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Receipt Number : 8a28095e4baf4637849b

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Receipt Amount : 100/-

Amount In Words : One Hundred Rupees Only

Document Type : Agreement or Memorandum of an
Agreement

District Name : Ranchi

Stamp Duty Paid By : Research and Development Centre for Iron
and Steel Steel Authority of India Limited
Ranchi

Purpose of stamp duty paid : Collaborative Work for Laboratory Study
on Nano Lubrication in Hot Rolling at
RDCIS SAIL

First Party Name : Research and Development Centre for Iron
and Steel Steel Authority of India Limited
Ranchi

Second Party Name : Indian Institute of Technology Indian
School of Mines Dhanbad

GRN Number : 2213140425

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पी. पाठक
P. PATHAK
मुख्य महाप्रबंधक (रोलिंग मिल्स)
Chief General Manager (Rolling Mills)
आर.सी.सी.आई.एस., सेत, राँची - 834002
RDCIS SAIL Ranchi

AGREEMENT

BETWEEN

STEEL AUTHORITY OF INDIA LIMITED
RESEARCH & DEVELOPMENT CENTRE FOR IRON & STEEL, RANCHI

AND

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

ON

"Collaborative work for Laboratory Study on Nano-Lubrication in Hot Rolling at
RDCIS, SAIL"

This **AGREEMENT** made between Steel Authority of India Ltd., a Company incorporated under the Company's Act, 1956 having its Registered Office at Ispat Bhawan, Lodi Road, New Delhi – 110 003, and having a unit named Research and Development Centre for Iron and Steel at Ranchi – 834 002, herein after referred to as "**RDCIS, SAIL**" (which term or expression shall include its successors and assigns unless excluded by or repugnant to the context), of the **ONE PART**.

AND

Indian Institute of Technology (Indian School of Mines), Dhanbad located at Dhanbad – 826 004 hereinafter referred to as "**IIT(ISM), DHANBAD**" (which term or expression unless excluded by or repugnant to the context shall include its successors and assigns) of the **OTHER PART**.

RDCIS, SAIL and **IIT(ISM), DHANBAD** may be referred to hereinafter collectively, as the '**PARTIES**' and, individually as a '**PARTY**'.

WHEREAS, RDCIS, SAIL is one of the largest R&D Centres in India in the field of Iron & Steel and possesses extensive laboratory facilities and technical expertise and, is pursuing Research & Development (R&D) activities in the entire field of iron and steel industry as well as in allied areas, And

WHEREAS, IIT(ISM), DHANBAD, a premier Academic Institute providing Graduate, Post Graduate and Ph. D. degrees in the Technical Discipline/ Sciences and having a

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cluster of highly qualified academicians engaged in teaching and research activities and collaborations with Government, organisations, foundations and industries, both national and international and contributes to the industrial development and economic growth of the country by preparing a cadre of engineers and scientists. IIT(ISM), DHANBAD is willing to collaborate with RDCIS, SAIL for Laboratory Study on Nano-Lubrication in Hot Rolling at RDCIS, SAIL

Therefore, both parties agree to enter into an agreement on the following terms and conditions:

1.0 Scope of Work

The scope of work for "Laboratory study on nano-lubrication in hot rolling, RDCIS" shall comprises the following eight parts:

- A: Preparation of Technical Memorandum
- B: Preparation of Technical Specification
- C: Development of method for preparation of nano fluids
- D: Design of experiments with nano fluids lubrication
- E: Preparation of Interim Report
- F: Experiments with nano-fluids as lubricants in Experimental Rolling Mill (ERM) and evaluation of tribological properties
- G: Training to RDCIS Engineers
- H: Submission of Completion report

The scope of work for each assignment for the respective **PARTIES** shall be as under:

SI.	Activities	Responsibility
(A)	Preparation of Technical Memorandum on Nano Lubrication in Hot Rolling	
A.1	Literature search on identification of suitable nano particles, consumables, equipments for preparation of oil based nano-fluids	IIT(ISM), Dhanbad
A.2	Theoretical insight into nano-lubrication mechanism in hot rolling of steel	IIT(ISM), Dhanbad
A.3	Discussion on Technical Memorandum; (a) Development of theoretical insight into nano-lubrication mechanism in hot rolling of steel, (b) Effects of nano-lubrication on friction, wear, rolling parameters, metallurgical properties and	IIT(ISM), Dhanbad



