19	2019-20	2020-21
Weighted Average Emission Rate	0.83	0.82	0.82	0.80	0.79
Simple Operating Margin (1)	0.97	0.96	0.96	0.96	0.95
Build Margin	0.87	0.87	0.88	0.87	0.87
Combined Margin (1)	0.92	0.91	0.92	0.92	0.91

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.16)

Table B: Values for FY 2016-17 to 2020-21, including cross-border electricity transfers.

Emission Factors (tCO_2/MWh) (incl. Imports)	2016-17	2017-18	2018-19	2019-20	2020-21
Weighted Average Emission Rate (2)	0.82	0.82	0.82	0.79	0.79
Simple Operating Margin (1) (2)	0.96	0.95	0.96	0.96	0.94
Build Margin (not adjusted for imports)	0.87	0.87	0.88	0.87	0.87
Combined Margin (1) (2)	0.92	0.91	0.92	0.91	0.90

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.16)

(2) For Adjustments of imports from other countries, an emission factor of zero is used. See "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.10 & 11), options a+b

Appendix D – Summary of Methodology ACM0002 / Version 20.0

Download ACM0002 at: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

ACM0002 is a consolidated CDM methodology for grid-connected power generation from renewable energy sources. It covers grid-connected renewable power generation project activities that involve retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant... Examples of eligible project types include hydro power plants with or without reservoir; wind energy; geothermal energy; solar energy; and wave and tidal energy.

The methodology requires the calculation of the baseline emission factor following the combined margin (CM) approach. The combined margin consists of a weighted average of:

- Operating margin (OM);
- Build margin (BM).

The relative weights used to determine the combined margin are by default the same, i.e. 50%. Alternative weights can be used for intermittent power sources.

There are four options to calculate the operating margin, depending on local conditions:

- *Simple operating margin*. This is the preferred approach for India.
- The other three approaches are: (i) *simple adjusted operating margin*; (ii) *dispatch data analysis operating margin*; and (iii) *average operating margin*.

The build margin is the generation-weighted average emission factor of the most recent power plants, consisting of the larger of (i) the five power plants that have been built most recently; or (ii) the capacity additions that represent 20% of the system generation that have been built most recently. In India, the latter approach generally yields the larger sample and hence must be followed. CDM projects must be excluded from the build margin, as long as the build margin does not contain generation units older than 10 years.

The operating margin must be adjusted for electricity transfers (imports) from connected electricity systems (other states/regions, other countries) to the project electricity system. Generally, no such adjustments are required for the build margin.

The actual emission reductions achieved by a CDM project are calculated based on the monitored electricity production in each year, and the combined margin (baseline emission factor). The combined margin is initially calculated from the most recent data available at the time of PDD submission. It can then either remain fixed for the duration of the project's crediting period *(ex-ante approach)*, or be updated annually *(ex-post approach)*. The two approaches have different requirements in terms of data vintage.

Appendix E – Abbreviations

Abbreviation	Full Name
ACM0002	Approved Consolidated Methodology by CDM Executive Board for grid connected large scale renewable project
ACM0013	Approved Consolidated Methodology by CDM Executive Board for new grid connected fossil fuel fired power plants using a less GHG intensive technology.
AMS-I.D	Approved Methodology for small scale grid connected renewable projects
BM	Build margin
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CM	Combined margin
CO_2	Carbon Dioxide
FY	Fiscal year
GCV	Gross Calorific Value
GHG	Greenhouse Gases
GWh	Gigawatt hour
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
MW	Megawatt
NEWNE	Integrated Northern, Eastern, Western and North Eastern Grid
OM	Operating margin
PDD	Project Design Document
RLDC	Regional Load Dispatch Centre
RPC	Regional Power Committee
SR	Southern Grid
UNFCCC	United Nations Framework Convention on Climate Change

GIRIDHAN METAL PRIVATE LIMITED

JAMURIA INDUSTRIAL ESTATE,
P. O. NANDI, P. S. JAMURIA,
PASCHIM BARDHMAN-713344(W.B.)

Expansion of Integrated Steel Plant by expanding Sponge Iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,300 TPA, Rolling Mill from1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA to 30,000 TPA & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB).

A DOCUMENT ON

HAZARDS IDENTIFICATION AND RISK ASSESSMENT

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DEMOLITION WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Setting up working platform (Scaffold)	Scaffold rod collapsed and hit a person at site.	Major injury/illness (Long absenteeism, M.C > 14 days).	Use safety net; Proper planning of work.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Electrocution due to faulty wiring touching metal.	Fatality or permanent disability or irreversible illness	Do not allow electrical wiring through scaffold structures.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Setting up working platform (Ladder)	Slippery, ladder fall.	Fatality or permanent disability or irreversible illness	Buddy system properly secured.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Ladder broke.	Fatality or permanent disability or irreversible illness	Check the ladder properly before use.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Overstretching.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break.	3	1	3	Additional control shall be proposed when necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition.	Training and proper planning of work.	4	1	4	Additional control shall be proposed when necessary.
Setting up working platform (Temporary Staging)	Temporary staging broke due to overloading of debris which is not removed.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Training and proper planning of work.	2	2	4	Additional control shall be proposed when necessary.
Working environment	Falling from height.	Fatality or permanent disability or irreversible illness	Workers wear safety harness; Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted due to faulty electrical equipment/dismantling wiring.	Fatality or permanent disability or irreversible illness	Wear proper PPE; Provide safe working/proper handling procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Use of solvents or any other chemical.	First aid cases/medical treatment (M.C between 1 to 3 days)	Proper protective clothing; Training.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Lighting.	First aid cases/medical treatment (M.C between 1 to 3 days)	To provide adequate lighting.	2	2	4	Additional control shall be proposed when necessary.
	Falling and drowned.	Fatality or permanent disability or irreversible illness	Fall protection provided; To wear life jacket.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DEMOLITION WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working at height	Fall during erection	Severe injury /fatality	Work Permit Procedure, Use of PPEs like Full body harness, fall arrestor and helmet.	4	2	8	BOCW Act 1996 and state rules
	Failure of ladder structure	Failure of ladder structure	Weekly safety inspection	4	2	8	BOCW Act 1996 and state rules
	Tripping or slipping from ladders or stairs	Severe injury /fatality	Work Permit Procedure, Use of PPEs like Full body harness, fall arrestor and helmet.	4	2	8	BOCW Act 1996 and state rules
Welding work	Incompetence of employees	Incompetence employees can result in an injury	BOCW Act 1996 and state rules	3	3	9	Only trained welders must b used, Work Permit System Procedure for Welding and Cutting Safety.
	Use of damaged welding holder & cable	Electrocution, shock resulting in injury	Electricity Rules 1956	3	3	9	Only trained welders must be used, Work Permit System Procedure for Welding and Cutting Safety.
	Explosion of cylinder due to mishandling	Burn injury/fatality/	Gas Cylinders Rules 2004	2	2	4	Procedure for Welding and Cutting Safety
	Working in inadequate lighting conditions	eye problem/ headache / other like slip/trip/fall	Light posts have been provided.	2	2	4	Light posts have been provided.
	Use of improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	2	4	Procedure for selection of PPEs, Procedure for Inspection of PPEs and Safety Devices.
Grinding work at Fabrication Area	Use of improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	2	4	Procedure for selection of PPEs Procedure for Inspection of PPEs and Safety Devices
	Operation of grinding wheel without wheel guard	Physical injury/fatality	BOCW Act 1996 and state rules	3	4	12	Guards to be ensured on the wheel, Abrasive Wheel Safety Procedure(
	No separate switches for common extension board	Physical injury/fatality	Electricity Rules 1956	2	2	4	Electrical Safety Procedure. Procedure for Electrical Safety Inspection
	Operation of grinding wheel without wheel guard	Physical injury/fatality	Electricity Rules 1956	2	2	4	Guards to be ensured on the wheel. Abrasive Wheel Safety Procedure
	Use of damaged power cables & bare wire connections	Electrical shock, physical injury	Electricity Rules 1956	2	2	4	Electrical Safety Procedure. 28) Procedure for Electrical Safety Inspection

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Gas cutting work	Back fire in gas cutting torch and gas cylinder	Burn injury/fatality	BOCW Act 1996 and state rules	4	4	16	Flash back arrestors are available at cylinder side as well as gas cutting torch, Procedure for Welding and Cutting Safety
	Flash back in gas cutting torch	burn injury	BOCW Act 1996 and state rules	3	3	9	Flash back arrestors are available at cylinder side as well as gas cutting torch, Procedure for Welding and Cutting Safety
	Damage of gas cylinder valve due to roll and fall	Fire/major injury/explosion/fatality	Gas cylinder rules 2004	3	2	6	Procedure for Welding and Cutting Safety
	Improper storage of gas cylinders	Physical injury due to fall of cylinders/explosion/property damage	Gas cylinder rules 2004	3	3	9	Procedure for Welding and Cutting Safety
	Fire/explosion due to heat exposure	Major burn injury/fatality	Gas cylinder rules 2005	2	2	4	Procedure for Welding and Cutting Safety
	Use of inadequate/improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	3	6	Procedure for selection of PPEs , Procedure for Inspection of PPEs and Safety Devices
Working environment	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Use proper ventilation system; Workers to take a short break.	3	1	3	Additional control shall be proposed when necessary.
	Body injuries due to struck by object / material debris.	Fatality or permanent disability or irreversible illness	Wear proper PPE.	2	5	10	Briefing By SHO on safety awareness Additional control shal be made i necessary.
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
Working with manual handling	Physical stress due to vibration.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Punching.	First aid cases/medical treatment (M.C between 1 to 3 days)	Training on proper handling; Wear proper PPE.	2	2	4	Additional control shall be proposed when necessary.
	Repetitive work.	Near miss/ unsafe act/ unsafe condition.	Working in interval time limit.	3	1	3	Additional control shall be proposed when necessary.
	Rotating, Shearing.	Minor injury/illness (M.C between 5 to 14 days)	Machine guarding; Training on proper handling.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries/cut caused by sharp object.	Major injury/illness (Long absenteeism, M.C > 14 days);	Worker wear proper PPE.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat due to oxy cutting activities.	Near miss/ unsafe act/ unsafe condition.	Wear proper and safe attire.	3	1	3	Additional control shall be proposed when necessary.
	Electrocuted due to faulty tools wiring.	Fatality or permanent disability or irreversible illness	To check tool equipment free from defect; Wear proper PPE.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries due to heat/radiation.	Near miss/ unsafe act/ unsafe condition.	Workers wear proper PPE.	2	1	2	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

	Inhalation of fume or chemical vapor.	Near miss/ unsafe act/ unsafe condition.	Worker wear proper PPE.	2	1	2	Additional control shall be proposed when necessary.
Working with machinery	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide signalman and barricade working area.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to equipment/machinery due to mishandling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Trained operator and close supervision; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By : GMPL TEAM	Checked By :- GMPLTEAM	Approved By : GMPL TEAM
CONCRETEING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization of machinery	Traffic Collision	Major injury/illness (Long absenteeism, M.C > 14 days)	Provide experience driver with legal driving licence.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Machinery collapse due to unstable ground	Major injury/illness (Long absenteeism, M.C > 14 days)	Use steel plate/solid material as a temporary platform.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition	Engineer to plan site layout.	3	1	3	Additional control shall be proposed when necessary.
Machinery movement within work area	Traffic collision.	Major injury/illness (Long absenteeism, M.C > 14 days)	Provide trafficman.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition	Engineer to plan site layout.	3	1	3	Additional control shall be proposed when necessary.
Unloading of ready mix concrete	Hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wearing proper PPE; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object.	Fatality or permanent disability or irreversible illness	Operator to check bucket condition; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object due to broken cable crane.	Fatality or permanent disability or irreversible illness	Crane with PMA certificate; Signal man properly monitor.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Worker wear hard hat and safety glove; Worker encouraged to take short break; Break if more than 2 hours	3	1	3	Additional control shall be proposed when necessary.
	Crane boom failure due to overloading or mishandling.	Fatality or permanent disability or irreversible illness	Crane with PMA certificate; Signal man properly monitor	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
In-situ concrete mixing (Manually)	Physical injuries caused by sharp object or hand tools.	Minorinjury/illness (M.C between 5 to 14 days)	Workers wear gloves and safety shoes.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling due to improper lifting techniques.	Minorinjury/illness (M.C between 5 to 14 days)	Use proper hand tool, Proper handling techniques.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Working with cement and mineral dust.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	3	1	3	Additional control shall be proposed when necessary.
	Dermatitis/skin irritation.	Near miss/ unsafe act/ unsafe condition	Workers wear gloves and safety shoes.	3	1	3	Additional control shall be proposed when necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
EXCAVATION WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading of excavator	Physical injuries caused by weight, sharp edges, hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Signal man to monitor; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Insects bites or allergy to plants.	Near miss/ unsafe act/ unsafe condition	To ensure that worker wear heavy duty gloves during work.	3	1	3	Additional control shall be proposed when necessary.
	Trip or fall during mount or dismount of machinery.	Minor injury/illness (M.C between 5 to 14 days)	Worker wear proper PPE; Closed supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden injuries caused by excessive or cumulative lifting and/or work-rest cycle.	Near miss/ unsafe act/ unsafe condition	To ensure that worker do not work more than 2 hours at each time.	3	1	3	Additional control shall be proposed when necessary.
	Struck by overturning machinery due to unstable ground/traffic collision or machinery mishandling.	Fatality or permanent disability or irreversible illness	Instruction and site condition being briefed; Use solid platform; Signal man provided for traffic; Monitoring and provide signage.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Excavator and case prepare base for site office container, diesel tank and store	Heat stroke caused by prolong exposure to sunlight and lack of water.	Near miss/ unsafe act/ unsafe condition	Workers wear hat and take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Physical injuries caused by startup/mobilization such as belts, chain or weight of bucket wheel or hydraulic breaker during changeover between different types of accessories.	Minor injury/illness (M.C between 5 to 14 days)	To ensure that only competent person/operator performed mobilization for respective machinery.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fire caused by heats engine or cigarette during refuel.	Localized damage (Repair cost > RM10,000 and < RM50,000)	To ensure that operator or worker not smoking during refueling and engine cool down of 15 minutes before refuel.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
EXCAVATION WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Excavate drainage/trenches/channel/site	Struck by collapse slope/falling object/material.	Fatality or permanent disability or irreversible illness	Close supervision; Working in buddy system; Barrier at excavate site area.	4	5	20	Briefing By SHO on safety awareness. Provide extra slope protection.
	Electrocution due to punching underground or overhead electric cable.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Worker or operator being briefed of site condition and hidden danger; Wear proper PPE; Closed supervision.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Monotony of work and work rest cycle for excavator operator; cumulative trauma of bending over in drainage trenches/channels during side shoring for workers.	Near miss/ unsafe act/ unsafe condition	To ensure that operator or worker not work continuously more than 4 hours and encourage short breaks where applicable.	2	1	2	Additional control shall be proposed when necessary.
	Punching by moving bucket due to improper manual handling.	Fatality or permanent disability or irreversible illness	Provide safe working practice; Warning signage; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip/fall/drop into trenches/drain/site during work or inspection.	Minor injury/illness (M.C between 5 to 14 days)	Set up barrier or warning markers; Close supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
ROAD WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Unloading material	Physical injuries caused by weight, sharp edges, hit by falling object.	Fatality or permanent disability or irreversible illness	Workers wear gloves and hard hat; Provide safe working procedure; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Snakes & insects bites & allergies from plant might be occurred during the activities	First aid cases/medical treatment (M.C between 1 to 3 days)	All workers at the site are required to wear long safety boots.	2	2	4	Additional control shall be proposed when necessary.
	During verification of peg points, trip / fall might happen.	First aid cases/medical treatment (M.C between 1 to 3 days)	All workers at the site are required to wear long safety boots.	2	2	4	Additional control shall be proposed when necessary.
	Punching.	Major injury/illness (Long absenteeism, M.C > 14 days)	Stay away from the working area.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by swinging object and property damage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe working procedure on proper lifting and material handling; Provide warning signage.	2	2	4	Additional control shall be proposed when necessary.
	Crane collapse due to unstable ground.	Fatality or permanent disability or irreversible illness	To check outrigger and ground condition; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to road surface due to crane sitting.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Proper use of outrigger pad; Use of supporting platform.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocution due to over head or underground live cable.	Minor injury/illness (M.C between 5 to 14 days)	Wear proper gloves; Provide warning signage; Close supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Boom failure due to overloading or mishandling.	Fatality or permanent disability or irreversible illness	To check on load chart and proper lifting method.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Material falling onto public vehicle/road.	Localized damage (Repair cost > RM10,000 and < RM50,000)	Provide warning signage; Put barrier on working area; Close supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object due to improper stacking.	Fatality or permanent disability or irreversible illness	Requirements on proper stacking techniques; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
ROAD WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment and with material	Body injuries while handling machinery/hopper.	Major injury/illness (Long absenteeism, M.C > 14 days).	Provide safe working procedure; Training on machinery handling; Close supervision.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Health hazard due to tar and bitumen exposure.	Near miss/ unsafe act/ unsafe condition	Wear proper PPE; Close supervision.	3	1	3	Additional control shall be proposed when necessary.
	Heat stroke and dehydration due to prolonged exposure to sunlight or heating material.	Near miss/ unsafe act/ unsafe condition	Worker wear proper PPE; Worker to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Heat injury to body due to inappropriate insulation hand tools or inappropriate hands tools.	First aid cases/medical treatment (M.C between 1 to 3 days)	To use proper insulated hand tool; Wear proper PEP.	2	2	4	Additional control shall be proposed when necessary.
	Burnt injury due to mishandling flammable liquid or other combustible materials.	Fatality or permanent disability or irreversible illness	Wear proper PPE; Provide warning signage/MSDS; Close supervision.	1	5	5	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck or hit by moving object (Hand tool or machinery).	Fatality or permanent disability or irreversible illness	To check outrigger and ground condition; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by traffic collision with public vehicle.	Minor injury/illness (M.C between 5 to 14 days)	Road site barrier/warning signage; Signal man proper monitoring; Close supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall hazard due to cable snap or mishandling during lifting works.	Minor injury/illness (M.C between 5 to 14 days)	To check wire rope and proper handling during lifting work.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall into loading tray.	Minor injury/illness (M.C between 5 to 14 days)	Training for workers; Close supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall into paver grader with rotating equipment.	Near miss/ unsafe act/ unsafe condition	Training for workers; Close supervision.	1	5	5	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
ROAD WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment and with material.	Material falling onto public vehicle/live lane/roads.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Close supervision; Proper cover and close the road while unloading material.	2	2	4	Additional control shall be proposed when necessary.
	Communication interrupted by noisy condition.	Near miss/ unsafe act/ unsafe condition	Training to workers use proper hand signal where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Traffic collision with public vehicle.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To wear high visibility vest and clothing; Close supervision.	2	2	4	Additional control shall be proposed when necessary.
	Material lifting interrupted by windy condition.	Near miss/ unsafe act/ unsafe condition	Training to workers proper lifting techniques and to provide sling man.	2	1	2	Additional control shall be proposed when necessary.
	Sudden injuries on hand due to vibration using jackhammer.	First aid cases/medical treatment (M.C between 1 to 3 days)	Provide safe working procedure; Training on hand tool handling.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
ROOF WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading of roof.	Physical injuries caused by weight/sharp edges.	Major injury/illness (Long absenteeism; M.C > 14 days)	Workers wear gloves and hard hat; Provide safe working procedure.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to hit by falling material/object.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days)	Training and regular toolbox talk; Close supervision.	2	2	4	Additional control shall be proposed when necessary.
	Hit by moving/falling object during transfer of material.	Fatality or permanent disability or irreversible illness	Provide signal man; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage of material due to mishandling and fall from height during lifting work.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe working/material handling procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary.
Material storage at roof top.	Heat stress/stroke due to hot working environment	Near miss/ unsafe act/ unsafe condition	Use proper ventilation system; Take a short break and drink water.	3	1	3	Additional control shall be proposed when necessary.
	Falling/flying object material due to windy condition.	Fatality or permanent disability or irreversible illness	Material to be securely stack and away from edges.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Walkways and working platform.	Slip and fall from height.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Wear safety harness and provides lifeline.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work.	3	1	3	Additional control shall be proposed when necessary.
Installation of roof material	Slip & fall from height.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Wear safety harness & provide lifelines.	3	5	15	Permit to work, qualification/competency, briefing by SHO on safety awareness.
	Material damage due to falling/hit by falling object	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe material handling & toe board at edge of roof; Cordon working area; Warning signage.	2	2	4	Additional control shall be proposed when necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
SCAFFOLDING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading	Physical injuries caused by weight, sharp edges, hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wearing proper PPE; Provide warning signage; Safe handling/working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition	Workers wearing hard hat; To take a short break and drink water.	3	1	3	Additional control shall be proposed when necessary.
	Physical injuries due to slip/trip fall during carry scaffold for storage.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide safe material handling/working procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work; Safe work procedure.	3	1	3	Additional control shall be proposed when necessary.
	Physical injuries caused by fall of material during lifting process.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Close supervision; Provide safe material handling/working procedure.	2	2	4	Additional control shall be proposed when necessary.
	Sudden injuries caused by excessive lifting.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide warning signage; Safe handling/working procedure.	2	2	4	Additional control shall be proposed when necessary.
	Hand injuries when stacking the scaffold from lorry.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
SCAFFOLDING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Installation of scaffold	Hit by moving object.	Fatality or permanent disability or irreversible illness	Wear proper PPE, Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Platform collapse due to unstable ground.	Extensive damage > RM250,000	Provide safe working procedure, safe handling/working procedure, supervisor to check platform ground	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object.	Fatality or permanent disability or irreversible illness	Wearing hard hat, close supervision by competent scaffold supervisor.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Slip & trip while set up of installation at platform.	First aid cases/medical treatment (M.C between 1 to 3 days),	Wear proper PPE, platform to be clear & dry, close supervision.	2	2	4	Additional control shall be proposed when necessary
	Fall from height.	Fatality or permanent disability or irreversible illness	Provide safe working procedure, wear safety harness & provide lifelines	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Erection of scaffold	Slip and trip during erection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Using safe working platform; Passageway clear from obstruction; Workers wear proper PPE.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Material falling.	Minor injury/illness (M.C between 5 to 14 days)	Close supervision by competent scaffold supervisor; Provide warning signage at working area; Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Falling from height.	Fatality or permanent disability or irreversible illness	Close supervision; Using safe working platform; Worker wearing safety harness.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Check and verify peg points as per survey drawings with reference to construct drawings	When checking peg points, possible injuries from snakes/insects bites and allergies from plants.	First aid cases/medical treatment (M.C between 1 to 3 days)	Worker to work in buddy system and compulsory use of safety shoes or proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Trip/fall during verification of peg point.	First aid cases/medical treatment (M.C between 1 to 3 days)	Worker to work in buddy system and use of belay lines for transversing slopes if applicable; Workers to rotate carrying equipment and position.	2	2	4	Additional control shall be proposed when necessary
	Cumulative trauma from carrying peg variation equipment such as dumpy level, theodolite and stands inclusive of measurement staff.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to rotate carrying equipment and position.	1	2	2	Additional control shall be proposed when necessary
Mobilize excavator or case	Trip/fall during mount/dismount of machinery, noise and vibration of machinery gives physical discomforts.	First aid cases/medical treatment (M.C between 1 to 3 days)	To ensure that operator to perform pre start check and clean up of slippery surfaces before mount/dismount.	2	2	4	Additional control shall be proposed when necessary
	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Drop of machinery parts and hit the body of worker, noise and vibration of machinery might cause injury.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to wear proper PPE; Provide safe working procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Unloading pipes from trailers	The crane's chain slipped or broken during the lifting operation and piles fall off and hit the body of worker causing body parts dislocated/fracture.	Major injury/illness (Long absenteeism, M.C > 14 days)	Workers to wear proper PPE; Provide signalman; Crane to have a valid PMA certificate; Provide safe work procedure.	1	4	4	Additional control shall be proposed when necessary
	Hand injuries might be occurred when the workers help to unload the pipes.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to wear proper PPE; Provide safe work procedure.	2	2	4	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive load weight.	First aid cases/medical treatment (M.C between 1 to 3 days)	Provide training/safety awareness; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by weight, sharp edges.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary
	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide warning signage; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary
Stacking of pipes	Improper stacking of pipes might cause others to fall off and cause body injuries.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Hand injuries due to stacking the pipes on form ground with timber blocks and wedges.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	2	1	2	Additional control shall be proposed when necessary