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	surface quality of rolled products	
A.4	Preparation and submission of Technical Memorandum to RDCIS, SAIL in hard copy (2 nos.) and soft copy	IIT(ISM), Dhanbad
(B)	Preparation of Technical Specification	
B.1	Identification of equipments for preparation and application (Roll Bite Lubrication system i.e. RBL system) of nano-lubricants in hot rolling and	IIT(ISM), Dhanbad and RDCIS jointly
B.2	Finalization of Technical Specification of the equipments for nano fluids preparation and RBL system	RDCIS and IIT(ISM), Dhanbad jointly
B.3	The procurement of the equipments for preparation of nano lubricants, RBL system and consumables for use at RDCIS	RDCIS
(C)	Development of method for preparation of nano fluids	
C.1	Development of process for preparation of stable oil based nano fluid for Hot rolling application and demonstration of methods for preparation of stable oil based nano fluid for Hot rolling application	IIT(ISM), Dhanbad
C.2	Demonstration and explanation of each processes for preparation of nano fluids to RDCIS, SAIL	IIT(ISM), Dhanbad
(D)	Design of experiments with nano fluids lubrication	
D.1	Design of experiment of hot rolling in Experimental Rolling Mill and AMSLER Wear Testing Machine with application of nano lubricants	IIT(ISM), Dhanbad and RDCIS jointly
(E)	Preparation of Interim Report	
E.1	Methods for preparation of nano-lubricants and design of experiments	IIT(ISM), Dhanbad
E.2	Descriptions of methods for preparation of nano-fluids for hot rolling lubrication	IIT(ISM), Dhanbad
E.3	Submission of interim report to RDCIS in hard copy (2nos) and soft copy	IIT(ISM), Dhanbad
(F)	Experiments with nano-fluids as lubricants in Experimental Rolling Mill	



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	(ERM) and evaluation of tribological properties	
F.1	Experiments in Experimental Rolling Mill with nano fluids at RDCIS, SAIL	IIT(ISM), Dhanbad and RDCIS jointly
F.2	Tribological tests such as friction, wear, rolling process parameters, metallurgical properties	IIT(ISM), Dhanbad and RDCIS jointly
F.3	High temperature wear test with nano fluids at IIT(ISM), Dhanbad	IIT(ISM), Dhanbad
F.4	Study the effects of nano fluids on surface roughness of roll surface as well as rolled products surface at RDCIS	IIT(ISM), Dhanbad and RDCIS jointly
(G)	Training to RDCIS Engineers	
G.1	Arrangement of training on "Theoretical insight into nano-lubrication mechanism in hot rolling and interpretation of analysis results of experiments" for minimum 2-10 persons for 2 working days at RDCIS SAIL, Ranchi	IIT(ISM), Dhanbad
G.2	Boarding, lodging and transportation charges of the faculty	IIT(ISM), Dhanbad
(H)	Submission of Completion report	
H.1	Preparation and submission of final completion report in hardcopy (2 nos) and softcopy to RDCIS.	IIT(ISM), Dhanbad

2.0 Obligations of RDCIS, SAIL

- 2.1 **RDCIS, SAIL** will arrange all the equipments and consumables required for preparation of suitable nano-lubricants for hot rolling experiments for ERM.
- 2.2 **RDCIS, SAIL** will also arrange the facilities and consumables required for hot rolling, room temperature wear experiments and gate pass arrangements of IIT(ISM), Dhanbad for RDCIS visit.
- 2.3 **RDCIS, SAIL** will arrange materials for high temperature wear test sample.
- 2.4 Engineer from **RDCIS, SAIL** will assist IIT(ISM), Dhanbad during RDCIS visits.
- 2.5 **RDCIS, SAIL** will arrange the venue for training program.
- 2.6 Safety & security of the personnel of **RDCIS, SAIL** shall be the responsibility of **RDCIS, SAIL**.



- 2.7 **RDCIS, SAIL** shall not disclose any data/information of **IIT(ISM), Dhanbad** related to this Project which may come to their knowledge through experiments, correspondences etc., which are not directly connected with the scope of work covered under this **AGREEMENT**, without prior written permission of **IIT(ISM), Dhanbad**.
- 2.8 Co-ordinator from RDCIS side shall be Sri Pradip Sahana, Manager (FR&T), RDCIS, SAIL.