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Excavate drainage/ channels and preparing foundation	Trip/fall during mount/dismount of machinery, noise and vibration of machinery gives physical discomforts.	First aid cases/medical treatment (M.C between 1 to 3 days).	To ensure that operator to perform pre start checks and clean up of slippery surfaces before mount/dismount.	2	2	4	Additional control shall be proposed when necessary
	Monotony of work and work cycle for excavator operator; cumulative trauma of bending over in drainage trenches/channel during side shoring.	First aid cases/medical treatment (M.C between 1 to 3 days).	To ensure worker take a short break where applicable.	2	2	4	Additional control shall be proposed when necessary
	Buried alive by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days).	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Struck by collapse machinery.	Fatality or permanent disability or irreversible illness	Provide solid platform/use steel plate; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
Placing of culverts/lay bedding concrete/pipes or related materials	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE	2	1	2	Additional control shall be proposed when necessary
	Powered equipment and machinery such as hopper or manual compactor may cause possible injuries.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear proper PPE	2	2	4	Additional control shall be proposed when necessary

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Placing of culverts/lay bedding concrete/pipes or related materials (Cont'd)	Physical injuries caused by weight, sharp edges.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide warning signage; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Buried alive by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by heavy items slipping from hands/lifting equipment and falling onto worker.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Signalman to be provided to stop other from working under the crane.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden body injuries due to excessive lifting.	First aid cases/medical treatment (M.C between 1 to 3 days),	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	2	2	4	Additional control shall be proposed when necessary
	Electrocuted by faulty wiring.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck by collapse machinery due to unstable ground.	Fatality or permanent disability or irreversible illness	Use of solid supporting platform; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Radiation.	Major injury/illness (Long absenteeism, M.C > 14 days)	Worker wearing proper eye protection.	1	4	4	Additional control shall be proposed when necessary
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Dermatitis due to prolonged direct contact with cement.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Install applicable components according to specifications	Physical injuries caused by weight, sharp edges when transferring material and equipment.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Workers to work in buddy system.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	2	1	2	Additional control shall be proposed when necessary
	Possible injuries from fall and or equipment/ components falling onto workers when work at night.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Provide proper lighting.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by heavy items slipping from hands/lifting equipment and falling on to worker.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear proper PPE; Signalman to be provided to stop other from working under the crane.	2	2	4	Additional control shall be proposed when necessary
Conduct applicable acceptance test or benchmark acceptance procedure	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by weight, sharp edges when transferring test equipment.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear proper PPE; Workers to work in buddy system.	2	2	4	Additional control shall be proposed when necessary
	Possible injuries from fall and or hit by falling equipment.	Minor injury/illness (M.C between 5 to 14 days)	Ensure trenches have boundaries and warning markers.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Backfill for applicable closed drainage system to desired level	Excessive vibration of compactor/hopper and heat radiation from closed proximity of equipment.	Near miss/ unsafe act/ unsafe condition	To ensure workers not working more than 4 hours continuously and encourage to take a short break.	3	1	3	Additional control shall be proposed when necessary
	Monotony of work and work rest cycle for excavator operator; cumulative.	Near miss/ unsafe act/ unsafe condition	To ensure workers not working more than 4 hours continuously and encourage to take a short break.	3	1	3	Additional control shall be proposed when necessary
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
Post-work safety	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Fall from height due to unprotected opening.	Fatality or permanent disability or irreversible illness	Provide warning system; Provide barrier.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Inhalation/exposure to toxic gases.	Fatality or permanent disability or irreversible illness	Working in buddy system; Close supervision; Check for toxic gases.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Confine space and insufficient oxygen.	Fatality or permanent disability or irreversible illness	Provide proper ventilation; Working in buddy system; Exhaust fan system.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
CONFINED WORK SPACE	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Entering confined space	Physical injuries due to slip and fall into manhole.	Major injury/illness (Long absenteeism, M.C > 14 days).	Workers wear proper PPE; Use safety harnesses if required; Closedsupervision.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Toxication due to inhalation of toxic gases.	Fatality or permanent disability or irreversible illness	Competent gas tester checks the air;Provide proper ventilation; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted due to faulty wiring or electric leakage.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body cut/pierce by sharp object.	Major injury/illness (Long absenteeism, M.C > 14 days).	Workers wear proper PPE; Closed supervision.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Mobilize material or equipment into confined space	Hand injuries might be occurred when the workers to unload material/ equipment.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers to wear proper PPE; Provide safe work procedure.	2	2	4	Additional control shall be proposed when necessary
	Hit by moving object.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide warning signage; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive load weight.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide training/safety awareness; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
Working in confined space	Physical injuries or death caused by hazardous atmosphere: asphyxiate, toxic gases, explosion.	Fatality or permanent disability or irreversible illness	Workers to wear proper PPE; Provide proper ventilation system; Work in buddy system; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden injuries due to prolonged bending over .	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear proper PPE; Workers to take break where applicable.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
CONFINED WORK SPACE (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working in confined space (Cont'd)	Heat stroke due to excessive heat and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers to take a short break where applicable and drink more water; Provide proper ventilation system; Closed supervision.	3	1	3	Additional control shall be proposed when necessary
	Buried alive due to slope collapse/earth/solid material/fluid.	Fatality or permanent disability or irreversible illness	Workers to wear proper PPE; Provide lifeline communication system and work in buddy system; Closed supervision; Provide adequate slope protection.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Death due to inhalation of carbon monoxide.	Fatality or permanent disability or irreversible illness	Any machinery to be place outside; Provide proper ventilation system; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Inspection/ finished up and exit from confined space	Trip/fall/drop into manhole during inspection.	Fatality or permanent disability or irreversible illness	Provide warning signage; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Buried by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted by faulty wiring.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and proper planning of work; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Hit by moving object.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wearing proper PPE; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
WELDING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ unloading of welding equipment	Physical injuries caused by weight, sharp edges.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by falling cylinder.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear safety shoes; Provide safe handling procedure.	2	2	4	Additional control shall be proposed when necessary
	Environment pollution caused leaking gases.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide safe storage procedure; Provide maintenance schedule; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Sudden injuries caused by excessive lifting and mishandling.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide safe handling/lifting procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
Welding process	Eyes injury caused by excessive flash light.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wearing face shield/goggle; Provide only competent welder.	2	2	4	Additional control shall be proposed when necessary
	Gas inhalation/welding fume.	First aid cases/medical treatment (M.C between 1 to 3 days).	Wearing face mask and face shield; Provide safe working procedure; Provide proper ventilation/exhaust fan.	2	2	4	Additional control shall be proposed when necessary
	Explosion due to leaking cylinder/valve/hose.	Fatality or permanent disability or irreversible illness	Worker wear proper PPE; Provide safe working procedure; Provide warning signage; Proper maintenance schedule; Closed supervision.	1	5	5	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries due to burnt/hot surface.	Major injury/illness (Long absenteeism, M.C > 14 days).	Worker wear proper PPE; Provide safe working procedure.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
WELDING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Welding process (Cont'd)	Fire caused by improper welding procedure.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Worker wears proper PPE; Provide safe working procedure; Provide fire extinguisher; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by sharp objects.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear proper PPE; safe material handling.	2	2	4	Additional control shall be proposed when necessary
	Falling from height due to unstable platform.	Fatality or permanent disability or irreversible illness	Worker wearing safety harness; Provide safe working procedure; Provide safe working platform.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Inspect and storage of wielding set	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and regular toolbox talk; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Material damage due to falling/mishandling during storage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe handling procedure; Provide a specific storage room.	2	2	4	Additional control shall be proposed when necessary
	Hand injury due to hot surface/platform.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear proper PPE; To ensure/wait till hot surface is cold.	2	2	4	Additional control shall be proposed when necessary
	Hit by moving object during transfer of equipment.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe working procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
MASONRY WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Transporting of material	Traffic collision.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Competent and certified driver; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Machinery breakdown.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Regular maintenance and servicing.	2	2	4	Additional control shall be proposed when necessary
	Material overloading, falling and hit workers.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Closed supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Unloading of material	Physical injuries due to hit by moving objects.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to hit by falling objects.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane collapse due to unstable ground/platform or mishandling.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Fully use outrigger platform.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip and fall due to poor housekeeping.	Major injury/illness (Long absenteeism, M.C > 14 days).	Provide good/save access and maintain good hours keeping.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling due to improper lifting techniques.	Minor injury/illness (M.C between 5 to 14 days)	Use proper hand tools; Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to cut/pierce by sharp edge object.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Provide safe working procedure.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By : -	Approved By :
MASONRY WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Storage of material	Hit by falling object due to improper stacking.	First aid cases/medical treatment (M.C between 1 to 3 days).	Requirements proper stacking techniques.	2	2	4	Additional control shall be proposed when necessary
	Fall hazard due to mishandling during stacking.	First aid cases/medical treatment (M.C between 1 to 3 days).	To check safe condition of platform; Wear a proper PPE; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive lifting is carried out.	First aid cases/medical treatment (M.C between 1 to 3 days).	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	2	2	4	Additional control shall be proposed when necessary
	Manual handling.	Near miss/ unsafe act/ unsafe condition	Training and regular toolbox talk; Closed supervision.	3	1	3	Additional control shall be proposed when necessary
Working environment	Material fall onto public vehicle/live lane/road.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To properly cover the material/stacked it away from the edge.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip and fall due to poor housekeeping.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide good/save access and maintain good house keeping.	2	2	4	Additional control shall be proposed when necessary
	Dusty work environment.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers to wear proper PPE (i.e Face mask); Conduct housekeeping regularly.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Falling from height.	Fatality or permanent disability or irreversible illness	To provide barrier at open space edge; Workers to wear safety harness; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries/cut caused by sharp object.	Minor injury/illness (M.C between 5 to 14 days)	Worker wears proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
MASONRY WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working with material	Hit by falling object due to mishandling/slip/fall.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Dermatitis due to exposure to cement/mineral dust.	First aid cases/medical treatment (M.C between 1 to 3 days).	Worker wear gloves/face mask; Conduct housekeeping regularly.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to equipment/material due to mishandling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Train worker for properly handling; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Fall from height due to unstable/collapse platform.	Fatality or permanent disability or irreversible illness	Provide safe working platform; To provide barrier at open space edge; Workers to wear safety harness; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition	Worker to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Environment pollution due to concrete and mineral dust.	Near miss/ unsafe act/ unsafe condition	Worker wear gloves/face mask; Conduct housekeeping regularly; Provide water spray system.	3	1	3	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
LIFTING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Transporting of lifting machinery	Traffic collision.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide experience driver with legal driving licensee; Provide traffic man.	2	2	4	Additional control shall be proposed when necessary
	Machinery breakdown.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Regular maintenance and servicing.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Equipment/machinery falling onto public vehicle/road.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To securely tighten up equipment/machinery before transporting; Provide warning signage.	2	2	4	Additional control shall be proposed when necessary
	Body injuries while handling or secure equipment/ machinery for transporting.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide safe working procedure; Training on machinery handling; Close supervision.	2	2	4	Additional control shall be proposed when necessary
Mobilization/ unloading machinery/ material	Physical injuries caused by fall/hit by moving object during lifting process.	Fatality or permanent disability or irreversible illness	Worker wear gloves and hard hat; Signalman monitored lifting process; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane cable slipped or break during the lifting process.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Signalman monitored lifting process; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to road surface due to crane sitting.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Proper use of outrigger pad; Use of support platform.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck by moving object due to unstable ground or mishandling.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Signalman monitored lifting process; Provide barrier and signage, Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
LIFTING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage taking a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive lifting.	Near miss/ unsafe act/ unsafe condition	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by trip and fall during lifting and carrying material.	Minor injury/illness (M.C between 5 to 14 days)	Safe working procedure; Closed supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work; Safe working procedure.	3	1	3	Additional control shall be proposed when necessary
Working with lifting/hoisting machinery.	Crane boom failure/collapse due to overloading.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Signalman monitored lifting process; Close supervision; Provide barrier and signage.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane topple due to overweight/unstable ground.	Fatality or permanent disability or irreversible illness	Crane park at solid platform and outrigger support is fully used; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and regular toolbox talk; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Material damage due to falling/mishandling during storage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe handling procedure; Provide specific storage room.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
HANDTOOL WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment	Space constraint.	First aid cases/medical treatment (M.C between 1 to 3 days).	Training and proper planning of work; Safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by swinging object and property damage.	First aid cases/medical treatment (M.C between 1 to 3 days), Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Provide safe working procedure; Provide warning signage; Work in safe condition and space; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
Working with hand tool	Physical injuries caused by weight/sharp object.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear gloves; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Electrocution due to faulty wiring.	Fatality or permanent disability or irreversible illness	Worker wear proper PPE, make sure all equipment free from defect.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Injuries or damage due to excessive vibration (Jackhammer/hopper).	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide training how to use hand tool; Provide safe workingprocedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Eyes injury caused by flying object/debris of hand tools.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide safe working procedure; Workers wearing face shield / goggle; Provide only competent worker.	2	2	4	Additional control shall be proposed when necessary
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition	Worker to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Injuries or damage due to mishandling or use of tools.	First aid cases/medical treatment (M.C between 1 to 3 days).	Conduct training; Provide safe working procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Electrical hand toolbreakdown	Near miss/ unsafe act/ unsafe condition	Regular maintenance and servicing; Provide safe working procedure.	3	1	3	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
HANDTOOL WORK (Cont'd)	CONSTRUCTION			

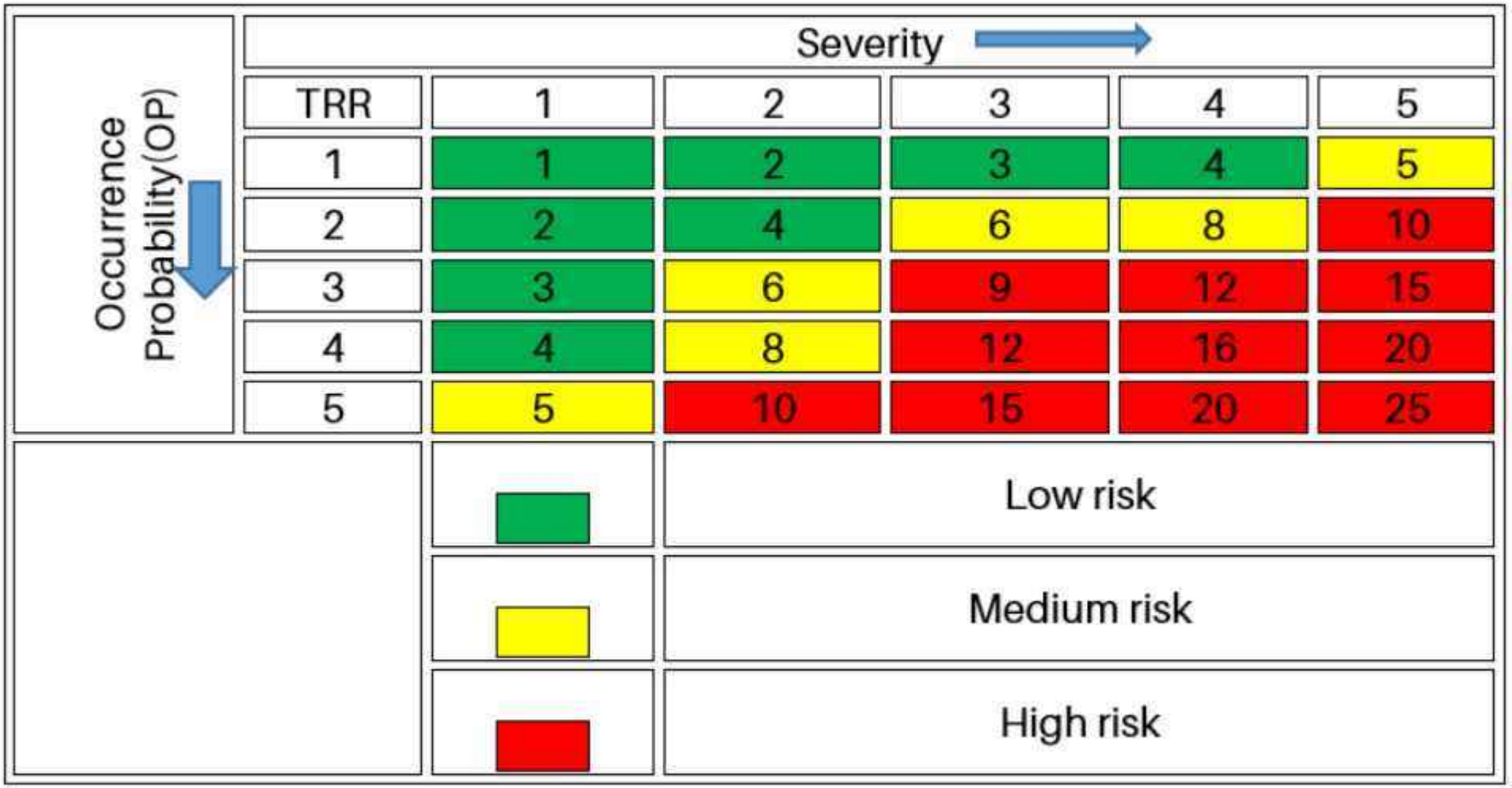
HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Storage of hand tool	Physical injuries caused by weight/sharp objects.	First aid cases/medical treatment (M.C between 1 to 3 days).	Workers wear gloves; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Possible injuries from fall and or hit by falling hand tool.	First aid cases/medical treatment (M.C between 1 to 3 days).	Worker wear Proper PPE (i.e. Safety shoes).	2	2	4	Additional control shall be proposed when necessary
Working/office environment	Sudden injuries caused by excessive lifting and mishandling of files, table, boxes and files cabinet.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide safe handling/lifting procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	When dealing with people with unsound/unstable mind and being attack, verbally or physically abuse.	First aid cases/medical treatment (M.C between 1 to 3 days).	Inculculate team spirit in the office; Create a friendly office environment; Provide two way communication; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries and property damage caused by fire at company's floor or other floors.	First aid cases/medical treatment (M.C between 1 to 3 days), Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Provide overload tripping device at main breaker and main switch; Provide fire extinguisher; Conduct ERP and fire drill training; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Fall sick/fever/flu due to unstable room temperature.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide sweater; Air conditioning temperature to be set comfortably.	2	2	4	Additional control shall be proposed when necessary
	Vomiting and diarrhea due to food or water poisoning in the office.	First aid cases/medical treatment (M.C between 1 to 3 days).	Provide boiling water to all employees or visitor; To ensure cleanliness of pantry.	2	2	4	Additional control shall be proposed when necessary

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
HANDTOOL WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working/office environment (Cont'd)	Body injuries due to sitting for a very long period.	Near miss/ unsafe act/ unsafe condition	To ensure worker take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Allergic reactions or infections due to air contamination caused by rotten waste, fungi, bacteria and cigarette smoke.	Near miss/ unsafe act/ unsafe condition	Instruct building management to clean the air filter regularly; Impose NO SMOKING in the office.	2	1	2	Additional control shall be proposed when necessary
	Eyes injuries due to working in front of/looking at the computer for a very long period.	Near miss/ unsafe act/ unsafe condition	To ensure worker take a short break where applicable.	2	1	2	Additional control shall be proposed when necessary
	Electrocution due to short circuit or power leakage.	Fatality or permanent disability or irreversible illness	Provide overload tripping device at main breaker and main switch; Use SIRIM proven electrical appliances; Use only highly insulated electrical appliances.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL



REPORT OF

"WORK ZONE MONITORING"

For

GIRIDHAN METAL PVT. LTD.

JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI,
P.S. JAMURIA, PASCHIM BARDHAMAN,
PIN – 713344, WEST BENGAL, INDIA

DATE OF INSPECTION : 04.12.2023

Conducted by

PIONEER SAFETY INDUSTRIES

85, Bentinck Street, 5th Floor, Kolkata 700 001.
Mobile : 9433120475
E-mail :pioneersafetyindustries@gmail.com/subhrodaspioneer@rediffmail.com

Acknowledgement

We express our sincere thanks to the management and employees of **GIRIDHAN METAL PVT. LTD.** for their manufacturing plant situated JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S. JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA for their co-operation and total help without which WORK ZONE MONITORING could not have been possible. The courtesy and cordiality extended to the audit team is highly appreciated

PIONEER SAFETY INDUSTRIES

INTRODUCTION :

GIRIDHAN METAL PVT. LTD. for their manufacturing plant situated **JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S. JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA** requested to M/s PIONEER SAFETY INDUSTRIES to conduct the survey of work environment monitoring at their works for assessment of Air borne contaminates accordingly the monitoring (as per your scope the said job) was completed as per requirement of Factories Rules. The entire site examinations were completed on **04.12.2023** results of the monitoring have reported.

STANDARDS :

Factories Acts 1948, under Sec7A (2)e

West Bengal Factories Rules 1958. Rules 13(B)2

SCOPE OF WORK :

Heat Stress.

Date of Inspection : 04.12.2023

PIONEER SAFETY INDUSTRIES Kolkata

OBSERVATION :

Results as mention in which are annexed herewith reveal the under noted. Heat Stress has been found to be within permission limit in general.

INSTRUMENT USED :

- Globe Thermometer
- Digital Anemometer
- Dry & wet Bulb

RECOMMENDATION :

- Working personal should be protected with suitable safety appliances for protection against dust and gases.
- Periodical assessment of the work environment is suggested for better control of work zone environment and protection of working personnel.
- Advised the working personal to use PPEs DUST MUSK, EAR MUFF and EAR PLUG at high noise zone.

PIONEER SAFETY INDUSTRIES Kolkata

FORM 30

REGISTER CONTAINING PARTICULAR OF MONITORING OF WORK ENVIRONMENT REQUIRED UNDER SECTION 7-A (2)(E) OF THE ACT

Name of the Factory : GIRIDHAN METAL PVT. LTD.
Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S. JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA.
Particulars of sampling : HEAT STRESS

Location / Operation monitered	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
INDUCTION FURNACE AREA	Heat Stress	04.12.2023	4	^0C	26.5 26.8 27.1 27.3	26.9	31 ^0C	Globe and Wet Bulb thermometer	07	03	Below TLV		UTTAM METYA
FURNACE PLATFORM NEAR FURNACE NO - 01	Heat Stress	04.12.2023	4	^0C	26.3 26.6 27.1 27.4	26.6	31 ^0C	Globe and Wet Bulb thermometer	04	03	Below TLV		UTTAM METYA
FURNACE PLATFORM NEAR FURNACE NO - 03	Heat Stress	04.12.2023	4	^0C	22.1 22.5 22.8 23.1	22.6	31 ^0C	Globe and Wet Bulb thermometer	03	02	Below TLV		UTTAM METYA
FURNACE PLATFORM NEAR FURNACE NO - 06	Heat Stress	04.12.2023	4	^0C	24.6 24.8 25.6 25.8	25.2	31 ^0C	Globe and Wet Bulb thermometer	06	03	Below TLV		UTTAM METYA

NB: TLV: Threshold Limit Values

PIONEER SAFETY INDUSTRIES

PIONEER SAFETY INDUSTRIES Kolkata

For Pioneer Safety Industri

SK. ABDUL FARUK
B. Tech (Chemical)

FORM 30

REGISTER CONTAINING PARTICULAR OF MONITORING OF WORK ENVIRONMENT REQUIRED UNDER SECTION 7-A (2)(E) OF THE ACT

Nameofthe Factory : GIRIDHAN METAL PVT. LTD.
Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S. JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA.
Particulars of sampling : HEAT STRESS

Location / Operation monitored	Identified Contaminates	Date of Monitorin	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
CCM PLATFORM	Heat Stress	04.12.2023	4	^0C	25.2 25.6 25.8 26.4	25.8	31 ^0C	Globe and Wet Bulb thermometer	04	03	Below TLV		UTTAM METYA
BILLET CUTTING AREA	Heat Stress	04.12.2023	4	^0C	24.3 24.5 25.1 25.6	24.9	31 ^0C	Globe and Wet Bulb thermometer	15	03	Below TLV		UTTAM METYA
NEAR TURNING TABLE AREA	Heat Stress	04.12.2023	4	^0C	22.1 22.5 22.8 23.1	22.6	31 ^0C	Globe and Wet Bulb thermometer	03	02	Below TLV		UTTAM METYA
LADDLE PREPARATION AREA	Heat Stress	04.12.2023	4	^0C	24.3 24.5 25.1 25.6	24.9	31 ^0C	Globe and Wet Bulb thermometer	04	03	Below TLV		UTTAM METYA

NB: TLV: Threshold Limit Values

PIONEER SAFETY INDUSTRIES

PIONEER SAFETY INDUSTRIES Kolkata

For Pioneer Safety Industries
SK. ABDUL FARUK
B. Tech (Chemical)

TABLE 1

Threshold Limit Values for Heat Stress Exposure as per Occupational Safety and Health Administration				
% Work	**Workload**			
	Light	**Moderate**	**Heavy***	**Very Heavy***
75 to 100% (Continuous)	31.0°C	28.0°C	N/A	N/A
50 to 75%	31.0°C	29.0°C	27.5°C	N/A
25 to 50%	32.0°C	30.0°C	29.0°C	28.0°C
0 to 25%	32.5°C	31.5°C	30.5°C	30.0°C
*Criteria values are not provided for Heavy/Very Heavy work for continuous and 25% rest because of the extreme physical strain. Detailed job hazard analyses and physiological monitoring should be used for these cases rather than these screening criteria.				

PIONEER SAFETY INDUSTRIES Kolkata

PHOTOGRAPHS OF WORK ZONE MONITORING

FURNACE PLATFORM NEAR FURNACE N0 - 06

FURNACE PLATFORM NEAR FURNACE NO - 03

PHOTOGRAPHS OF WORK ZONE MONITORING

CCM PLATFORM

FURNACE PLATFORM NEAR FURNACE NO. - 01

Conclusion

On the basis of the assessment of the hazard control arrangement as noted under various parts and considering the observations on the Work Zone Monitoring as stated when concluded it is found that sincere attention is paid by the management for the safety and health of its employees.

However, it may please be noted that there is always a scope of further improvement.

Audited by –

Sk. Abdul Faruk

(Sk. Abdul Faruk)

[Authorized Person]

SK. ABDUL FARUK
B. Tech (Chemical)

PIONEER SAFETY INDUSTRIES Kolkata

Prepared by : -

PIONEER SAFETY INDUSTRIES

COMPETENT AUTHORITY

Approved by Chief Inspector of Factories, Govt. of West Bengal under Factories Act Under Section 21 (2), 28, 29, 31 and 36 (6 & 112) of the Factories Act

SAFETY AUDIT, ELECTRICAL SAFETY AUDIT, WORK ZONE MONITORING, JOB SAFETY ANALYSIS, HIRA / HAZOP STUDY, STABILITY TEST & CERTIFICATION, FIRE SAFETY CERTIFICATION, SAFETY TRAINING, NDT AND DP TEST

: OFFICE :
"YASHODA BUSINESS CENTRE"
85, Bentinck Street, 5th Floor,
Room No. 9, Kolkata – 700 001.
Mobile : 8583992136 / 7003065634 / 9433120475

REPORT OF

"WORK ZONE MONITORING"

For

GIRIDHAN METAL PVT. LTD.

JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI,
P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN – 713344,
WEST BENGAL, INDIA

DATE OF INSPECTION : 16.05.2023

Conducted by

PIONEER SAFETY INDUSTRIES

"Yashoda Business Centre", 85, Bentinck Street, 5th Floor,
Room No. – 9, Kolkata 700 001. Mobile : 9433120475, 8583992136
E-mail :pioneersafetyindustries@gmail.com/subhrodaspioneer@rediffmail.com

Acknowledgement

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PIONEER SAFETY INDUSTRIES

OBSERVATION :

Results as mention in which are annexed herewith reveal the under noted. Heat Stress has been found to be within permission limit in general.

INSTRUMENT USED :

- Globe Thermometer
- Digital Anemometer
- Dry & wet Bulb

RECOMMENDATION :

- Working personal should be protected with suitable safety appliances for protection against dust and gases.
- Periodical assessment of the work environment is suggested for better control of work zone environment and protection of working personnel.
- Advised the working personal to use PPEs DUST MUSK, EAR MUFF, EAR PLUG at high noise zone.

Form-30

Register Containing particular of monitoring of work environment required under section 7-A (2)(E) of the Act

Name of the Factory: GIRIDHAN METAL PVT. LTD.
Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA.
Particulars of sampling : HEAT STRESS

Location/ Operation monitored	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
FERRO FURNACE FLOOR	Heat Stress	16.05.2023	4	^0C	25.2 25.6 25.8 26.4	25.8	31 ^0C	Globe and Wet Bulb thermometer	04	03	Below TLV		UTTAM METYA
FERRO TAPPING AREA	Heat Stress	16.05.2023	4	^0C	26.3 26.5 27.4 27.6	27.0	31 ^0C	Globe and Wet Bulb thermometer	15	03	Below TLV		UTTAM METYA
DRI KILN NO - 01	Heat Stress	16.05.2023	4	^0C	24.1 25.6 25.8 26.1	25.4	31 ^0C	Globe and Wet Bulb thermometer	05	02	Below TLV		UTTAM METYA
DRI KILN NO - 02	Heat Stress	16.05.2023	4	^0C	25.3 25.6 26.4 27.1	26.1	31 ^0C	Globe and Wet Bulb thermometer	04	03	Below TLV		UTTAM METYA

NB: TLV: Threshold Limit Values

Sk. Abdul Faruk

Sk. Abdul Faruk.

PIONEER SAFETY INDUSTRIES

PIONEER SAFETY INDUSTRIES Kolkata

Form-30

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Particulars of sampling : HEAT STRESS

Location/ Operation monitored	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
CPP CFBC AREA 0 METER	Heat Stress	16.05.2023	4	^0C	25.3 25.4 26.1 26.4	25.8	31 ^0C	Globe and Wet Bulb thermometer	01	5	Below TLV	U.M.	UTTAM METYA
CPP WHRB NO - 01 AREA	Heat Stress	16.05.2023	4	^0C	22.1 23.4 24.5 24.7	23.7	31 ^0C	Globe and Wet Bulb thermometer	00	05	Below TLV	U.M.	UTTAM METYA
CPP WHRB NO - 02 AREA	Heat Stress	16.05.2023	4	^0C	23.4 23.6 24.8 24.9	24.2	31 ^0C	Globe and Wet Bulb thermometer	00	05	Below TLV	U.M.	UTTAM METYA

NB: TLV: Threshold Limit Values

Sk. Abdul Faruk
Sk. Abdul Faruk.

PIONEER SAFETY INDUSTRIES

TABLE 1

Threshold Limit Values for Heat Stress Exposure as per Occupational Safety and Health Administration				
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	Light	**Moderate**	**Heavy***	**Very Heavy***
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50 to 75%	31.0°C	29.0°C	27.5°C	N/A
25 to 50%	32.0°C	30.0°C	29.0°C	28.0°C
0 to 25%	32.5°C	31.5°C	30.5°C	30.0°C

* Criteria values are not provided for Heavy/Very Heavy work for continuous and 25% rest because of the extreme physical strain. Detailed job hazard analyses and physiological monitoring should be used for these cases rather than these screening criteria.

PIONEER SAFETY INDUSTRIES Kolkata

PHOTOGRAPHS OF WORK ZONE MONITORING

FERRO FURNACE FLOOR

FERRO TAPPING AREA

PHOTOGRAPHS OF WORK ZONE MONITORING

DRI KILN NO -01

DRI KLIN NO - 02

PIONEER SAFETY INDUSTRIES Kolkata

PHOTOGRAPHS OF WORK ZONE MONITORING

CPP CFBC BOILER AREA

CPP WHRB BOILER NO - 01

PHOTOGRAPHS OF WORK ZONE MONITORING

CPP WHRB BOILER NO - 02

PIONEER SAFETY INDUSTRIES Kolkata

Conclusion

On the basis of the assessment of the hazard control arrangement as noted under various parts and considering the observations on the Work Zone Monitoring as stated when concluded it is found that sincere attention is paid by the management for the safety and health of its employees.

However, it may please be noted that there is always a scope of further improvement.

Audited by -

Sk. Abdul Faruk

Sk. Abdul Faruk

PIONEER SAFETY INDUSTRIES

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. GOUTAM BOURI	**Lab No**	1242238
UHID	319882	**Sample Date**	22/09/2023 11:56AM
Age/Gender	33 Yrs/Male	**Receiving Date**	22/09/2023 12:08PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 3:45PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Haematology

CBC Haemogram, Blood — Sample: EDTA Whole Blood

Test Name	Result	Unit	Bio. Ref. Range	Method
Hemoglobin	13.8	g/dL	13.0 - 16.0	Cyanide-free sodium lauryl sulphate (SLS)
Red Blood Cell [RBC] Count	**5.90**	10^6/µL	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	44.5	%	36.0 - 46.0	Manual/ Calculated
MCV	**75.3**	fl	83.0 - 101.0	Manual/ Calculated
MCH	**23.4**	pg	27.0 - 32.0	Manual/ Calculated
MCHC	**31.1**	g/dL	31.5 - 34.5	Manual/ Calculated
RDW CV	**15.6**	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	08	mm/hr	0 - 10	Modified westergren tube
Platelet count	224	10^3/µL	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	6.70	10^3/µL	4.00 - 10.00	Fluorescence flow cytometry
DLC				
Neutrophils	56	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	33.1	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	5.2	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	5.1	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.6	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	1.69			Calculated

End Of Report

Dr. Vandana Raut
MBBS, MD (Pathology), Senior Consultant - Lab Services,
Reg No: 80135 (WBMC)

* Content of this report is only an opinion not the diagnosis, Please correlate clinically.
* Report shall not be reproduced except in full and with written approval from the Concern Department.
* For amended reports, the contents are final and supercede the recalled report.

Printed at 22/09/2023 16:41

A Unit of Parashmani Medical Centre Pvt. Ltd.

Goutam Bowri

33/m

UHID :- 319882

Date :- 22.09.23

HEALTHWORLD HOSPITALS

MAKING A WORLD OF DIFFERENCE

VA — 6/6 – N6
 — 6/6 – N6

Colour vision - NORMAL.

WNL

22.9.23

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. GOUTAM BOURI	**Lab No**	1242238
UHID	319882	**Sample Date**	22/09/2023 11:56AM
Age/Gender	33 Yrs/Male	**Receiving Date**	22/09/2023 12:08PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 2:03PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur-16	**Processed At**	Lab-Healthworld Hospitals Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
Clinical Biochemistry				
				Sample: Plasma (fluoride)
Glucose Random [R]				
Glucose R	92.4	mg/dL	70 - 140	
				Sample: Serum
Serum Creatinine				
Serum Creatinine	0.92	mg/dL	0.67 - 1.20	Jaffe, Kinetic

End Of Report

Dr. Moushumi Lodh
MBBS,MD (Biochemistry), MHA, Executive Director- Lab Services,Healthworld Hospitals,Reg No: 71993 (WBMC)

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. GOUTAM BOURI	**Lab No**	1242238
UHID	319882	**Sample Date**	22/09/2023 11:56AM
Age/Gender	33 Yrs/Male	**Receiving Date**	22/09/2023 12:18PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 4:29PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Clinical Pathology

Urine Routine Examination — Sample: Urine

Test Name	Result	Unit	Bio. Ref. Range	Method
Physical Examination:				
Colour:-	Pale Yellow		Pale Yellow	
Volume:	35	mL		
Appearance:	Clear			
Chemical Examination:				
pH:-	6.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.010		1.015 - 1.030	Strip Test
Protein:	NEGATIVE		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedicts
Ketone:	NEGATIVE		NEGATIVE	Strip test / Rothera's
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			
Microscopic Examination:				
Leukocytes:	0-3/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Nil/HPF		0-2 /HPF	Light microscopy
Crystals:	Nil		NIL	Light microscopy
Casts:	Nil		NIL	Light microscopy

End Of Report

Dr. Devashis Mandal
MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)

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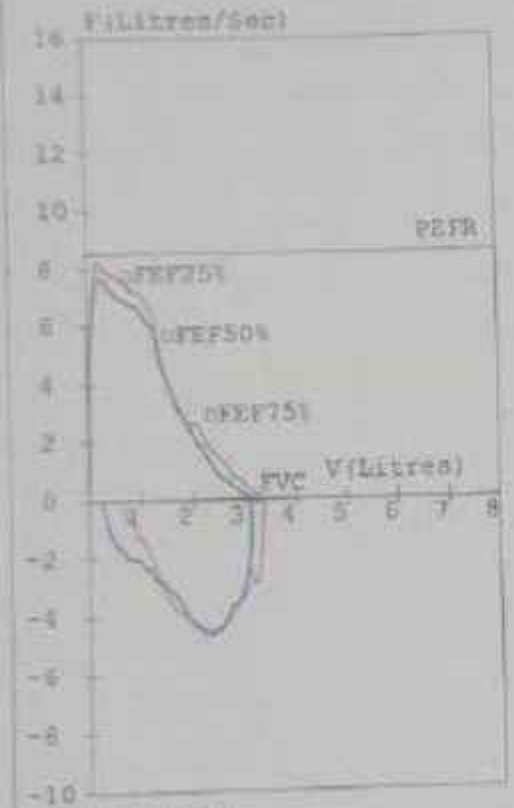
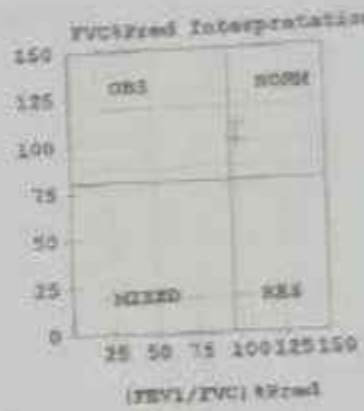
Printed at 22/09/2023 16:41 Page: 3 Of 3

HEALTHWORLD HOSPITALS

C-49,COMMERCIAL AREA,CITY CENTRE,DURGAPUR-713216,WB.