| 3.0 Obligations of **IIT(ISM), Dhanbad**

- 3.1 **IIT(ISM), Dhanbad** shall initiate, organize, develop, coordinate and complete the activities as per scope of work.
- 3.2 **IIT(ISM), Dhanbad** will submit the Technical Memorandum, Interim Report, process development for preparation of oil based nano fluids and final report.
- 3.3 **IIT(ISM), Dhanbad** will make necessary arrangement for preparation of high temperature wear test sample.
- 3.4 **IIT(ISM) Dhanbad** will provide faculty support for training on "Theoretical insight into nano-lubrication mechanism in hot rolling and interpretation of analysis results of experiments" for minimum 2-10 persons for 2 working days for RDCIS Engineers at RDCIS SAIL, Ranchi
- 3.5 **IIT(ISM) Dhanbad** shall provide the services of their laboratory facilities and manpower for characterization of nano fluids at their laboratory and for conducting experiments at **IIT(ISM) Dhanbad** as per the above scope of work.
- 3.6 Safety & security of the personnel of **IIT(ISM) Dhanbad** during experiments shall be the responsibility of **IIT(ISM) Dhanbad**.
- 3.7 **IIT(ISM) Dhanbad** shall not disclose any data/information of **RDCIS, SAIL**, which may otherwise come to their knowledge through experiments, correspondence etc., which are not directly connected with the scope of work covered under this **AGREEMENT**, without prior written permission of **RDCIS, SAIL**.
- 3.8 All expenses of **IIT(ISM) Dhanbad** experts for visiting RDCIS SAIL for this collaborative project shall be borne by **IIT(ISM) Dhanbad**.
- 3.9 Prof. Subrata Kumar Ghosh, Associate Professor, Department of Mechanical Engineering, IIT(ISM), Dhanbad shall be the Principal Investigator of the project. In case, the Principal Investigator, for any reason whatsoever, is not able to continue and complete the work as per plan of work of the agreement, IIT(ISM), Dhanbad shall ensure that the project is completed successfully, by providing substituted competent Principal Investigator for completion of the Scope of Work under this Agreement within the time frame under this agreement without any additional cost to RDCIS, SAIL.



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4.0 Consultancy Fee and Payment terms

This **AGREEMENT** shall be effective for a period of 10 (ten) months from the date of signing of the **AGREEMENT** for the scope of work as outlined in **Para 1.0** hereinabove. However, both **PARTIES** may mutually agree for extension of the **AGREEMENT** provided the Scope of Work under this **AGREEMENT** remains incomplete or any enlargement in the given Scope of Work.

- 4.1 RDCIS, SAIL shall pay to **IIT(ISM) Dhanbad** a total consultancy lump sum fee of Rs. 5.50 lakh (Rupees Five lakh fifty thousand) plus applicable GST under this AGREEMENT in three installments as under and shall remain firm till completion of the collaborative work. IIT(ISM) Dhanbad shall raise GST compliant invoices clearly mentioning SAC code and their GST No. The GST No. of SAIL/ RDCIS 20AAACS7062FAZ is also to be mentioned in all invoices to enable SAIL RDCIS to avail input tax credit.
 - 4.1.1 20% of the total fee plus applicable GST as first installment on completion of Activity Sl. No. 1 of Table –I to this agreement and on submission of GST Invoice.
 - 4.1.2 20% of the total fee plus applicable GST, as second installment on completion of Activity Sl. No. 2 of Table –I to this agreement and on submission of GST Invoice.
 - 4.1.3 60% of the total fee plus applicable GST, as third and final installment on completion of Activity Sl. No. 3 of Table –I to this agreement and on submission of GST Invoice.
- 4.2 All installments shall be released only after completion of activities as per Table –I of this agreement to the satisfaction of RDCIS, SAIL and against certification by IIT(ISM), DHANBAD that the amount released earlier have been fully utilized for the scope of work covered by this agreement. If any amount remains un-utilised out of installment(s) paid earlier the same shall be adjusted and the balance amount shall be paid to IIT(ISM), DHANBAD.
- 4.3 RDCIS, SAIL shall pay to IIT(ISM), DHANBAD the total fee as mentioned in para 4.0, hereinabove, in 3 (three) installments through e-payment /electronic mode against receipt of bill/invoice, in triplicate, along with a request letter. For e-payment, IIT(ISM), DHANBAD shall give their mandate/authorization in a prescribed form.



A handwritten signature "Prathap" is present.

Table - I

Sl. No.	Deliverables	Time frame	% Payment
1.	Submission of Technical memorandum	3 months from Date of signing of this Agreement	20%
2.	Submission of Interim report	5 months from completion of Sl no.1	20%
3.	Final Report	2 months from completion of Sl no.2	60%

- 4.4 The third and final installment will be released only after submission of a 'Statement of Account' by IIT(ISM) to RDCIS, SAIL in respect of utilisation of project fund for the scope of work covered under this agreement.
- 4.5 Neither Party shall be eligible for liquidated damages in case of delay in completion of the agreement.