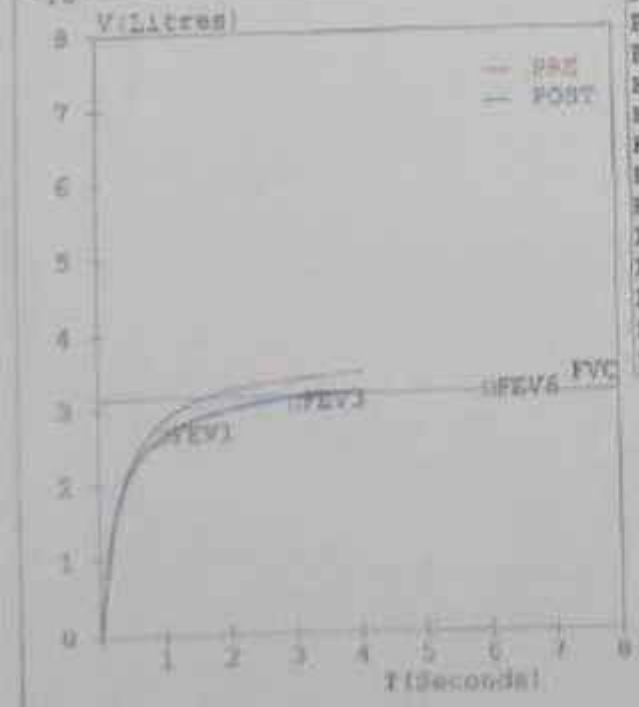
Patient: MR GOUTAM BOURI	Age : 33 Yrs	Gender : Male	
Refd.By: SELF	Height : 162 Cms	Smoker : No	
Pred.Eqns: RECORDERS	Weight : 57 Kgs	Eth. Corr: 100	
Date : 22-Sep-2023 01:44 PM	ID : 319682	Temp :	





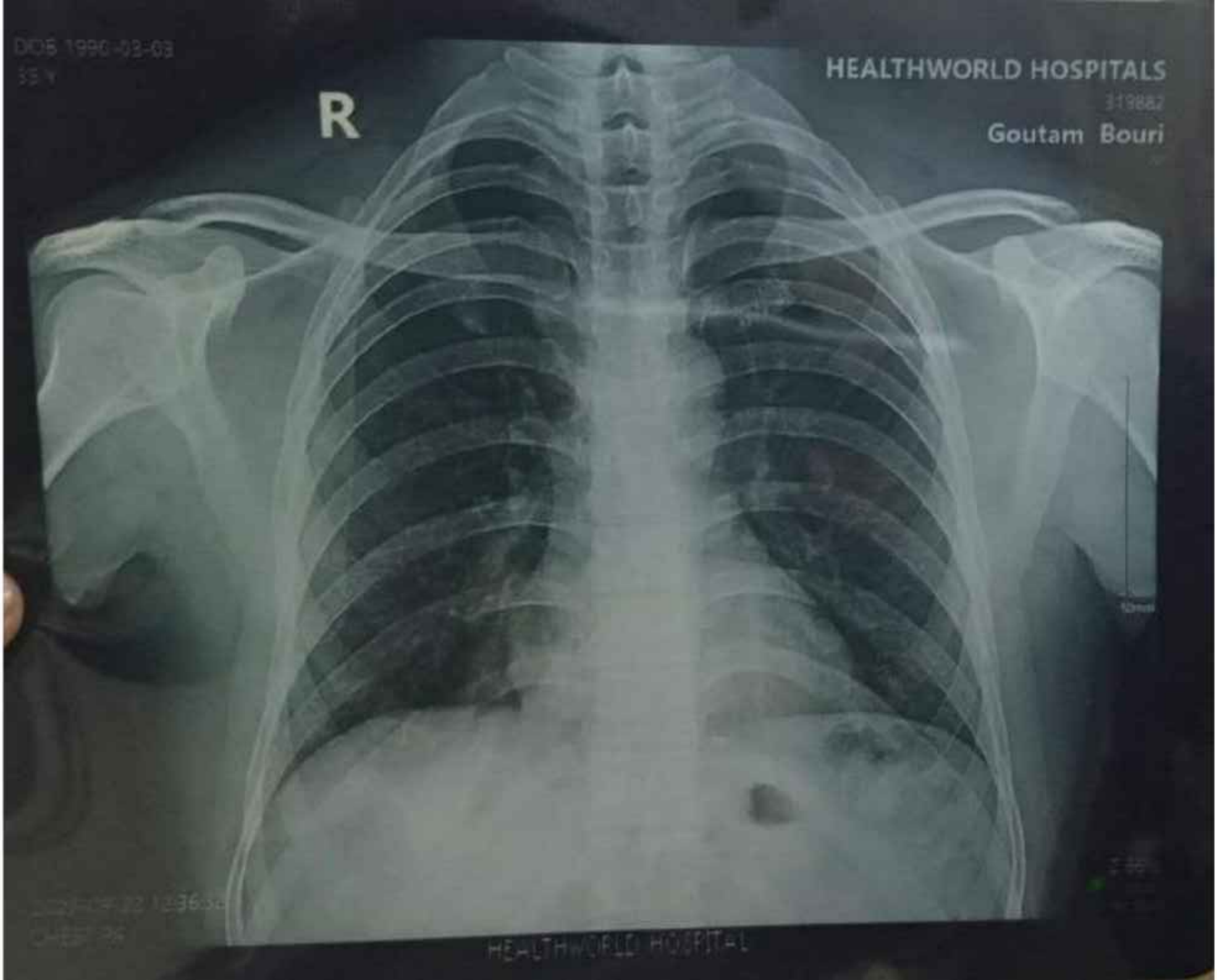
FVC Results

Parameter		Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.15	03.42	109	03.19	101	-07
FEV1	(L)	02.66	02.86	108	02.67	100	-07
FEV1/FVC	(%)	84.44	83.38	099	83.70	099	---
FEF25-75	(L/s)	04.10	02.91	071	02.93	071	+01
PEFR	(L/s)	08.53	08.18	096	07.59	089	-07
FIVC	(L)	-----	02.80	---	02.93	---	+05
FEV.5	(L)	-----	02.27	---	02.19	---	-04
FEV3	(L)	03.05	03.36	110	03.12	102	-07
PIFR	(L/s)	-----	04.52	---	04.65	---	+03
FEF75-85	(L/s)	-----	00.86	---	00.73	---	-15
FEF.2-1.2	(L/s)	06.96	07.31	105	06.75	097	-08
FEF 25%	(L/s)	07.74	07.17	093	06.71	087	-06
FEF 50%	(L/s)	05.62	03.01	054	03.68	065	+22
FEF 75%	(L/s)	02.90	01.34	046	01.10	038	-18
FEV.5/FVC	(%)	-----	66.18	---	68.65	---	+04
FEV3/FVC	(%)	96.83	97.96	101	97.81	101	---
FET	(Sec)	-----	04.21	---	04.26	---	---
ExplTime	(Sec)	-----	00.03	---	00.03	---	---
Lung Age	(Yrs)	033	030	091	033	100	+10
FEV6	(L)	03.15	-----	---	-----	100	---
FIF25%	(L/s)	-----	00.27	---	03.75	---	+1289
FIF50%	(L/s)	-----	04.16	---	04.14	---	+00
FIF75%	(L/s)	-----	04.28	---	02.58	---	-40



Pre Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80
Post Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

DR. RAMPRASAD GORAI


DOB 1990-03-03
R
HEALTHWORLD HOSPITALS
Goutam Bouri
HEALTHWORLD HOSPITAL

CARDIOPRINT

Mr. Goutam Boun, 33 yers
ID: 319882

Male

22.09.2023 17:57:54
HealthWorld Hospital
Gandhi More
Durgapur

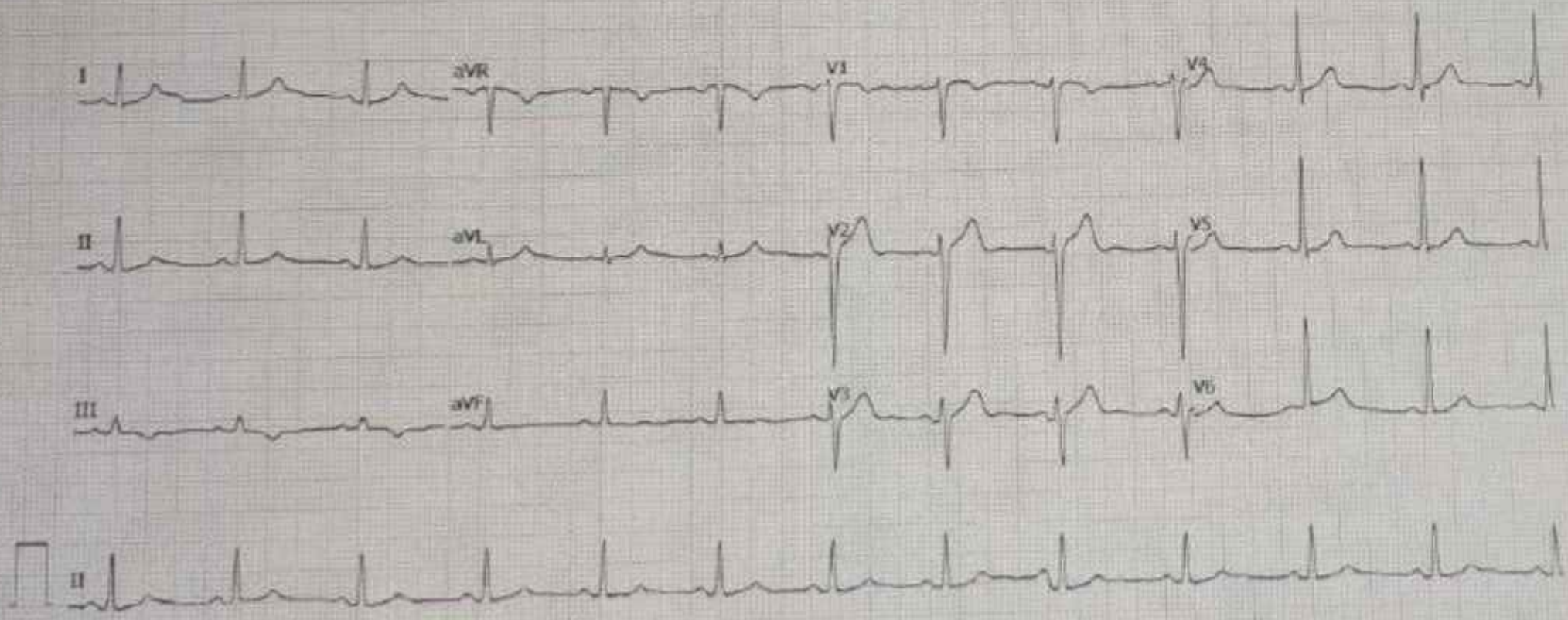
Location:
Order Number:
Visit:
Indication:
Medication 1:
Medication 2:
Medication 3:

Room:

75 bpm
-- / -- mmHg

Technician:
Ordering Ph:
Referring Ph:
Attending Ph:

QRS :	76 ms	Normal sinus rhythm
QT / QTcBaz :	360 / 402 ms	Normal ECG
PR :	138 ms	
P :	94 ms	
RR / PP :	804 / 800 ms	
P / QRS / T :	46 / 50 / 3 degrees	



25 mm/s 10 mm/mV ADS 0.56-20 Hz 50 Hz

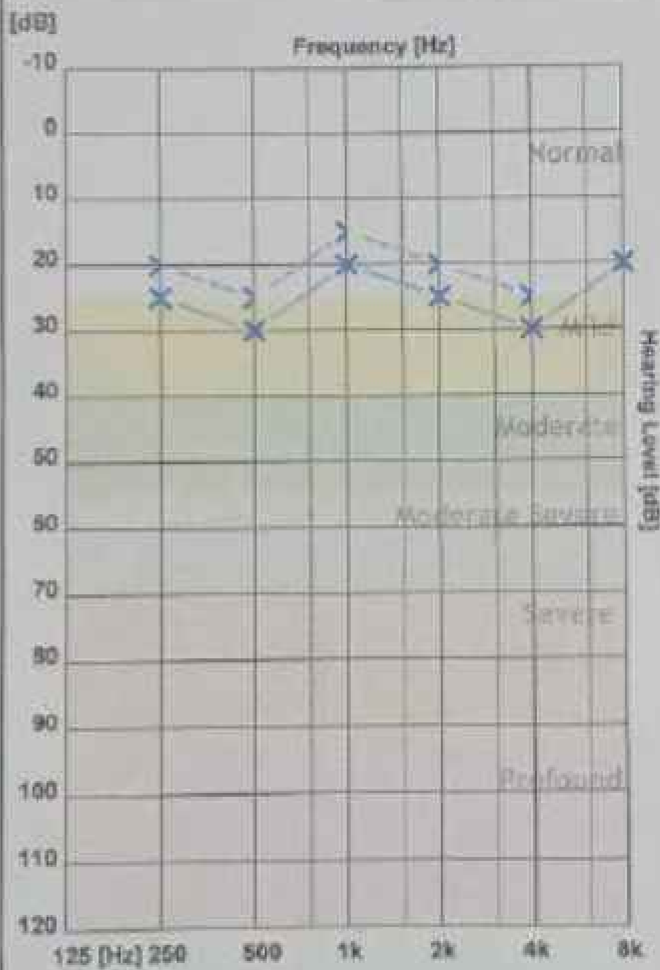
Unconfirmed
4x2.5x3_2S_R1 1/1

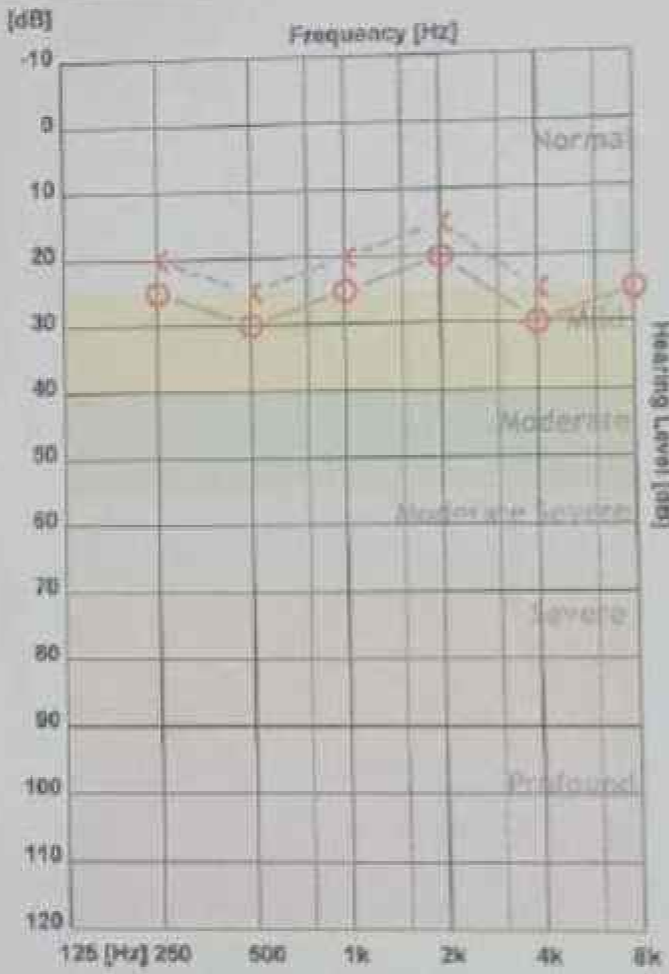
HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 443
Name : GOUTAM BOURI
CR Number : 20230922141732
Registration Date : 22-Sep-2023

Age : 33
Gender : Male
Operator : HEALTHWORLD HOSPITAL





	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left		25	30		20		25		30		20
O - Air Right		25	30		25		20		30		25
[- Bone Left		20	25		15		20		25		
] - Bone Right		20	25		20		15		25		

	Average	High	Mid	Low
AIR Left	25.00 dB	25.00 dB	25.00 dB	25.00 dB
AIR Right	25.00 dB	25.00 dB	25.00 dB	26.67 dB

Clinical Notes :

ANNUAL HEALTH CHECK UP
PTA
RIGHT EAR: 25 dB (N.R: Upto 25 dB)
LEFT EAR: 25 dB (N.R: Upto 25 dB)

BILATERAL NORMAL HEARING SENSITIVITY.

Dr. BISWAJIT BANIK
MBBS, MS (ENT)
Senior Consultant - ENT
Reg No.: 88916 (WBMC)

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

ilac-MRA

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. SATYENDRA PAL SINGH	**Lab No**	1242231
UHID	319879	**Sample Date**	22/09/2023 11:53AM
Age/Gender	48 Yrs/Male	**Receiving Date**	22/09/2023 12:05PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 3:42PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Haematology

Sample: EDTA Whole Blood

Test Name	Result	Unit	Bio. Ref. Range	Method
CBC Haemogram, Blood				
Hemoglobin	13.8	g/dL	13.0 - 16.0	Cyanide-free sodium lauryl sulphate (SLS)
Red Blood Cell [RBC] Count	4.50	10^6/µL	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	43.4	%	36.0 - 46.0	Manual/ Calculated
MCV	96.6	fl	83.0 - 101.0	Manual/ Calculated
MCH	30.6	pg	27.0 - 32.0	Manual/ Calculated
MCHC	31.7	g/dL	31.5 - 34.5	Manual/ Calculated
RDW CV	13.5	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	10	mm/hr	0 - 10	Modified westergren tube
Platelet count	**129**	10^3/µL	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	4.45	10^3/µL	4.00 - 10.00	Fluorescence flow cytometry
DLC				
Neutrophils	47	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	**45.5**	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	5.0	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	1.9	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.6	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	1.03			Calculated

End Of Report

Vandana Raut

Dr. Vandana Raut
MBBS, MD (Pathology), Senior Consultant - Lab Services,
Reg No: 80135 (WBMC)

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Satyendra Pal Singh
48/M

UHID:- 319879.
Date:- 22.09.23

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

VA 6/6
6/6

Ref

Colour vision - NORMAL.

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. SATYENDRA PAL SINGH	**Lab No**	1242231
UHID	319879	**Sample Date**	22/09/2023 11:53AM
Age/Gender	48 Yrs/Male	**Receiving Date**	22/09/2023 12:05PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 2:03PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
Clinical Biochemistry				
			Sample: Plasma (fluoride)	
Glucose Random [R]				
Glucose R	83.8	mg/dL	70 - 140	
			Sample: Serum	
Serum Creatinine				
Serum Creatinine	0.94	mg/dL	0.67 - 1.20	Jaffe, Kinetic

End Of Report

Dr. Moushumi Lodh
MBBS,MD (Biochemistry), MHA, Executive Director- Lab Services,Healthworld Hospitals,Reg No: 71993 (WBMC)

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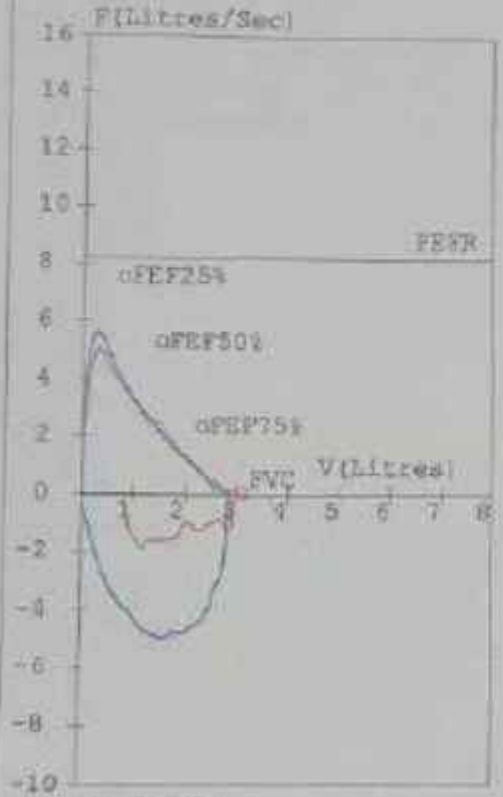
A Unit of Parashmani Medical Centre Pvt. Ltd.
Address : Plot No. E-4/5, Commercial Area, Opp. ESI, Registered Office: City Centre, Durgapur-713216, Dist. : Paschim Bardhaman, West Bengal, India
Website : www.healthworldhospitals.com, Email : info@hwhcc.com, CIN : U85100WB2014PTC201736 PAN : AAHCP6873C
For any query, Pl. Call : 8170055555 / 8170066600 / 0343-2547755, for Ambulance, Call : 8170052660
For Blood Collection from Home, Contact : 8170012815 (Durgapur), 8170052700 (Asansol), 8170052667 (Dhanbad)

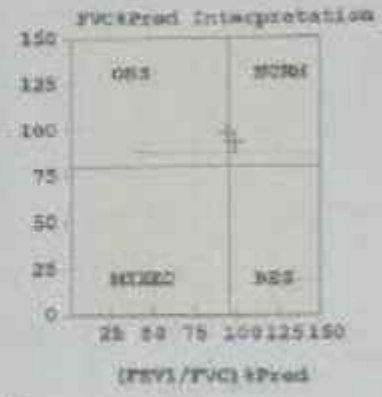

DOB 1975-06-15
48 Y
R
HEALTHWORLD HOSPITALS
Satyendra Pal Singh

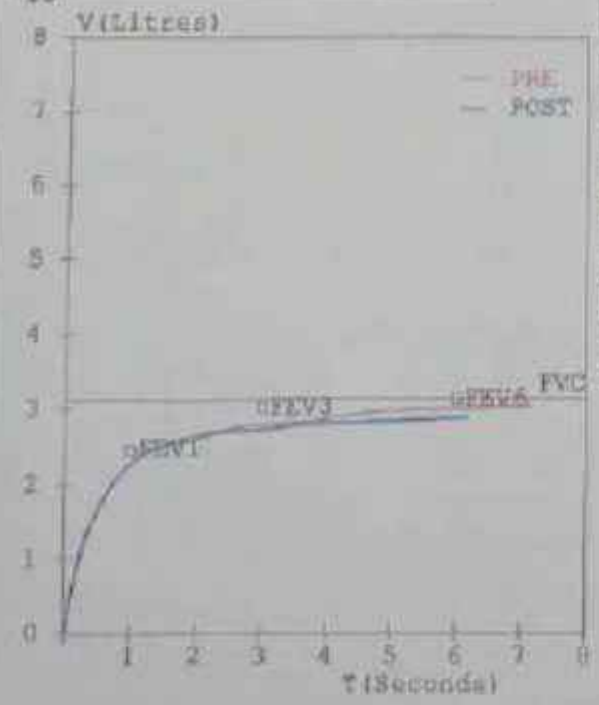
HEALTHWORLD HOSPITALS

C-49,COMMERCIAL AREA,CITY CENTRE,DURGAPUR-713216,WB.