5.0 Commercial Exploitation of the System

- 5.1 In case, any know-how or new technology is generated out of this collaborative agreement limited to the scope of work, the right for commercial exploitation shall vest with RDCIS, SAIL. RDCIS, SAIL shall have full right to exploit commercially the developed system under this agreement in steel plants/subsidiaries under Steel Authority of India Ltd. without any further obligation to IIT(ISM), DHANBAD. For commercialization, the benefit in terms of licensing fee and royalty will vest with RDCIS, SAIL.

6.0 Confidentiality

- 6.1 "Confidential Information" means any and all data, reports, records, correspondence, notes, compilations, studies and other information including Technical Information and other patent protected information disclosed directly or indirectly by one Party or any of their representatives, agents, consultants or advisers to another Party and/or any of their representatives, agents, whether such information is disclosed orally, in writing, in machine readable form or by any other means, regardless of whether such information is identified as confidential, and includes, without limitation, any information ascertainable by inspection by one Party or its representatives of the premises or business of another Party.



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- 6.2 In the course of negotiations, non-public, proprietary and confidential information will be exchanged amongst the Parties. The Parties agree to treat such information confidential and to use their best efforts to protect such information from disclosure to any third party.
- 6.3 During the term of the Agreement, each party agrees to consider information received from the other party as confidential provided they are clearly marked so, in written or tangible form. The obligations above shall not extend to any confidential information for which the receiving party can prove that this information:
- i. is in the public domain at the time of disclosure or comes within the public domain without fault of the receiving party.
 - ii. is already known or become known to the receiving party
 - iii. is received from a third party having no obligations of confidentiality to the disclosing party,
 - iv. is independently developed by the receiving party; or
 - v. is required to be disclosed by law or court order.
- 6.4 The obligations of confidentiality will be applicable for a period of five years after the termination of the Agreement.
- 6.5 Nothing in this Agreement shall affect any rights that the Disclosing Party may have in relation to the Confidential Information, neither shall this Agreement provide the Receiving Party with any right or license under any patents, copyrights, trade secrets, or the like in relation to the Confidential Information.

7.0 Patents & Intellectual Property Right

- 7.1 Any patent arising out of this project work and the scope of work of this agreement, shall be protected and Intellectual Property Right protection issues will be examined by RDCIS, SAIL before making it public by publishing in any technical journal and books, presenting findings in conferences/ seminars etc. Patent and copyrights, if any filed, shall be by RDCIS, SAIL. The expenses towards filing and maintenance of Patent and copyrights shall be borne by RDCIS, SAIL and the rights to continue or discontinue with Patent and/or copyrights shall vest with RDCIS, SAIL only without any obligation to IIT(ISM), DHANBAD.

8.0 Secrecy & Publication

- 8.1 Both, RDCIS, SAIL and IIT(ISM), DHANBAD undertake to make all the Technical know-how for development of system. Any specific findings emerging out of this development which have commercial implications and are patentable, shall not



be published and/or disclosed directly or indirectly to any other party either during the subsistence of this agreement or thereafter for a period of 5 (five) years. IIT(ISM), DHANBAD shall take adequate measures to ensure that the secrecy of the results is maintained by their employees.

- 8.2 IIT(ISM), DHANBAD and RDCIS, SAIL shall consult each other for any publication arising from the developmental work carried out under this agreement. These publications shall be in the names of investigators both from RDCIS, SAIL & IIT(ISM), DHANBAD and it will be duly acknowledged that the work has been carried out in collaboration and with the financial assistance of RDCIS, SAIL.

9.0 Modifications and amendments

- 9.1 Modifications and amendments to this agreement shall be valid only if they are made in writing and signed by the duly authorised representatives of the respective parties.

10.0 Force Majeure

- 10.1 Notwithstanding the provisions of this Agreement, neither Party shall be eligible for liquidated damages or termination for default against the non performing Party, if and to the extent that the delay in performance or other failure to perform its obligations under the contract is the result of an event of Force Majeure. If a Force Majeure situation arises, the affected Party shall promptly notify the other Party in writing of such conditions and the cause thereof. Unless otherwise directed by the client in writing, the affected Party shall continue to perform its obligations under the Agreement as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. Either party shall reserve the right to terminate this contract, by giving a written notice of minimum 30 days to the affected Party, if as a result of Force Majeure, the affected Party being unable to perform a material portion of the services for a period of more than two months.
- 10.2 "Force Majeure" shall mean any event beyond the control of the Employer or of the Controller, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following :
- a) war, hostilities or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy and civil war
 - b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts



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- c) strike, sabotage, unlawful lockout, epidemics, quarantine and plagues
- d) earthquake, fire, flood or cyclone, or other natural or physical disaster.