Patient: MR SATYENDRA PAL SINGH	Age	: 48 Yrs	Gender	: Male
Refd.By: SELF	Height	: 165 Cms	Smoker	: No
Pred.Eqns: RECORDERS	Weight	: 55 Kgs	Eth. Corr	: 100
Date : 22-Sep-2023 01:52 PM	ID	: 319879	Temp	:







FVC Results

Parameter		Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.09	03.03	098	02.87	093	-05
FEV1	(L)	02.46	02.27	092	02.27	092	---
FEV1/FVC	(%)	79.61	74.52	094	79.09	099	+06
FEF25-75	(L/s)	03.48	01.79	051	01.99	057	+11
PEFR	(L/s)	08.22	05.01	061	05.54	067	+11
FIVC	(L)	-----	02.21	---	02.88	---	+30
FEV.5	(L)	-----	01.65	---	01.67	---	+01
FEV3	(L)	03.00	02.80	093	02.73	091	-02
PIFR	(L/s)	-----	01.88	---	04.98	---	+165
FEF75-85	(L/s)	-----	00.35	---	00.67	---	+91
FEF.2-1.2	(L/s)	06.09	03.72	061	03.93	065	+06
FEF 25%	(L/s)	07.54	03.74	050	04.01	053	+07
FEF 50%	(L/s)	05.25	02.39	046	02.22	042	-07
FEF 75%	(L/s)	02.32	00.76	033	00.97	042	+28
FEV.5/FVC	(%)	-----	54.46	---	58.19	---	+07
FEV3/FVC	(%)	97.09	92.41	095	95.12	098	+03
FET	(Sec)	-----	07.15	---	06.30	---	---
ExplTime	(Sec)	-----	00.09	---	00.05	---	---
Lung Age	(Yrs)	048	052	108	052	108	---
FEV6	(L)	03.09	02.99	097	02.86	093	-04
FIF25%	(L/s)	-----	00.13	---	04.56	---	+3408
FIF50%	(L/s)	-----	01.17	---	04.87	---	+316
FIF75%	(L/s)	-----	01.31	---	03.66	---	+179

Pre Medication Report Indicates
Early Small Airway Obstruction as FEF 25-75 %Pred or PEFR %Pred < 70
Mild Obstruction as (FEV1/FVC)%Pred <95 and FVC%Pred >80
Post Medication Report Indicates
Early Small Airway Obstruction as FEF 25-75 %Pred or PEFR %Pred < 70
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

DR. RAMPRASAD GORAI

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. SATYENDRA PAL SINGH	**Lab No**	1242231
UHID	319879	**Sample Date**	22/09/2023 11:53AM
Age/Gender	48 Yrs/Male	**Receiving Date**	22/09/2023 12:15PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 4:29PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Clinical Pathology

Sample: Urine

Urine Routine Examination

Test Name	Result	Unit	Bio. Ref. Range	Method
Physical Examination:				
Colour:-	Straw		Pale Yellow	
Volume:	30	mL		
Appearance:	Clear			
Chemical Examination:				
pH:-	5.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.025		1.015 - 1.030	Strip Test
Protein:	Trace		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedicts
Ketone:	NEGATIVE		NEGATIVE	Strip test / Rotheras
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			
Microscopic Examination:				
Leukocytes:	3-4/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Occasional/HPF		0-2 /HPF	Light microscopy
Crystals:	Nil		NIL	Light microscopy
Casts:	Nil		NIL	Light microscopy

End Of Report

Dr. Devashis Mandal
MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)

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A Unit of Parashmani Medical Centre Pvt. Ltd.
Address : Plot No. C-4?, Commercial Area, Opp. ESIC Regional Office, City Centre, Durgapur-713216, Dist. - Paschim Bardhaman, West Bengal, India
Website : www.healthworldhospitals.com, Email : [illegible], CIN : [illegible], PAN : [illegible]
For any query, Pl. Call : [illegible], For Ambulance, Call : [illegible]
For Blood Collection from Home, Contact : [illegible] (Durgapur), [illegible] (Asansol), [illegible] (Dhanbad)

CARDIOPRINT

Mr Satyendra Pal Singh, 48yrs
ID: 319879

22 09 2023 13:10:08
HealthWorld Hospital
Gandhi More
Durgapur

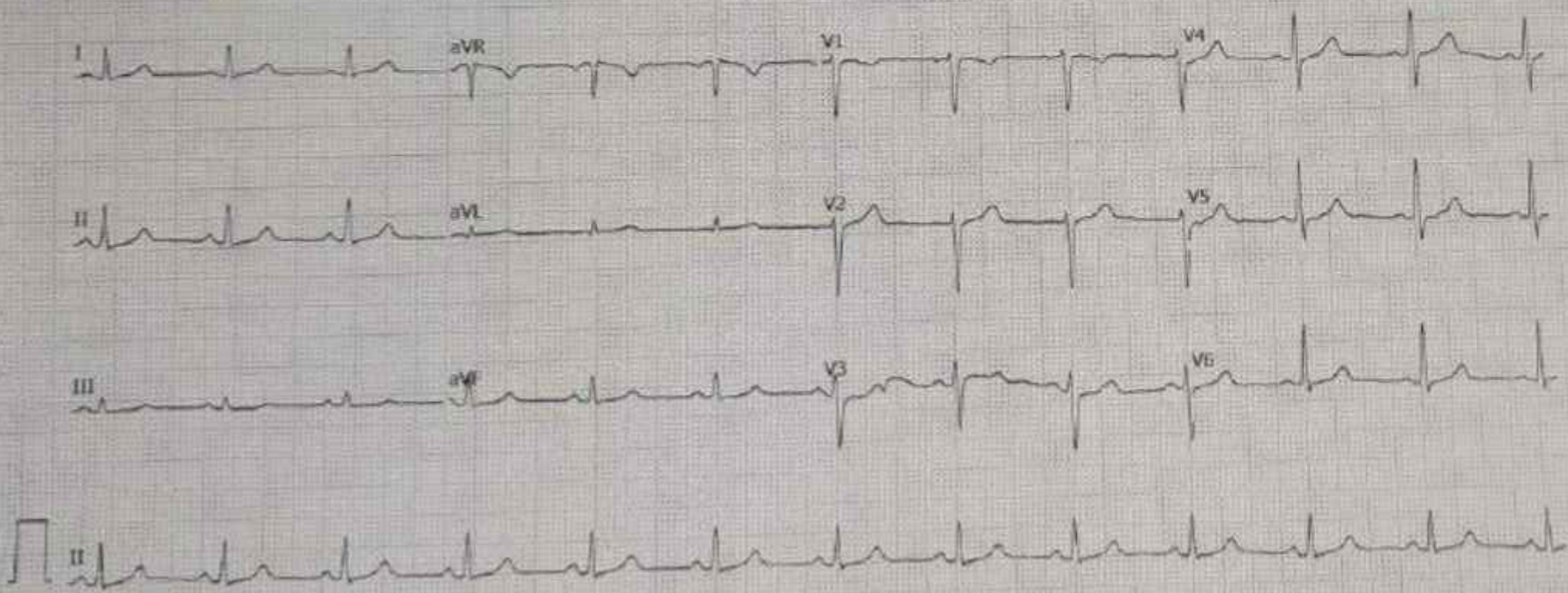
Location:
Order Number:
Visit:
Indication:
Medication 1:
Medication 2:
Medication 3:

Room:

74 bpm
-- / -- mmHg

Technician:
Ordering Ph:
Referring Ph:
Attending Ph:

QRS :	80 ms	Normal sinus rhythm
QT / QTcBar :	386 / 428 ms	Normal ECG
PR :	142 ms	
P :	106 ms	
RR / PP :	806 / 810 ms	
P / QRS / T :	69 / 45 / 44 degrees	



Unconfirmed
4x2.5x3_25_R1 1/1

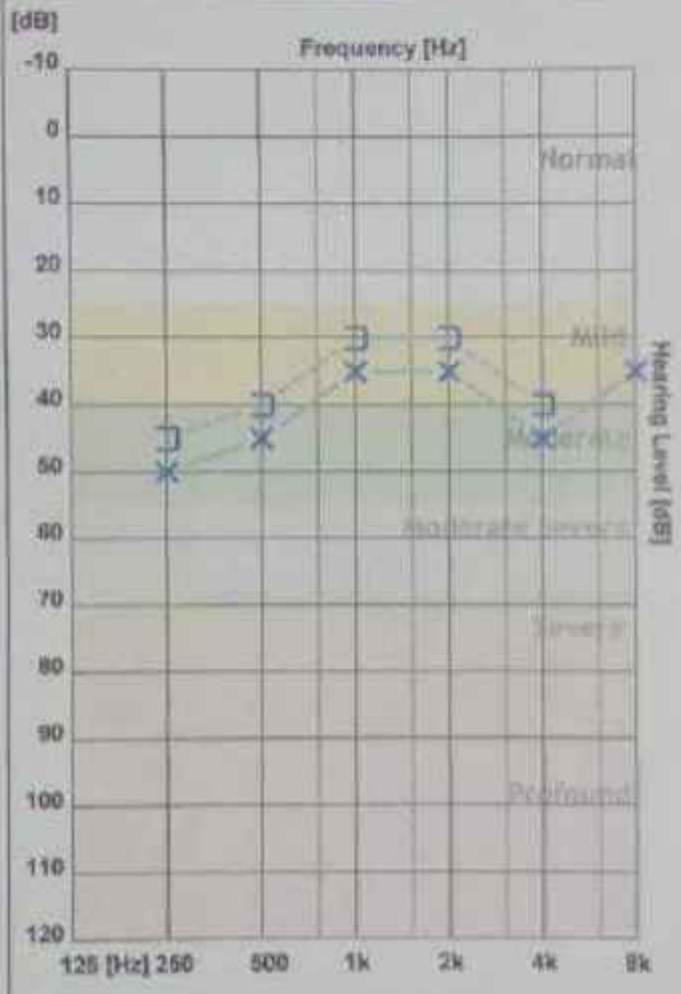
GE MAC2000 1.1 12SL™ v241 25 mm/s 10 mm/mV ADS 0.50-20 Hz 50 Hz

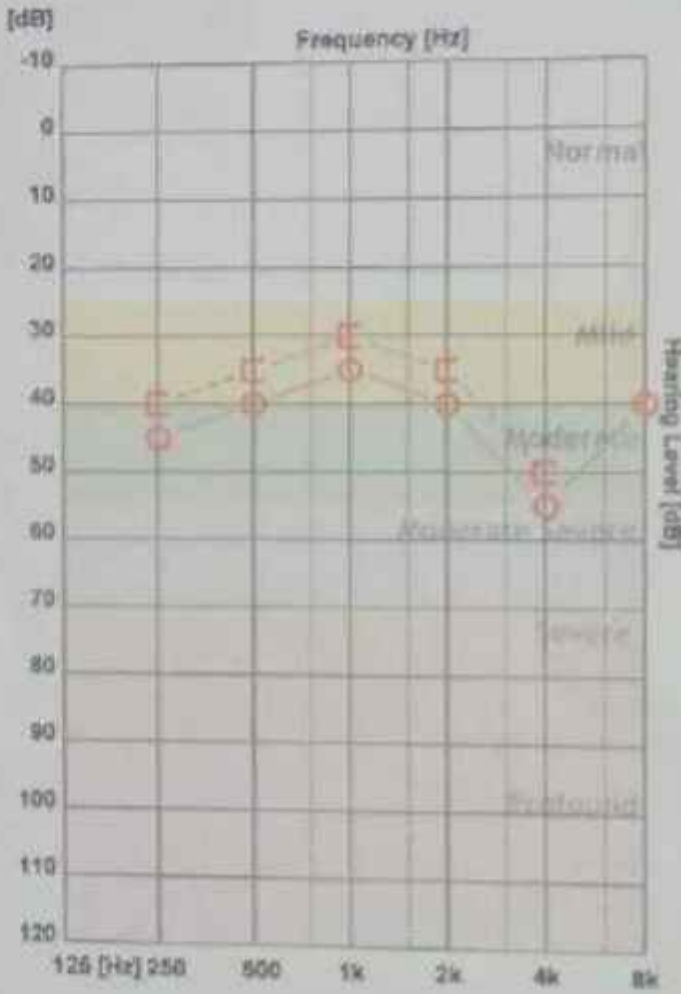
HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 444
Name : SATYENDRA PAL SINGH
CR Number : 20230922142019
Registration Date : 22-Sep-2023

Age : 48
Gender : Male
Operator : HEALTHWORLD HOSPITAL





	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left		50	45		35		35		45		35
O - Air Right		45	40		35		40		55		40
[- Bone Left		45	40		30		30		40		
] - Bone Right		40	35		30		35		50		

	Average	High	Mid	Low
AIR Left	38.33 dB	38.33 dB	38.33 dB	43.33 dB
AIR Right	38.33 dB	46.00 dB	43.33 dB	48.00 dB

Clinical Notes :

ANNUAL HEALTH CHECK UP
PTA
RIGHT EAR: 38.33 dB (R: 26 dB - 40 dB)
LEFT EAR: 38.33 dB (R: 26 dB - 40 dB)

BILATERAL MILD SN HEARING LOSS.

Dr. BISWAJIT BANIK
MBBS, MS (ENT)
Senior Consultant - ENT
Reg No : 88916 (WBMC)

Prasanta Bauri

24/m

HEALTHWORLD HOSPITALS

MAKING A WORLD OF DIFFERENCE

UHID :- 319889

Date :- 22.09.23

VA < 6/6 - N6
 6/6 - N6

W N L.

Colour vision - NORMAL

22.9.23.

HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

ilac-MRA

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. PRASANTA BAURI	**Lab No**	1242263
UHID	319889	**Sample Date**	22/09/2023 12:12PM
Age/Gender	24 Yrs/Male	**Receiving Date**	22/09/2023 12:25PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 2:03PM
Referred By			
Prescribed By	Dr. Self	**Report Status**	Final
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
Clinical Biochemistry				
Glucose Random [R]				Sample: Plasma (fluoride)
Glucose R	84.4	mg/dL	70 - 140	
Serum Creatinine				Sample: Serum
Serum Creatinine	0.93	mg/dL	0.67 - 1.20	Jaffe, Kinetic

End Of Report

Dr. Moushumi Lodh
MBBS,MD (Biochemistry), MHA, Executive Director- Lab Services,Healthworld Hospitals,Reg No: 71993 (WBMC)

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HEALTHWORLD HOSPITALS
MAKING A WORLD OF DIFFERENCE

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. PRASANTA BAURI	**Lab No**	1242263
UHID	319889	**Sample Date**	22/09/2023 12:12PM
Age/Gender	24 Yrs/Male	**Receiving Date**	22/09/2023 12:25PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 3:23PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Haematology

Sample: EDTA Whole Blood

Test Name	Result	Unit	Bio. Ref. Range	Method
CBC Haemogram, Blood				
Hemoglobin	14.8	g/dL	13.0 - 16.0	Cyanide-free sodium lauryl sulphate (SLS)
Red Blood Cell [RBC] Count	**4.47**	10^6/µL	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	45.1	%	36.0 - 46.0	Manual Calculated
MCV	100.8	fl	83.0 - 101.0	Manual Calculated
MCH	**33.0**	pg	27.0 - 32.0	Manual Calculated
MCHC	32.8	g/dL	31.5 - 34.5	Manual Calculated
RDW CV	13.2	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	**27**	mm/hr	0 - 10	Modified westergren tube
Platelet count	207	10^3/µL	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	**10.14**	10^3/µL	4.00 - 10.00	Fluorescence flow cytometry
DLC				
Neutrophils	64.3	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	26.9	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	4.6	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	3.7	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.5	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	2.39			Calculated

End Of Report

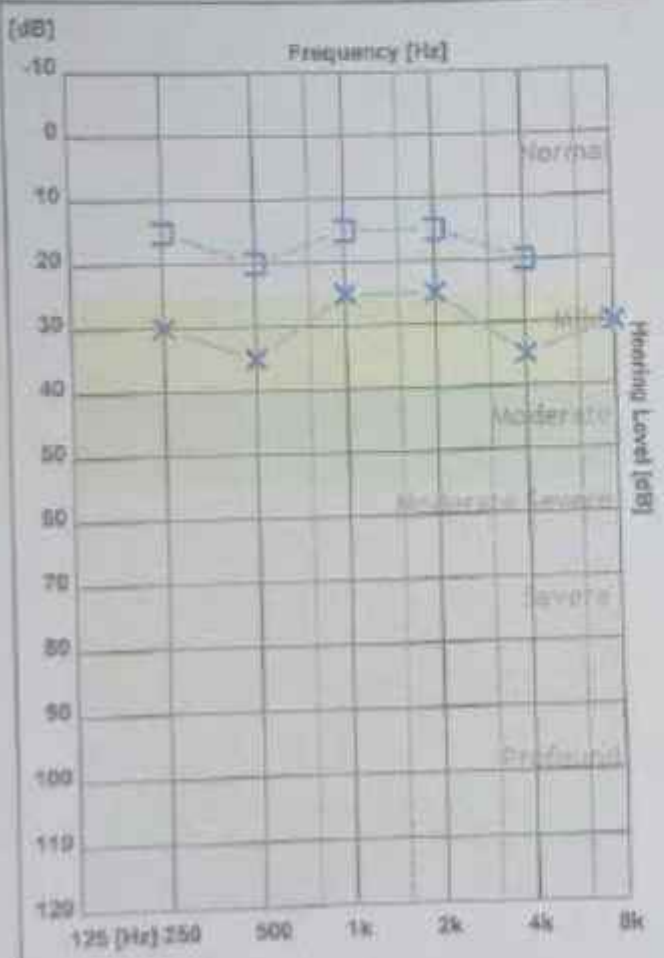
Dr. Vandana Raut
MBBS, MD (Pathology), Senior Consultant - Lab Services,
Reg No: 80135 (WBMC)

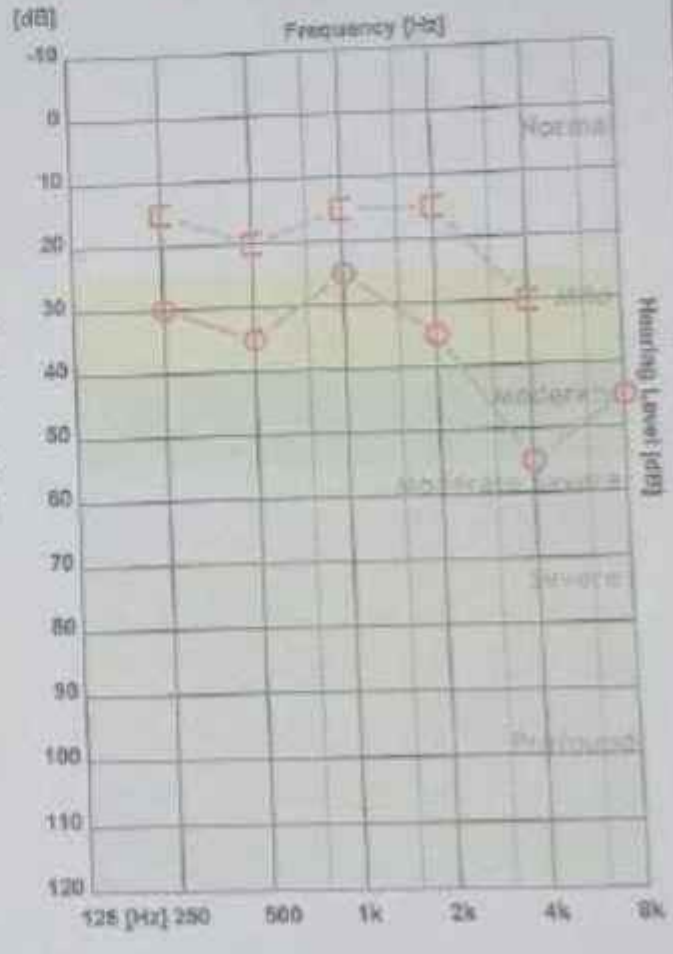
HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 449
Name : PRASANTA BAURI
CR Number : 20230922150536
Registration Date : 22-Sep-2023

Age : 24
Gender : Male
Operator : HEALTHWORLD HOSPITAL





	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left		30	35		25		25		35		30
O - Air Right		30	35		25		35		50		45
[- Bone Left		15	20		15		15		20		
] - Bone Right		15	20		15		15		20		

	Average	High	Mid	Low
Air Left	28.33 dB	30.00 dB	28.33 dB	30.00 dB
Air Right	31.67 dB	45.00 dB	28.33 dB	30.00 dB

Clinical Notes :

ANNUAL HEALTH CHECK UP
PTA
RIGHT EAR: 31.67 dB (R: 25 dB - 40 dB)
LEFT EAR: 28.33 dB (R: 25 dB - 40 dB)

BILATERAL MILD CONDUCTIVE HEARING LOSS

Dr. BISWAJIT BARIK
MBBS, MS (ENT)
Consultant - ENT
(WBMC)

DEPARTMENT OF LABORATORY SERVICES

Patient Name	MR. PRASANTA BAURI	**Lab No**	1242263
UHID	319889	**Sample Date**	22/09/2023 12:12PM
Age/Gender	24 Yrs/Male	**Receiving Date**	22/09/2023 12:36PM
Bed No/Ward	OPD	**Report Date**	22/09/2023 4:28PM
Referred By		**Report Status**	Final
Prescribed By	Dr. Self		
Collected At	Healthworld Hospitals, City Centre, Durgapur - 16	**Processed At**	Lab-Healthworld Hospitals,Durgapur-16

Clinical Pathology

Test Name	Result	Unit	Bio. Ref. Range	Method
Urine Routine Examination			Sample: Urine	
Physical Examination:				
Colour:-	Pale Yellow		Pale Yellow	
Volume:	40	mL		
Appearance:	Clear			
Chemical Examination:				
pH:-	5.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.010		1.015 - 1.030	Strip Test
Protein:	NEGATIVE		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedicts
Ketone:	NEGATIVE		NEGATIVE	Strip test / Rotheras
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			
Microscopic Examination:				
Leukocytes:	0-1/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Nil/HPF		0-2 /HPF	Light microscopy
Crystals:	Nil		NIL	Light microscopy
Casts:	Nil		NIL	Light microscopy

End Of Report

Dr. Devashis Mandal
MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)

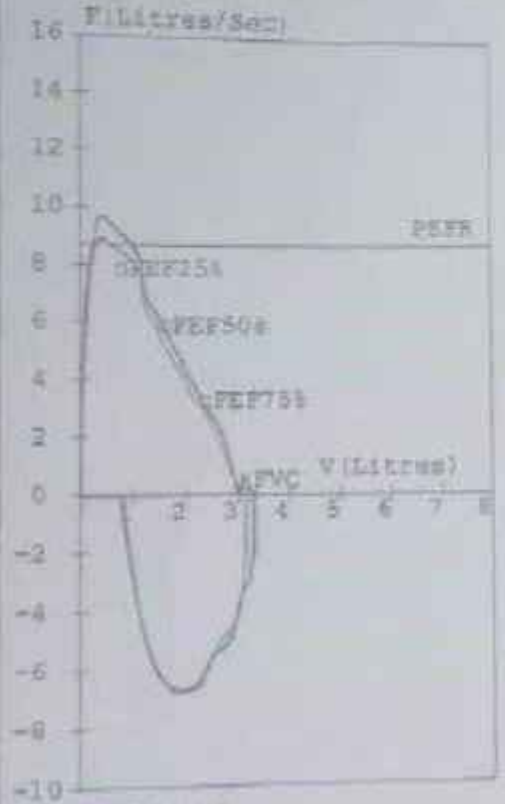
* Content of this report is only an opinion not the diagnosis. Please correlate clinically.
* Report shall not be reproduced except in full and with written approval from the Concern Department.
* For amended reports, the contents are final and supercede the recalled report.

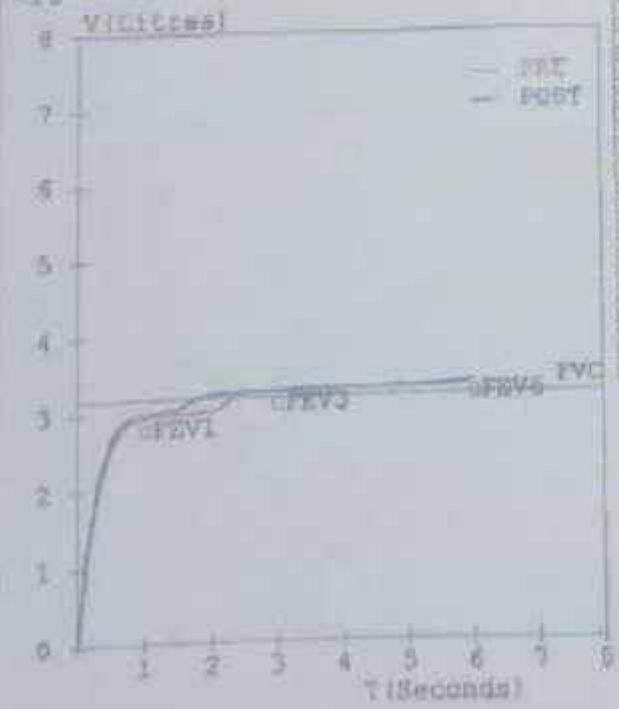
A Unit of Parashmani Medical Centre Pvt. Ltd.
Address : Plot No. C-49, Commercial Area, Opp. ESIC Regional Office, City Centre, Durgapur-713216, Dist. : Paschim Bardhaman, West Bengal, India
Website : www.healthworldhospitals.com, Email : info@hwhos.com, CIN : U85100WB2014PTC201736 PAN : AAHCP6874G

HEALTHWORLD HOSPITALS

C-49,COMMERCIAL AREA,CITY CENTRE,DURGAPUR-713216,WB.

Patient: MR PRASANTA BAURI	Age : 24 Yrs	Gender : Male	
Refd.By: SELF	Height : 160 Cms	Smoker : No	
Pred.Eqns: RECORDERS	Weight : 52 Kgs	Eth. Corr: 100	
Date : 22-Sep-2023 02:41 PM	ID : 319989	Temp :	





FVC Results

Parameter		Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.17	03.19	101	03.34	105	+05
FEV1	(L)	02.77	02.96	107	03.00	108	+01
FEV1/FVC	(%)	87.38	92.79	106	89.82	103	-03
FEF25-75	(L/s)	04.47	04.77	107	04.94	111	+04
PEFR	(L/s)	08.70	08.93	103	09.62	111	+08
FIVC	(L)	-----	02.40	---	02.59	---	+08
FEV.5	(L)	-----	02.58	---	02.68	---	+04
FEV3	(L)	03.08	03.19	104	03.26	106	+02
PIFR	(L/s)	-----	06.78	---	06.72	---	-01
PEF75-85	(L/s)	-----	02.15	---	01.90	---	-12
FEF.2-1.2	(L/s)	07.47	08.16	109	08.79	118	+08
FEF 25%	(L/s)	07.85	08.29	106	08.88	113	+07
FEF 50%	(L/s)	05.84	05.15	088	05.42	093	+05
FEF 75%	(L/s)	03.24	02.75	085	02.68	083	-03
FEV.5/FVC	(%)	-----	80.88	---	80.24	---	-01
FEV3/FVC	(%)	97.16	100.00	103	97.60	100	-02
FET	(Sec)	-----	02.36	---	06.16	---	---
ExplTime	(Sec)	-----	00.04	---	00.04	---	---
Lung Age	(Yrs)	024	022	092	022	092	---
FEV6	(L)	03.17	-----	---	03.33	105	-99
FIF25%	(L/s)	-----	00.05	---	00.05	---	+00
FIF50%	(L/s)	-----	04.75	---	04.95	---	+04
FIF75%	(L/s)	-----	06.49	---	06.54	---	+01

Pre Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80
Post Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

DR. RAMPRASAD GOR


R

CARDIOPRINT

Mr Prasanta Bauri, 24yrs
ID: 316889

22.09.2023 14:00:03
HealthWorld Hospital
Gandhi More
Durgapur

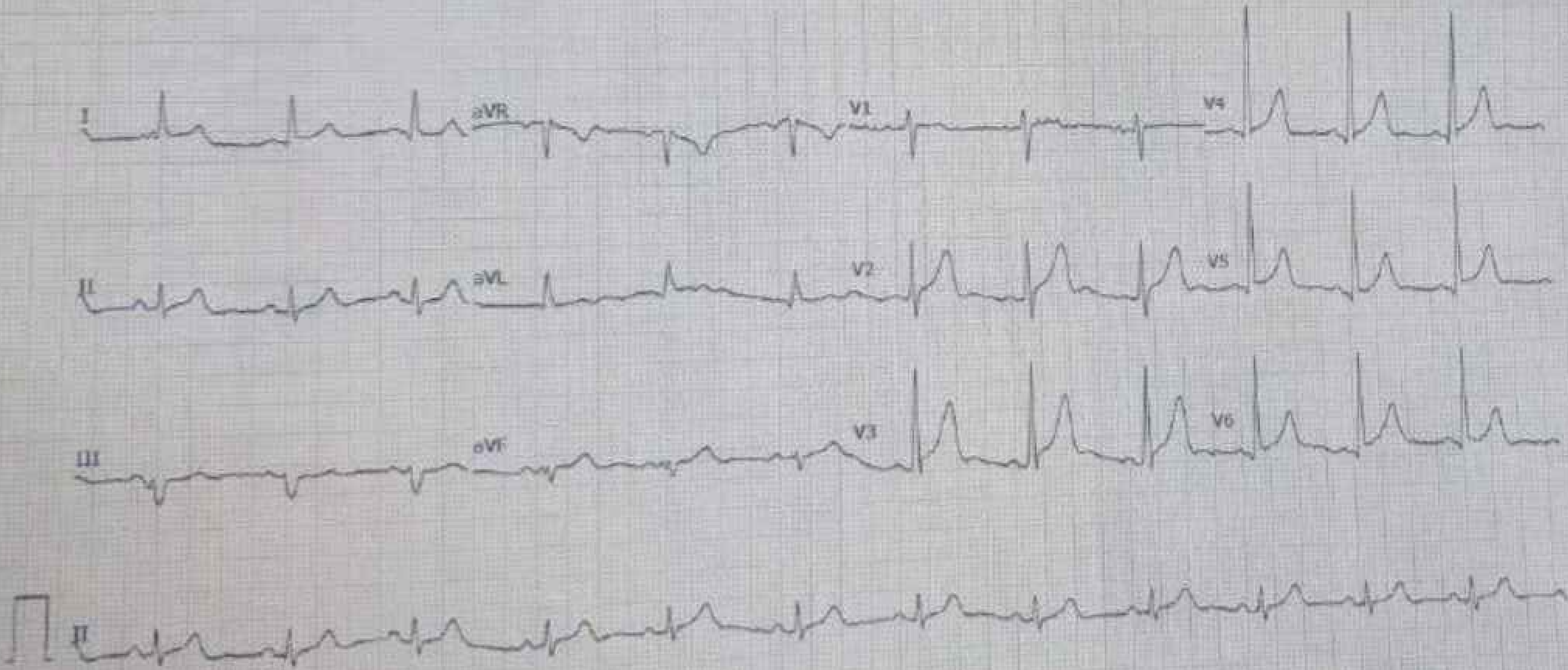
Location:
Order Number:
Visit:
Indication:
Medication 1:
Medication 2:
Medication 3:

Room:

75 bpm
--/-- mmHg

Technician:
Ordering Ph:
Referring Ph:
Attending Ph:

QRS :	84 ms	Normal sinus rhythm
QT / QTcBaz :	376 / 419 ms	Early repolarization
PR :	124 ms	Normal ECG
P :	76 ms	
RR / PP :	800 / 800 ms	
P / QRS / T :	67 / 7 / 49 degrees	



Unconfirmed
4x2.5x3_25_R1 1/1

25 mm/s 10 mm/mV ADS 0.56-20 Hz 50 Hz

CER Details

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
1.	Concern Raised in PH - Creation of employment Opportunities & skill development											
	Village Damodarpur	Adoption of Adivasi football team for boys and girls & development of their Football ground	15 nos. boys & 15 nos. girls	Partially done	Skill development/vocational training in trades	10nos.	Done	Skill development/vocational training in trades	10	Done	30.2	40.3
		Training & Employment of local youth in own company	10 nos.	Done								
		**Training & employment of 38 local peoples instead of 30 peoples has been done till date										
	Village Simultala/Shekhpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	done	Skill development/vocational training in trades	10 nos.	done	26.2	34.0
		**Training & employment of 34 local peoples instead of 30 peoples has been done till date										
	Village Ikra/Balanpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	done	Skill development/vocational training in trades	10 nos.	Done	26.2	28.0
		** Training & employment of 28 local peoples instead of 30 peoples has been done till date										

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
	Village Akhalpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	Done	Skill development/vocational training in trades	10 nos.		26.2	34.0
		** Training & employment of 34 local peoples instead of 30 peoples has been done till date										
	Village Benali				Skill development/vocational training in trades	10 nos.	Done	Skill development/vocational training in trades	10 nos.	Done	25	
2.	**Concern Raised in PH - Infrastructure Development & provision of drinking water facilities in nearby areas viz., development of roads, local schools**											
	Village Damodarpur	Construction of Adivasi community temple	1 nos.	Done	RO drinking water for villagers through tanker	1 no.	Done	Installation of solar lights	10 nos.		61	58.2
		Construction of community toilet for villagers	6 nos.	Done	Repairing of internal roads	400 m	Done	RO drinking water for villagers through tanker	1 no.	Done		
		Provision of RO drinking water for villagers through tanker	1 no.	Done								
	Village	Construction of	2 with 6	Done	Construction of	400 m	Partially	RO drinking	1 no.	Done	67	47.2

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
	Simultala/Shekhpur	Community toilet	toilets each		drainage system and connect with main drain		done	water for villagers through tanker				
		Construction of bath ghat	1 no.	Done	RO drinking water for villagers through tanker	1 no.	Done					
		Provision of RO drinking water for villagers through tanker	1 no.	Done								
	Village Ikra/Balanpur	Construction of well for drinking water	1 no.	Done	Construction of cycle stand shed in Govt. High school	1		Provision of computer	3 nos.	Done	14.1	11.5
		Construction of lunch shed in Govt. primary school	1 no					Provision of printer	1 no.	Done		
		Construction of cultural stage	1 nos.	Partially done				Installation of LED lights in villages	10 nos.	Done		
								Distribution of furniture(Tables & Chairs) in Govt Primary	30 nos.	Done		

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
								school				
	Village Akhalpur	Construction of toilet in Govt. Primary School	2 closed toilets with 3 urinals	Done	Construction of borewell for drinking water in Govt. Primary School	1 no.	Done	Installation of solar light	5 nos.		19.0	26.9
		Construction of boundary wall of Muslim Cementry	1000 m	Done	Construction of public toilet in Hermitage	5 closed toilets						
	Village Benali	Renovation of Govt. School	1 no.	Done	Distribution of furniture in school (Tables & Chairs)	20 nos.		Repairing of internal road	700 m		15.5	12.6
	Others							Development of roads opposite to plant site or connecting to one pucca road from Akhalpursubvillage to Damodarpur main road	1 km (** 250 mpucca road has been done)		80	22.0

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
3.	Concern Raised in PH - Greenbelt development in nearby areas & preserving local species											
	Village Damodarpur	Community plantation	500 saplings	Done	Distribution of samplings and tree guard	300		Distribution of samplings and tree guard	300	Done	0.85	0.9
	Village Simultala/Shekhpur	Community plantation	600 saplings	Done	Distribution of samplings and tree guard	300		Distribution of samplings and tree guard	300	Done	0.95	1.0
	Village Ikra/Balanpur	Community plantation along with plantation in Govt. Primary School	700 saplings	Partially Done							0.55	0.6
	Village Akhalpur	Community plantation	700 saplings	Done				Distribution of samplings and tree guard	300	Done	0.8	1.0
	Village Benali	Community plantation	400 saplings					Distribution of samplings and tree guard in schools and villages	500 saplings		0.7	
4.	Concern Raised in PH - Development of Health facilities											

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1st year			To be implemented in 2nd Year			To be implemented in 3rd Year				
	Village Damodarpur	Air-Conditioned Bolero Ambulance to Borough for villagers duly equipped with oxygen and stretcher	1 no.								10	
	Village Akhalpur				Provision of medical equipment as per the requirement of health centre	2 nos.					20	
5.	**Concern Raised in PH - Control of Pollution because of proposed project viz., air pollution, discharge of water, dust etc**											
	Village Damodarpur				Water tanker for water sprinkling on road to minimise fugitive emission during vehicular movement	2 nos.	Done				12	18.6
6.	Surroundings villagers	AC Hearse Van - for nearby villages										13.8
7.	Royal Enfield bike hand over to Asansol Durgapur Police Commissionerate											22.38
			Company has allocated Rs. 4.36 Crores for implementing all the activities mentioned above for socio-economic development of the area								436.25	**372.98**

Damodarpur Village

Construction of One Toilet Blocks (6 Toilets in the building Complex)

Damodarpur Village

Damodarpur More adjacent to Jamuria Haripur main road repairing work by heavy duty paver blocks

Damodarpur Village

Construction of Two Santhal Temples

Damodarpur Village

Damodarpur Adibasi Football Team with hired Coach on monthly remuneration with all required dresses and accessories

SIMULTALA

Renovation of One Pond by dredging and construction of Two numbers of Ghat

SIMULTALA

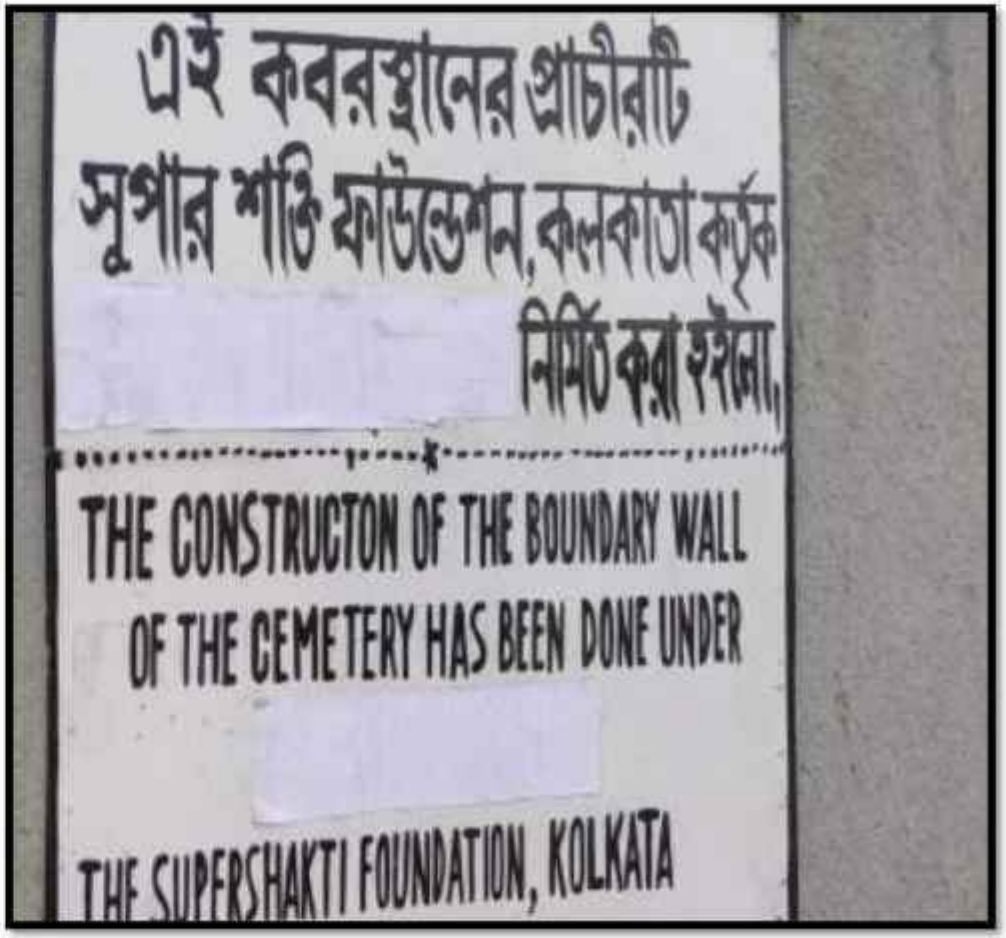
Construction of Toilets and Temples

Akhalpur Village

Construction of Shiv Mandir

Akhalpur Village

Construction of Boundary Wall of Kabristan



Akhalpur Village

Construction of Bathing Ghat

AC Hearse Van for nearby villages

Supply of R.O drinking water

Royal Enfield Bike Hand Over to Asansol Durgapur Police Commissionerate

ROYAL ENFIELD

To

Date: 29.04.2022

M/s. Super Shakti Foundation

Near Ibm Substation

Jamuria

Sub: Release balance amount cheque for Rs 12, 37,930/- in name of SG Automobiles.

Dear Sir,

With reference to your purchase order for 10 nos vehicle of Royal Enfield (Classic 350 Redditch Red) On Price of Z. 23,793 each (total Value Z. 37,930) and advance payment was made for Rs 25, 00,000/-

We please to inform you that your order for 10 no Classic 350 Redditch Red vehicle is ready for delivery.

So please issue the rest amount cheque in favour of SG Automobiles for the same.

Thanking You

For SG Automobiles

SG Automobiles

Scanned with OKEN Scanner

SBI

Pay SG Automobiles

Twelve Lakhs Thirty Seven thousand nine hundred thirty Only

₹ 1237930/-

Payable at Par at All SBI Bank Branches

SUPERSHAKTI FOUNDATION

Please sign above

⑈235468⑈ 900259038⑆ 626000⑈ 11

CER activity under progress

Construction of a Model School Damodar village for education to the Adivasi children's with appointment of a teacher on month ly remuneration.

GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : giridhanmetal@gmail.com CIN : U27320WB2019PTC234675

GIRIDHAN METAL PRIVATE LIMITED

CORPORATE ENVIRONMENTAL POLICY

For protection of environment and sustainable development, Giridhan Metal Private Limited is committed to abide by environmental norms and various conditions stipulated by the Govt of India during approval of projects at the central as well as at the state levels. In addition to this, Giridhan Metal Private Limited acknowledge the importance of the concept of inter-dependence of all sections of society. In particular, it focuses revolves around the community residing in the immediate vicinity of its steel manufacturing plant where it seeks to actively assist in improving the quality of life.

In line with its abiding concern for preservation of the ecological balance and safeguarding the health and environment of the community, Giridhan Metal Private Limited will always actively demonstrate its firm resolves to protect the environment and its deeply committed to its reputation and respect built over the years in industry and society for its professional of management based on philosophy of the best in business ethics. Giridhan Metal Private Limited has global commitments and also the guidelines on norms and directives of different State and Central Government of India, Giridhan Metal Private Limited has formulated the following Corporate Environmental Policy & Responsibility for effective implementation across the organization in its projects and integrated steel plant. The policy shall:

a) Be appropriate to the nature and scale of the organization's activities, products and services and adopted at the Board level. It shall be documented, implemented, maintained and communicated to all persons working for the organization and on its behalf.

b) Define a specific organisational structure for guidance & implementation.

c) Ensure the required commitment from top management for the allocation of sufficient financial, human, organizational infrastructure and technology resources for its implementation.

d) Shall be integrated with all stages of the project/activity cycle of the organization.

e) Ensure environmental performance of all projects/activities over and above the applicable statutory requirements to which organization have to comply.

f) Shall be aligned with policies and management systems of the organization including the Environmental Management System (EMS) or other environmental performance initiatives.

g) Shall provide for incentives for its employees for achieving corporate environmental targets that go beyond statutory compliance and disincentives for failure to achieve this.

h) Provide for monitoring and review of corporate environmental performance along with the reporting of non-compliance.

i) Monitoring of implantation and review shall be at the level of the Board and the guidance of the Board shall be communicated to all concerned in writing for compliance. Together these shall comprise the corporate Environmental Performance Report, and shall be included in the Organisation's Annual Report.

GIRIDHAN METAL PRIVATE LIMITED JAMURIA

In addition to the above, Giridhan Metal Private Limited will strive to adhere to the following elements of its Corporate Environmental Policy:

1) Operate the manufacturing and other facilities in compliance with all applicable laws and regulations related to environment and health & safety of employees and surrounding communities.
2) Continually improve the environmental performance of organisational process and products through waste minimization and pollution abatement.
3) Minimize consumption of natural resources through the reduction, reuse or recycling of materials, as much as possible.
4) Encourage efficient use of energy, water and utilities.
5) Purchase products and services as far as possible, that do the least damage to the environment on a life cycle basis.
6) Promote environmental awareness among the employees and encourage them to work in environmentally responsible manner.
7) Communicate the environmental commitment and performance of the organization to its clients, customers and the public.
8) Develop and maintain appropriate emergency and response programs where required by legislation or where significant health, safety or environmental hazards exist.

Develop and maintain greenery in and around its mines, plants and other project units.

Implementation of the Corporate Policy

Resources, Roles and Responsibility:

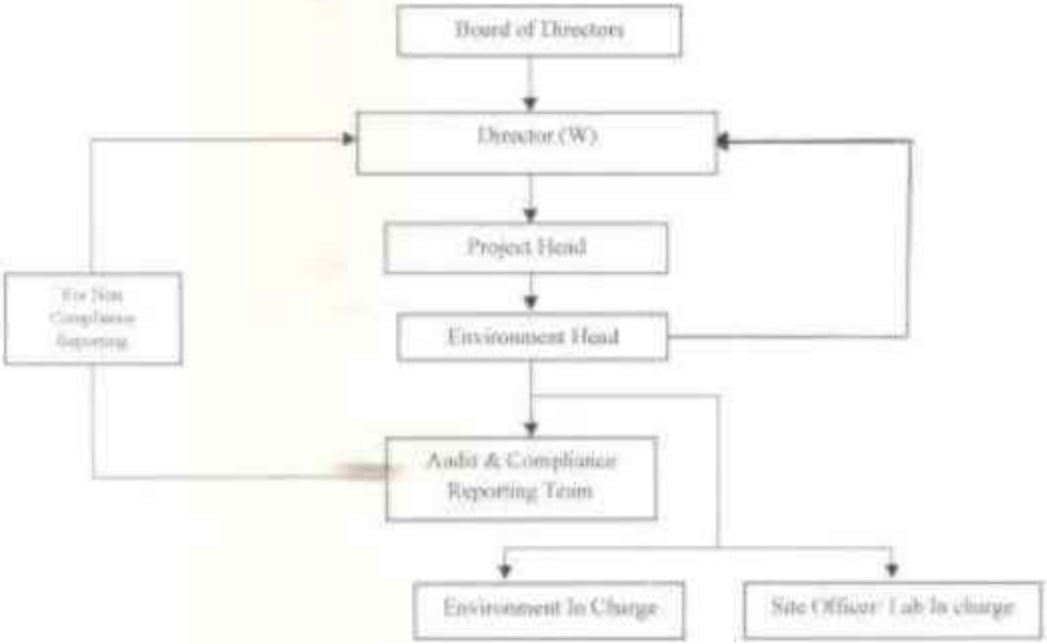
Giridhan Metal Private Limited shall have an organization structure to oversee the effective implementation of corporate Environment Policy. This structure shall define key responsibilities within the various levels of the organization for policy implementation and shall include involvement at all the levels throughout the organization. An Organization structure in this regard is shown below:

The management shall ensure availability of resources essential to implement the corporate environment policy across its all operational and project units. Resources shall include human resources, organizational infrastructure, technology and financial resources. Roles and responsibilities shall be defined and documented to facilitate the effective implementation of the environment policy.

As part of the existing Board structure, Audit & Compliance reporting team shall also oversee the environmental status inclusive of the conditions prescribed under various environmental consents and clearances, as and when obtained from various State and Central Govt authorities, as well as the corporate norms, standards and targets that exceed the legal compliance requirements.

The below organizational structure Management Cell is responsible for any non-compliance/ infringement/ deviation/ violation of the environmental or forest norms under the supervision of Board of Directors.

GIRIDHAN METAL PRIVATE LIMITED JAMURIA



Documentation:

The policy shall be made available on the Giridhan Metal Private Limited's website and also be available in hard copy. The planning, implementation and monitoring of the organizational environmental performance shall be documented. All achieved milestones will be supported by documentary evidence in the form of photographs, monitoring records and /or reports, wherever applicable.

Transparency in the implementation of Environmental policy

Monitoring will be conducted periodically as per relevant norms framed by SPCB or MoEFCC or any other statutory authorities. It shall serve to drive accountability and transparency and provides for learning to implement in future initiatives. Giridhan Metal Private Limited shall implement a monitoring mechanism by its defined organizational structure with clear roles & responsibilities for every operational and project units by creating a register specifying all the regulatory compliances and clearance conditions that have been imposed by the Ministry or other public authorities. Giridhan Metal Private Limited shall also prepare Annual Environmental performance report and include it in its Annual Report.

The policy has been passed by the Board of Directors of Giridhan Metal Private Limited in compliance with the circular issued by Ministry of Environment, Forest and Climate Change. All issues related to Environment specifically non compliances be placed before the Board and the Head of the Plant should submit a report on the same before the ensuing meeting along with all the corrective measures taken thereon.

GIRIDHAN METAL PRIVATE LIMITED JAMURIA

GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : giridhanmetal@gmail.com CIN : U27320WB2019PTC234675

Annexure – 1

GIRIDHAN METAL PRIVATE LIMITED

Environment Policy

Protection of environment is of prime concern and an important business objective at Giridhan Metal Private Limited. With a leading role in providing services in Manufacturing industry value chain in India, Giridhan Metal Private Limited is conscious of its responsibility towards creating, maintaining and ensuring a safe and clean environment for sustainable development. In particular Giridhan Metal Private Limited is committed to:

1) Operate the manufacturing and other facilities in compliance with all applicable laws and regulations related to environment and health & safety of employees and surrounding communities.
2) Continually improve the environmental performance of organisational process and products through waste minimization and pollution abatement.
3) Minimize consumption of natural resources through the reduction, reuse or recycling of materials, as much as possible.
4) Encourage efficient use of energy, water and utilities.
5) Purchase products and services as far as possible, that do the least damage to the environment on a life cycle basis.
6) Promote environmental awareness among the employees and encourage them to work in environmentally responsible manner.
7) Communicate the environmental commitment and performance of the organization to its clients, customers and the public.
8) Develop and maintain appropriate emergency and response programs where required by legislation or where significant health, safety or environmental hazards exist.
9) Develop and maintain greenery in and around its mines, plants and other project units.

Date 04 MAR 2020

Sanjay Agarwal
Director

GIRIDHAN METAL PRIVATE LIMITED
JAMURIA

■ বিক্ষোভ বেতন বৃদ্ধির দাবিতে মঙ্গলবার বিক্ষোভ দেখালেন দুর্গাপুর পুরসভার সাফাই কর্মীরা

গ্রীষ্মে রক্তসঙ্কট কাটাতে রক্তদান শিবির করলেন বিদায়ী মন্ত্রী তথা তৃণমূল প্রার্থী স্বপন দেবনাথ

বর্ধমান সময়

■ খুনের হুমকি কাঁকসায় তৃণমূলকর্মীকে খুনের হুমকি দিয়ে পোস্টার ঘিরে চাঞ্চল্য। অভিযোগ দায়ের হ...

গুসকরা শহরের পূর্বপাড়াপল্লিতে একটি বাড়িতে লুটপাট চালাল দুষ্কৃতীরা। সোমবার রাতের ঘটনা

কোভিড রুখতে পদক্ষেপ পশ্চিম বর্ধমানে ■ শয্যা বাড়ল বাঁকুড়া-কালনায়

বেসরকারিকরণ

[illegible]

বিজ্ঞপ্তি

গিরিধন মেটাল প্রাইভেট লিমিটেড

কারখানা: জামুড়িয়া শিল্প তালুক, গ্রাম: ইকরা এবং বাবোমধুপুর, পোস্ট নন্দী - ৭১৩৩৩৪ তহসিল: জামুড়িয়া, জেলা: পশ্চিম বর্ধমান, পশ্চিমবঙ্গ

এতদ্বারা সকল জনসাধারণকে জানানো হইতেছে যে ভারত সরকার এর অন্তর্ভুক্ত পরিবেশ, বন ও জলবায়ু পরিবর্তন মন্ত্রক, নয়া দিল্লি দ্বারা জামুড়িয়া শিল্প তালুক স্থিত মেসার্স গিরিধন মেটাল প্রাইভেট লিমিটেড লৌহ ইস্পাত কারখানার সম্প্রসারণ এর অনুমতি দেওয়া হইয়াছে। এই লৌহ ইস্পাত কারখানা যাহার স্পঞ্জ আইরন বর্তমান ১,২০,০০০ টিপিএ হইতে ৩,১৮,০০০ টিপিএ, এসএমএস বিলেট বর্তমান ১,০৫,০০০ টিপিএ হইতে ৩,৭২,০০০ টিপিএ, রোলিং মিল ১,০০,০০০ টিপিএ হইতে ৩,০০,০০০ টিপিএ, অর্থ্যাযুক্ত আর্ক ফার্নেস ১৫,০০০ টিপিএ হইতে ৩০,০০০ টিপিএ এবং ক্যাপটিভ পাওয়ার প্লান্ট ১৬ মেগাওয়াট হইতে ৪২ মেগাওয়াট এবং তাহার সহিত বর্ধিত তাপ পুনরুদ্ধার বইলারের সম্প্রসারণের অনুমতি পত্র ০৮ই এপ্রিল ২০২১ তারিখে পরিবেশ, বন ও জলবায়ু পরিবর্তন মন্ত্রক, ভারত সরকারের প্রেরিত চিঠি সংখ্যা এফ. এনও জে -১১০১১/৩৬৯/২০১০ আই এ II (I) মারফত প্রাপ্ত হইয়াছে। পরিবেশগত ছাড়পত্র, পরিবেশের বর্তমান পরিস্থিতি এবং ইহার সুরক্ষার সম্বন্ধিত বিস্তারিত বিবরণের জন্য আপনারা http://www.giridhanmetal.com অথবা http://parivesh.nic.in ওয়েবসাইটে এ লগ অন করিয়া দেখিতে পারিবেন।

ধন্যবাদান্তে

গিরিধন মেটাল প্রাইভেট লিমিটেড

জামুড়িয়া

মাথায় ভেঙে পড়ল জীর্ণ বাড়ির বিম, মৃত বিমাকর্মী

[illegible]

রানিগঞ্জ

[illegible]

শ্মশানে অশান্তি

[illegible]

ঘরে বাইরে

টেলিভিশন

[illegible]

কোন হলে কোন ছবি

[illegible]

শব্দ-জব্দ ৯২৮

[illegible]

সমাধান ৯২৭

পাশাপাশি: [illegible]

উপর-নীচ: [illegible]

আজ

[illegible]

ब्रीफ न्यूज

अन्य लोग घायल

भभुआ शहर (कैमूर). एक अनियंत्रित ट्रैक्टर ने दो वर्षीय बच्चे का इलाज करा कर लौट रहे बाइक सवार को जोरदार टक्कर मार दी. इस हादसे में बाइक पर पीछे बैठी महिला की मौत हो गयी, जबकि बाइक चला रहा युवक और दो वर्षीय बच्चा गंभीर रूप से घायल हो गया. मृतक महिला भगवानपुर थाना क्षेत्र के जैतपुरखुर्द गांव निवासी गंगा सिंह यादव की पत्नी राजकुमारी देवी हैं. वहीं, युवक अधौरा थाना क्षेत्र के चैनपुरा गांव निवासी मोहम्मद अफजल बताया गया है. गंभीर रूप से घायल मोहम्मद अफजल को सदर अस्पताल में रेफर कर दिया गया. बालक की हालत खतरे से बाहर है.

कोरोना. बिहार में संक्रमण दर 12.56%, पटना में सर्वाधिक

सूबे में 12,604 नये मरीज मिले

संवाददाता > पटना

परिवहन विभाग के सचिव संजय कुमार अग्रवाल ने कोरोना संक्रमण से बचाव के लिए बसों और अन्य वाहनों के परिचालन से संबंधित सभी जिला पदाधिकारी, वरीय पुलिस अधीक्षक, पुलिस अधीक्षक को दिशा-निर्देश दिया है. अगर सफर के दौरान लोग बिना मास्क के मिलेंगे, तो उनके खिलाफ कार्रवाई होगी और वाहन को भी जब्त कर लिया जायेगा. अग्रवाल ने कहा कि कोरोना का संक्रमण बढ़ रहा है, यह चिंता का विषय है. इसलिए जरूरी है कि सभी लोग कोविड के प्रावधानों का पालन करें. राज्य सरकार द्वारा जारी दिशा-निर्देशों का पालन करें और इसकी निगरानी सभी जिलाधिकारी करें. उन्होंने कहा कि भीड़-भाड़ से बचें.

वाहन में मास्क लगाना अनिवार्य

- सभी यात्रियों को मास्क लगवाना सुनिश्चित करें
- ड्राइवर, क्षमता से आधी सीट पर ही बैठाएं
- वाहन को प्रतिदिन धुलवाना और समय-समय पर सैनिटाइजेशन कराएं
- ड्राइवर और कंडक्टर को साफ कपड़े और मास्क-ग्लव्स पहनने होंगे
- वाहनों के अंदर और बाहर कोविड-19 के संक्रमण से बचाव के उपायों संबंधी पोस्टर लगाएं
- वाहनों में चढ़ने-उतरने के समय सोशल डिस्टेंसिंग का पालन सुनिश्चित कराया जायेगा

सभा (विधान) के 18 पदाधिकारियों का तबादला कर दिया है. ये सभी उप सचिव स्तर के पदाधिकारी हैं. प्रशासन विभाग ने मंगलवार को इससे संबंधित अधिसूचना जारी की.

इसमें हिलसा के अनुमंडलीय लोक शिकायत निवारण पदाधिकारी अनिल कुमार, खगड़िया सदर के बृज किशोर चौधरी, सुपौल से राज कुमार यादव को उद्योग विभाग में उप-सचिव के अलावा कैमूर मोहनियां के अनुमंडलीय लोक शिकायत निवारण पदाधिकारी रवींद्र कुमार, समस्तीपुर सदर के धर्मेंद्र कुमार सिंह को बिहार मेडिकल सर्विसेज एंड इंफ्रास्ट्रक्चर कॉरपोरेशन लिमिटेड में समकक्ष पद पर, सहरसा के सिमरी बख्तियारपुर के अनुमंडलीय लोक शिकायत निवारण पदाधिकारी निरंजन कुमार, अरवल के कमल नयन को राज्य स्वास्थ्य समिति में समकक्ष पद पर, मधुबनी की अनुमंडलीय लोक शिकायत निवारण पदाधिकारी रेणु कुमारी, रक्सौल के आनंद प्रकाश एवं बिहारशरीफ के शिशिर कुमार को स्वास्थ्य विभाग में ओएसडी तथा रजौली के अनुमंडलीय लोक शिकायत निवारण पदाधिकारी अशोक कुमार, नवादा सदर के मनोज कुमार झा, मुंगेर सदर के नूर अहमद, सीतामढ़ी सदर के सुनील दत्त झा, बगहा के मदन कुमार, सिकरहना (पश्चिमी चंपारण) के अरविंद कुमार, धमदाहा (पूर्णिया) के ओम प्रकाश मंडल और बक्सर के अनुमंडलीय लोक शिकायत निवारण पदाधिकारी भूपेंद्र प्रसाद को पटना जिला में वरीय उप समाहर्ता बनाया गया है.

शिक्षकों के वेतन के लिए 20.47 अरब रुपये जारी

संवाददाता > पटना

वित्तीय वर्ष 2021-22 में माध्यमिक और उच्च माध्यमिक शिक्षकों के वेतन के लिए शिक्षा विभाग ने 20.47 अरब रुपये जारी कर दिये हैं. इस पैसे से जिला परिषद और नगर निकायों के तहत नियुक्त शिक्षकों को वेतन मिलेगा. जानकारी के मुताबिक, माध्यमिक और उच्च माध्यमिक शिक्षकों की सैलरी में एक अप्रैल से प्रस्तावित पंद्रह फीसदी वेतन की वृद्धि की राशि अभी नहीं जोड़ी गयी है. इसके लिए शिक्षा विभाग अलग से एक औपचारिक आदेश जारी करेगा. औपचारिक आदेश के जारी होने तक पहले की भांति वेतन मिलेगा. उल्लेखनीय है कि 20 सितंबर 2020 को विभागीय संकल्प जारी किया गया था कि पंचायती राज संस्थाओं के तहत कार्यरत शिक्षकों एवं पुस्तकालय अध्यक्षों के वर्तमान वेतनमान में

एक अप्रैल 2021 से 15 फीसदी का इजाफा किया जायेगा. विभागीय जानकारी के मुताबिक, माध्यमिक और उच्च माध्यमिक स्कूलों में तैनात पुस्तकालय अध्यक्षों को भी इससे वेतन मिल सकेगा. इस राशि में से नगर निगम के शिक्षकों के लिए 1.54 अरब, नगर पालिकाओं/नगर परिषदों के शिक्षकों के लिए 1.66 अरब, नगर पंचायतों/अधिसूचित समितियों के लिए 1.32 अरब से अधिक और जिला परिषद के माध्यमिक शिक्षकों के लिए 15.90 अरब से अधिक रुपये स्वीकृत किये गये हैं. इन चारों मदों के लिए उपबंधित राशि 22.28 अरब से अधिक राशि निर्धारित की गयी है.

शहरी निकायों में होगा सैनिटाइजेशन का काम : डिप्टी सीएम

पटना. कोरोना महामारी के बढ़ते प्रकोप से बचने के लिए राज्य के सभी शहरी निकायों में व्यापक सैनिटाइजेशन का काम किया जायेगा. मंगलवार को उप मुख्यमंत्री व नगर विकास एवं आवास विभाग के मंत्री तारकिशोर प्रसाद ने वीडियो कांफ्रेंसिंग के माध्यम से पूर्णिया, कोसी, सारण, तिरहुत एवं भागलपुर प्रमंडल के अंतर्गत आनेवाले नगर निकायों के कार्यों की समीक्षा की. उन्होंने कहा कि कोरोना संक्रमण के दौरान विभागीय दायित्व अत्यंत महत्वपूर्ण है. अधिकारी पूरी संवेदनशीलता के साथ काम करें. सभी शहरी वार्डों में सोडियम हाइपोक्लोराइड, ब्लीचिंग पाउडर का छिड़काव कराया जाये. डिप्टी सीएम ने निर्देश दिया कि जल-जमाव के स्थायी समाधान के लिए विस्तृत कार्य योजना बनायें.

बाइक ने ट्रैक्टर-ट्रॉली में मारी टक्कर, जीजा और साले की मौत

रामपुर (कैमूर). तेज रफ्तार एक बाइक अनियंत्रित होकर ट्रैक्टर-ट्रॉली से जा टकरायी. इस हादसे में बाइक पर सवार जीजा और साले की मौत हो गयी, जबकि साले की पत्नी गंभीर रूप से घायल है. घटना मंगलवार सुबह सोनहन थाना क्षेत्र स्थित शिवपुर गांव के समीप की है.

मृतकों में बेलाव थाना क्षेत्र के खरेंदा गांव निवासी रामलाल राम व रोहतास जिले के चेनारी थाना क्षेत्र के करमी गांव निवासी रामायण राम हैं. घायल रामायण राम की पत्नी कस्तूरा देवी है.

पहले पेज से...

टीके की बढ़ती मांग...

लिए बेकार स्थिति में है और सुप्रीम कोर्ट मूकदर्शक की भूमिका निभा रहा है. इसलिए शीर्ष अदालत के हस्तक्षेप को सही परिप्रेक्ष्य में समझना चाहिए, क्योंकि कुछ मामले क्षेत्रीय सीमाओं से भी आगे हैं. अदालत ने कोविड प्रबंधन मामले में मदद के लिए वरिष्ठ अधिवक्ता जयदीप गुप्ता और मीनाक्षी अरोड़ा को न्याय मित्र भी नियुक्त किया. मालूम हो कि सुप्रीम कोर्ट ने कोरोना की गंभीर स्थिति का पिछले दिनों स्वतः संज्ञान लिया था.

गाड़ी से टमाटर निकालते हुए पुलिस का वीडियो वायरल

पटना. मामला कदमकुआं थाना क्षेत्र के भिखना पहाड़ी का है. जहां गाड़ी के पीछे से एक पुलिसकर्मी जल्दी-जल्दी टमाटर निकाल कर अपनी झोली में भर रहा है. चोरी-छिपे टमाटर निकालते हुए पुलिसकर्मी का किसी ने वीडियो बना लिया और इसे वायरल कर दिया. एक मालवाहक गाड़ी, जिस पर टमाटर की पेटियां लदी है. शायद किसी सब्जी मंडी में जा रही थी, तभी भिखना पहाड़ी चौराहे पर खड़ी पुलिस की नजर गाड़ी पर पड़ी. इसके बाद एक पुलिसकर्मी गाड़ी को रोकता है. कुछ देर बात करने के बाद जल्दी से पीछे जाता है और अपनी झोली में टमाटर निकाल कर भरने लगता है. पुलिसकर्मी तब तक टमाटर निकालते रहता है, जब तक कि गाड़ी चलने नहीं लगती है. सोशल मीडिया पर यह वीडियो खूब वायरल हो रहा है.

11वीं में एडि...
जल्द विषय...

पटना. सीबीएसई और आईसीएसई ... पर्ट द इंडियन स्कूल एग्जामिनेशन (सीआइएससीई) की ओर से 12वीं ...

12 मई, 2021
पूर्वाह्न 11.00 बजे से

Annexure-30

GIRIDHAN METAL PRIVATE LIMITED

Registered Office "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36. E-mail : giridhanmetal@gmail.com. CIN : U27320WB2019PTC234675

Date: 24.04.2021

To,
The Chairman
Asansol Durgapur Development Authority
Asansol, Paschim Bardhaman, West Bengal

Ref: Environmental Clearance vide letter no. J-11011/366/2010-IA.II (I) dated 08/04/2021

Dear Sir,

We have obtained Environmental Clearance for Expansion of our existing steel plant by expanding Sponge iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,000 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA 30,000 & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) at Jamuria Industrial Estate, Village - Ikra & Damodarpur, Tehsil – Jamuria, District - Paschim Burdwan, West Bengal from Ministry of Environment, Forest and Climate Change, Government of India.

As per the direction contained in the aforesaid Environmental Clearance (EC), kindly receive a copy of the letter J-11011/366/2010-IA.II(I) dated 8th April, 2021.

Thanking you,

Yours faithfully
For Giridhan Metal Private Limited

Sanjay Agarwal
Director

GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : giridhanmetal@gmail.com CIN : U27320WB2019PTC234675

Date: 24.04.2021

To,
The Mayor
Asansol Municipal Corporation
Asansol, Paschim Bardhaman, West Bengal

Ref: Environmental Clearance vide letter no. J-11011/366/2010-IA.II (I) dated 08/04/2021

Dear Sir,

We have obtained Environmental Clearance for Expansion of our existing steel plant by expanding Sponge iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,000 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA 30,000 & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) at Jamuria Industrial Estate, Village - Ikra & Damodarpur, Tehsil - Jamuria, District - Paschim Burdwan, West Bengal from Ministry of Environment, Forest and Climate Change, Government of India.

As per the direction contained in the aforesaid Environmental Clearance (EC), kindly receive a copy of the letter J-11011/366/2010-IA.II(I) dated 8th April, 2021.

Thanking you,

Yours faithfully
For Giridhan Metal Private Limited

Sanjay Agarwal
Director

Works : Jamuria Industrial Estate, P.O. Nandi, P.S. Jamuria, Paschim Bardhaman - 713 344, West Bengal, India
Email : giridhanmetaljamuria@gmail.com

LED Display Board

Your application has been Submitted with following details

Annexure-32

Proposal No	IA/WB/IND/201973/2010
Compliance ID	6791672
Compliance Number(For Tracking)	EC/COMPLIANCE/6791672/2023
Reporting Year	2023
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	22-07-2023
IRO Name	Soma Das
IRO Email	chh112@ifs.nic.in
State	WEST BENGAL
IRO Office Address	Integrated Regional Offices, Kolkata

Note:- SMS and E-Mail has been sent to Soma Das, WEST BENGAL with Notification to Project Proponent.

Your application has been Submitted with following details	
Proposal No	IA/WB/IND/201973/2010
Compliance ID	28425364
Compliance Number(For Tracking)	EC/M/COMPLIANCE/28425364/2023
Reporting Year	2023
Reporting Period	01 Dec(01 Apr - 30 Sep)
Submission Date	01-12-2023
IRO Name	ARTATRANA MISHRA
IRO Email	jhk109@ifs.nic.in
State	WEST BENGAL
IRO Office Address	Budgam

Note:- SMS and E-Mail has been sent to ARTATRANA MISHRA, WEST BENGAL with Notification to Project Proponent.

GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 2nd Floor, Kolkata - 700 017, West Bengal, India
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : gindhanmetal@gmail.com.CIN : U27320WB2019PTC234675

Ref No. GMPL/23-24/SPCB/ 10

FORM-V

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR 2022-23

GIRIDHAN METAL PRIVATE LIMITED, JAMURIA

PART-A

Name and address of the owner/ occupier of the industry operation or process	Mr Sanjay Agarwal (Director) Giridhan Metal Private Limited Jamuria Industrial Estate P.O.-Nandi; P.S. - Jamuria Paschim Bardhaman – 713344 (W.B.)
Industry category Primary-(STC Code) Secondary-(STC Code)	Integrated Steel Plant ---
Production capacity	318000 TPA DRI, 30000 TPA Fe-Mn/Si-Mn with 30 MW CPP
Year of Establishment	2020 (Production starts from Aug 2021with 350 TPD DRI & 16 MW CPP)
Date of Last Environmental /Audit Report submitted	---

PART B

WATER AND RAW MATERIAL CONSUMPTION

1) Water consumption m^3/day

Process
Cooling } 241 m3
Domestic

Name of products	Process water consumption per unit of product output	
	During the financial year 2021-22	During the financial year 2022-23
Sponge Iron (m^3/MT)	0.22	0.21
Silico Manganese (m^3/MT)	0.44	0.32
Captive Power Plant ((m^3/MW)	0.38	0.28

2) Raw material consumption

Sl No	Name of Raw Material	Name of the Products	Consumption of raw material	
			2021-22 (MT/Yr)	2022-23 (MT/Yr)
1	Iron Ore/Pellet	Sponge Iron	86802	3,36,037
2	Coal	Sponge Iron	77654	2,35,336
3	Dolomite	Sponge Iron	2729	8,701
4	Manganese Ore	Si-Mn	12061	46857
5	Dolomite	Si-Mn	2026	4633
6	Coal	Si-Mn	11732	21907
7	Hard Coke	Si-Mn	1674	8410
8	Fe-Mn slag	Si-Mn	---	2050
9	Coal	CFBC	7543	2102

GIRIDHAN METAL PVT. LTD. Jamuria

PART-C
POLLUTION DISCHARGED TO ENVIRONMENT/ UNIT OF OUTPUT
(PARAMETERS AS SPECIFIED IN THE CONSENT ISSUED)

Sl No	Pollutants	Prescribed Standard (mg/l)	Quantity of Pollutants discharged (mass/day)		Concentration of Pollutants discharged (mass/volume)		Percentage of variation from prescribed standard with reasons
a)	Water	Standard norms (mg/l)	Kg/day		mg/lit		
			FY: 2021-22	FY: 2022-23	FY: 2021-22	FY: 2022-23	
	pH	5.5-9.5	8.22	8.61	8.22	8.61	No deviation.
	Total Suspended Solids (TSS)	100	0.36	0.15	10	10	Alls values are within the standard norms.
	BOD	30	0.12	0.06	3.3	3.87	
	COD	250	0.43	0.19	12.0	12.33	No effluent discharge from the plant
	Oil & Grease	10	<0.63	<1.4	<1.4	<1.4	
b)	AIR PM emission from Stack of	Prescribed Standard (mg/Nm³)	Kg/day		mg/Nm³		
			FY: 2021-22	FY: 2022-23	FY: 2021-22	FY: 2022-23	
	DRI 350 & 600 TPD attached with common stack through WHRB	30	119.67	82.93	17.0	14	No deviation.
	DRI product separation house (attached with common stack)	30	14.37	12.23	4.6	7	Alls values are within the standard norms as pollution control equipments are maintained properly
	DRI 350 TPD Cooling Tower	30	4.6	6.03	4.1	6.50	
	Ferro Division (2x9MVA)	30	19.77	49.01	6.0	18	
	CPP CFBC Boiler	30	NA	48.42	NA	26	

PART-D
HAZARDOUS WASTES
(AS SPECIFIED UNDER HAZARDOUS WASTES (MANAGEMENT, HANDLING AND TRANS BOUNDARY MOVEMENT RULES, 2008)

The industry got consent for operation very recently and the process for getting the authorization as per Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016 is under process.

PART-E
SOLID WASTE

Sl. No.	Solid waste	Total Quantity Generated	
		FY: 2021-22	FY: 2022-23
E-1: Generation from process			
1	Dolochar from DRI	7855	27961
2	Silico Manganese Slag	2853	15339
E-2: Generation from Pollution Control Equipments (Tonne/year)			
1	DE dust from DRI	3882	7061
2	Ash	655	1906
E-3: Quantity Recycled/Reutilized within the unit (Tonne/year)			

GRIDHANI METAL PVT. LTD. Jamuria

1	Dolochar from DRI	7847	27961
2	Ash	655	1906
3	DE dust from DRI	3882	7061
E-4: Quantity Sold (Tonne/year)			
NIL			
E-5: Quantity Disposed			
1	Si-Mn Slag	2853	15339 (Low land filling inside the plant premises)

PART-F
Characteristics of Hazardous as well as Solid wastes and their method of disposal

Hazardous/ Solid Wastes	Characteristics	Method of disposal
Used oil	Oily	Sale to authorized recycler

PART-G
Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production

1. Roof top rain water harvesting is being implemented at the beginning of the construction stage.
2. Dolochar generated from DRI process is being/will be reused in CFBC for generation of power
3. Waste heat of DRI plant is being used to generate power through waste heat recovery boiler.
4. Highly efficient pollution control equipments have been installed at all the operation units.
5. Raw material handling systems are equipped with efficient Dust suppression control measures.
6. Pollution dust generated from coal handling system is reused in power plant.
7. All pollution dust pneumatically conveying to a designated hopper to minimize fugitive dust.
8. Raw materials & products are conveying under fully covered condition.

PART H
Additional measures/ investment proposal for environmental protection abatement of pollution, prevention of pollution

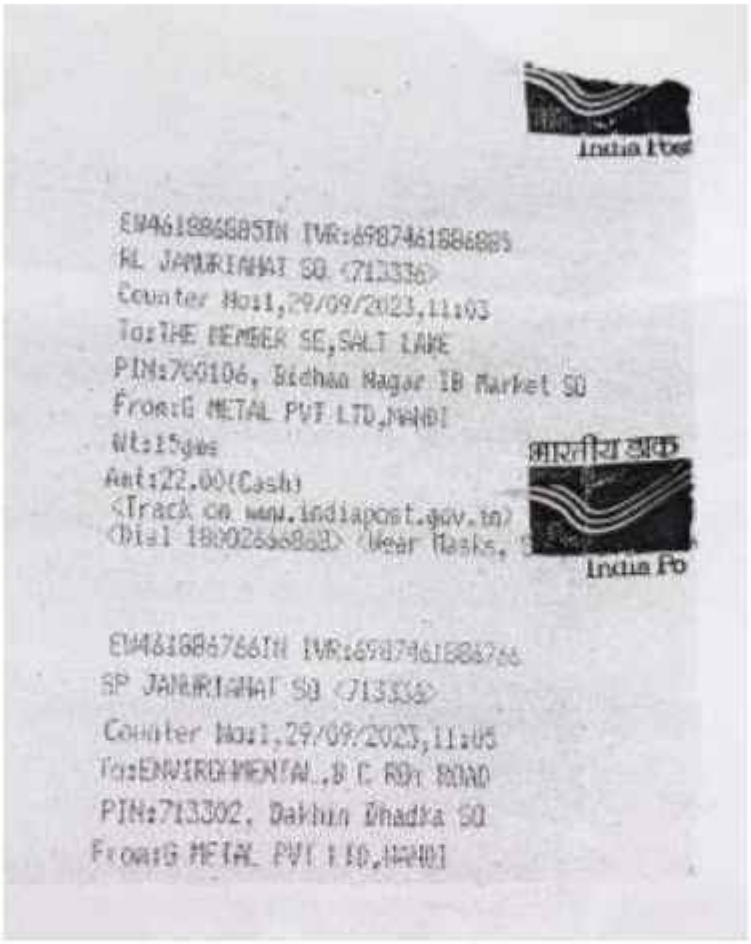
Environment Budgets (Planned Vs Actual) for FY 2020-21

Sl. No.	Item	Expenditure (Lakh(s) INR) Year-2020-21
1	Recurring cost for environmental protection during FY 2022-23	335.8
2	Maintenance cost of ESP WHRB-1	9.6
3	Installation of ESP WHRB-2	385.5
	Total	**730.9**

PART I
Any other particulars for improving the quality of the environment

1. Around 50000 sq. meter area inside the plant premises is covered under paver block to minimize the fugitive dust.
2. We also doing third part environmental monitoring (quarterly) by NABL accredited as well as WBPCB recognized laboratory.
3. Water sprinkler has been installed to minimize the fugitive dust.
4. Housekeeping audit is being done each and every month for all units.
5. 33% area has been covered under plantation throughout the entire plant.
6. More than 14000 tree plantation has been done in and around the plant premises.

GIRIDHAN METAL PVT. LTD. Jamuria


India Post
EM461886885IN IMR:6987461886885
KL JANARIGHAT SO (713336)
Counter No:1,29/09/2023,11:03
To:THE MEMBER SE,SALT LAKE
PIN:700106, Bidhan Nagar IB Market SO
From:G METAL PVT LTD,HAORI
Wt:15gms
Amt:22.00(Cash)
(Track on www.indiapost.gov.in)
(Dial 18002666868) (Wear Masks,
भारतीय डाक
India Po
EM461886766IN IMR:6987461886766
SP JANARIGHAT SO (713336)
Counter No:1,29/09/2023,11:05
To:ENVIRONMENTAL,B C ROY ROAD
PIN:713302, Dakhin Khadra SO
From:G METAL PVT LTD,HAORI

Annexure – 34

Status of commitment made during Public Hearing

Sl No	Issue raised by	Details	Commitment by GMPL	Status
1	Mr Prabhat Bannerjee, Jamuria	He welcomed the proposed expansion project and requested for employment of local youth. He also requested for pollution free environment and plantation	First preference shall be given to the local youth based on their qualifications. He also told that they will arrange an industrial training centre for skill development of local youth for a period of six months. Modernized pollution control devices will be installed and the green belt will also be developed	Skill development training along with employment provided to more than 140 local youth based on their qualifications. Modernized pollution control devices has been installed along with plantation. Presently we have planted 23195 trees which covered approx. 33% area out of total plant area under plantation and we are planning for 8545 more trees which cover 40% area in a span of a year.
2	Mrs Rakhi Karmakar, Mandalpur	She appreciated M/s Giridhan Metal Private Limited for their CSR activities till now. She also requested them to continue the CSR activities	The project proponent have assured that the CSR activities shall be continued	The CSR/CER activities are going on. Till 355.98 lacs incurred towards CSR/CER activities.
3	Mr Abdul Hause,Jamuria	He welcomed the proposed expansion project and requested to the project proponent for development of local schools, surroundings roads and green belt.	The project proponent shall give school dress, school bags, tables, chairs and arrangement and build toilets for both boys and girls separately in the school premises after discussion with the concerned authorities	We have constructed a Model School with tables, chairs along with appointment of required teachers on monthly remuneration at Damodar village for education of Adivasi children.
4	Mr. Lakshmikanta Mukherjee,Benali	He welcomed the proposed expansion project and requested not to extract ground water during plant operation	The project proponent ensured that they will not draw any ground water and the required water shall be drawn from River Damodar	We have not drawn the ground water. The required water is being drawn from Damodar river & Asansol Municipality.
5	Mr. Sanjay Banerjee, Benali	He welcomed the	The project proponent	We have installed

		proposed expansion projectand enquired about the control measures to be taken for air pollution	shall install modernized air pollution control devices for e.g. Bag Filter, ESP, Pug Mill, Telescopic Chute etc. in each and every dust generation point. The project proponent also ensured that the entire road of the plant premises will be concreted and the two number road sweeping machines will be engaged to clean the area	modernized air pollution control devices such as – DRI & CPP are well equipped with 5-fields ESP. Ferro Alloy plant, SMS & others dust generation points of DRI (CD, I-bin, product handling etc) are well equipped with modern & pulse jet type nag filter. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. Closed conveying system have been installed for fine dust /ash transportation. Pug Mill have been installed at ash conditioning. Telescopic chutes have installed at products & by products dispatch areas.
6	Mr. Chanchal Banerjee,Ikra	He welcomed the proposed expansion project and requested the project proponent for employment of local youth	First preference shall be given to the local youth based on their qualifications. He also told that they will arrange an industrial training center for skill development of local youth for a period of six months	Skill development training along with employment provided to more than 140 local youth based on their qualifications.
7	Mr. Sheikh Akhtar Mondal,Akhalpur	He welcomed the proposed expansion project and enquired about the action taken towards the minimization of road dust pollution during vehicle movement	Water sprinkling will be done on the road on daily basis for minimization of road pollution during vehicle movement	Water sprinkling is being done by water tanker on daily basis for minimize of road pollution during vehicle movement, it covers more than 3km area around the plant premises.
8	Mr. Pareshnath,Damodarpur	He welcomed the proposed expansion	No plant waste water will discharged from plant	Construction of an ETP is going on. We

		project and enquired about the action taken towards management of plant waste water	premises. The project proponent will install an effluent treatment plant for treatment of plant waste water and the treated water will be re-used in plantation, sprinkling and cooling purpose	have installed oil skimmer to remove oil & filters to remove suspended solids from water. Presently the water are being recycled. No plant waste water is discharged.
9	Mr. SatyanarayanRabani,Jamuria	He welcomed the proposed expansion project and requested to provide an ambulance for local people	The project proponent assured to donate an Ambulance for the welfare of the local people	We have donated an AC Hearse van instead of ambulance as requested by the villagers.
10	Mr. Ghanshyam Prasad Jaiswal,Jamuria	He welcomed the proposed expansion project and requested to provide the portable drinking water to the local villagers in summer season	The project proponent ensured to provide RO Drinking Water to local people during summer season	The drinking water is being provided to the local people.
11	Md. Roshan Ali,Jamuria	He welcomed the proposed expansion project and asked to maintain the roads due to movement of over weighted truck	The project proponent informed that most of the transportation shall be done through railways and road usage shall be limited. If required, on request of the concerned authority necessary measures shall be taken	Most of the transportations are being done by railways and road usage is limited, though repairing & maintenance of nearby road is being done by us.
12	Mr. Pradeep Mukherjee, Churulia	He welcomed the proposed expansion project and requested the Project Proponent to take necessary measures for abatement of pollution. He also requested for development of green belt inside as well as outside of plant premises		We have installed modernized air pollution control devices such as – DRI& CPP are well equipped with 5-fields ESP. Ferro Alloy plant, SMS & others dust generation points of DRI (CD, I-bin, product handling etc) are well equipped with modern & pulse jet type nag filter. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. Closed conveying system have been installed for fine

				dust /ash transportation. Pug Mill have been installed at ash conditioning. Telescopic chutes have installed at products & by products dispatch areas. Presently we covered approx. 33% area out of total plant area under plantation and we are planning to cover 40% area within next 3yyears.

যাদবপুর বিশ্ববিদ্যালয়

Faculty of Engineering & Technology
DEPT. OF CONSTRUCTION ENGINEERING

JADAVPUR UNIVERSITY
BLOCK-LB, PLOT-8, SECTOR-III, SALT LAKE
KOLKATA-700 106, INDIA

MOBILE : +91 9433112189 , FAX : (033) 2335-7254

To

The Director

M/s Giridhan Metal Pvt. Limited

Jamuria, Industrial Estate,

P.O.- Nandi, P.S.- Jamurai,

District – Paschi Burdhaman – 713344,

West Bengal

Date : 04/ 05/2024

Sub : A study report on Ld partially constructed railway siding with Wagon Tippler (Abandned Project) and proposed modification of the same based on report submitted by M/s TOR Steel Services Limited and finally, proposed extension of T.G Building with coal shed.

Ref : Your communication vide letter/ email dtd. 25th April 2024.

Respected Sir,

In response to your communication under reference and our subsequent visit on 03/05/2024, necessary observation are furnished below seriatim for kind consideration please.

Dr. [illegible] Ghosh
B.E. (Civil), M.E. (Structural Engg.), Ph.D (Engg.)
Professor
Construction Engg. Department
Jadavpur University, Kolkata-700 106

যাদবপুর বিশ্ববিদ্যালয়

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KOLKATA-700 106, INDIA

MOBILE : +91 9433112189 , FAX : (033) 2335-7254

1. The old and partial construction (now stated to be abandoned) on the western side of the plant, was intended for railway siding with Wagon Tippler only. All of the piers/ columns have been constructed as per drawing No. PIR / GMPL / SSL / E.R/ 2020 -01, submitted to the Railway Authorities, through the authorized consultant M/s PIR Projects and consultancy Private Limited. The positioned coordinates of the plant are shown in Annexure I.

2. The preliminary feasibility study's by M/s TOR Steel Services Private Limited on the possibilities of the converting old partially constructed Railway siding with wagon Tippler facilities were also examined. The enter report dt. 25.02.2023 (in three pages P/1 – P/3) appears to be adequate In the said report, it is also suggested that modifications in foundation is required to make the structure suitable for the support stations of 906 TPD DRI plant.

3. The Turbine Generator (T.G) Building extensions, was also visited, wherein no activity or storages was observed during the visit. The positioned coordinates of the building are also shown in Annexure I. During enquiry, it was informed by your company representatives that, the said extension project is , in order to avoid congestion and to continue and maintain safe operation of the existing power plants and machineries. When inspected the TG Building, some of the panels were found with horizontal spacing's in between them of less then 750mm (approx), which many impose unsafe condition. The temperature inside the electrical system cooridor also appeared to be on higher side, inspite of the temperature conditioning (AC) of the area.

Dr. [illegible] Ghosh
B.E. (Civil), M.E. (Structural Engg.), Ph.D (Engg.)
Professor
Construction Engg. Department
Jadavpur University, Kolkata-700 106

যাদবপুর বিশ্ববিদ্যালয়

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4. As per verbal request, the extended areas of the coal shed, which is adjacent to the presently used coal shed was also visited. The positional coordinates of the areas are also shown in Annexure I. During query, it was explained by your company representatives that the stated extension, is due to reduce difficulties in mobility of heavy vehicles for charging and also stacking coal properly. No coal or coke was found, stored in the extended portion , during the visit.

Recommendations :

(A) The entire reports of M/s Torsteel Services Pvt. Ltd dt.25.02.2023, with concluding recommendation appears to be in order.

(B) During modification, addition and alteration of civil structure following standards to be followed

i. Safety code for erection of structural steel works – IS 7205 : 1974
ii. Tolerances for Fabrication of steel structure – IS 7215 : 1974
iii. Specification for Slotted Sections, IS 8081 : 1976
iv. Code of practice for General Constructions in steel IS 800 : 2007, with special emphasizes on safety factor
v. Guidelines for storage and transportation of sponge Iron/ Direct reduced Iron (DRJ), IS 10852 : 1984
vi. Occupational Health and safety Management system, ISO – 45001, latest revision
vii. International standard for health and safety management system, ISO-18001.

Dr. [illegible] Ghosh
B. E. (Civil), M.E. (Structural Engg.), Ph.D (Engg.)
Professor
Construction Engg. Department
Jadavpur University, Kolkata-700 106

যাদবপুর বিশ্ববিদ্যালয়

Faculty of Engineering & Technology
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MOBILE : +91 9433112189 , FAX : (033) 2335-7254

(C) All raw materials, to be used during the entire works, should be tested for quality evaluation , prior to its use

(D) Where relevant and useful, necessary in process inspection to be carried out.

(E) The entire process of works, to be chronologically recorded and properly documented.

(F) Necessary clearances, approval required from regulatory authorities to be obtained prior to start of work, as well as after completion of work and beginning of production.

(G) Proper attention to be given for safety of persons engaged in works.

Dr. Pradip Ghosh
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যাদবপুর বিশ্ববিদ্যালয়

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Annexure : I

Positional coordinates of constructed areas (partially constructed areas , Western side of the plant)

Item (1)	23°41', 44.3" N,	87°05' 40.8" E;
	23°41' 44.4" N.	87°0541.8" E
	23° 41' 50.4" N,	87° 05' 42.1" E,
	23° 41' 50.2 N,	87° 05' 40.7" E
Item (3)	T.G. Building	
	23° 41', 45.7" N,	87°05' 48.2" E
	23°41' 45.6" N.	87° 05' 46.8" E
	23° 41' 47.1" N,	87° 05' 48.3" E,
	23° 41' 47.1" N,	87° 05' 47.7" E
Item (4)	Extended Areas of Coal Shed	
	23° 41', 47.4" N,	87° 05' 48.1" E
	23° 41' 47.3" N.	87° 05 47.1" E
	23° 41' 49.2" N,	87° 05' 48.1" E,
	23° 41' 49.5" N,	87° 05' 46.9" E

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