During the above mentioned force majeure situations, but not limited to, then the contract or agreement period will be extended for the period of force majeure, provided notice of the happenings of any such eventualities is given & supported by documentary evidence(s) by either party to other within 14 days after the occurrence of such event(s).

11.0 Termination

- 11.1 During the tenure of the agreement, either party can terminate the Agreement either for breach of any of the terms and conditions to the agreement or otherwise, by giving one month's notice in writing to the defaulting party. In the event of termination of the agreement, the rights and obligations of the parties thereto shall be settled by mutual discussion. Any financial settlement shall take into consideration the expenditure incurred/committed by IIT(ISM), DHANBAD, utilisation of funds already released to it by RDCIS, SAIL.

12.0 Indemnification

IIT(ISM), DHANBAD shall indemnify and save harmless RDCIS, SAIL, its officers, employees and agents, from all suits, actions and damages or costs of every kind and description, including Lawyer's fees, arising directly or indirectly out of the performance of work under this Agreement, whether caused by the negligent or intentional act or omission on the part of IIT(ISM), DHANBAD or its agents, servants, employees and subcontractors.

13.0 Subcontracting

IIT(ISM), DHANBAD shall not subcontract any work required under this Agreement without prior written consent of RDCIS, SAIL. If IIT(ISM), DHANBAD wishes to subcontract any of the said work, it must provide subcontractor names, addresses, and telephone numbers and a description of the work to be done along with credentials. IIT(ISM), DHANBAD will not be relieved of primary responsibility for full and complete performance of any work subcontracted to the subcontractor. There shall be no contractual relationship between the RDCIS, SAIL and the subcontractor.

14.0 Licenses, Applicable Laws

IIT(ISM), DHANBAD will be responsible for obtaining any and all licenses pertaining to performance of work under this Agreement, if required. All services, equipment and materials provided by IIT(ISM), DHANBAD shall conform to all



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applicable laws and regulations.

15.0 Arbitration

- 15.1 All disputes and differences whatsoever arising between the parties out of or relating to the construction, meaning and operation or effect of this agreement/or the breach thereof, shall be resolved amicably through conciliation. Should effort for an amicable resolution fail, the dispute and differences shall be referred to the adjudication of a Sole Arbitrator to be appointed by, Executive Director, I/c, RDCIS, SAIL, Ranchi or by an Officer holding such position of Head of RDCIS by whatever name called in consultation with IIT(ISM), DHANBAD. The decision of the Sole Arbitrator shall be final and binding on both the parties. The provisions of Arbitration and Conciliation Act 1996 and modifications, amendments thereof, shall apply to such arbitration proceedings. The award of the Sole Arbitrator shall be a reasoned or speaking one. The venue of Arbitration proceedings shall be Ranchi.
- 15.2 The project work under this Agreement shall continue during Arbitration proceedings.
- 15.3 The Arbitration clause shall be made operative only on failure of amicable settlement through conciliation.

16.0 Governing Law and Jurisdiction

This Agreement and any dispute or claim arising out of or in connection with it or its subject matter or formation shall be governed by and construed in accordance with the laws of India and the courts at Ranchi (Jharkhand) shall have exclusive jurisdiction in all matters arising out of this Agreement.

17.0 Miscellaneous

- 17.1 Both parties shall take all initiative so as to complete their respective obligations for executing the activities involved for achieving the objective of the project.
- 17.2 In the event of extraneous factors beyond the control of either party like accident, riots, earthquake etc. due to which the project has to be abandoned, neither party shall demand compensation from the other.
- 17.3 Neither party shall be liable for indirect or consequential damages.
- 17.4 An audited statement of account shall be submitted by IIT(ISM), DHANBAD to RDCIS, SAIL after completion of the project.
- 17.5 TDS on account of Income Tax & GST Income Tax shall be deducted at source as per the provisions of Income Tax Act. In case IIT(ISM), DHANBAD has been exempted from Income Tax, GST and submits a certificate/ documentary



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evidence issued as per the IT Act, no such deduction shall be made by RDCIS, SAIL.

17.6 GM & HOG, FR&T, RDCIS, SAIL, Ranchi or his authorized representative shall coordinate all activities related to this agreement.

17.7 **Waiver**

No waiver of any of the terms of this Agreement shall be effective unless made in writing by both the parties and no waiver of any particular terms shall be deemed to be a waiver of any other terms.

17.8 **Entire Agreement**

This Agreement, and any annexures, duplicates, or copies, constitutes the entire agreement between the Parties with respect to the subject matter of this Agreement, and supersedes all prior negotiations, agreements, representations, and understandings of any kind, whether written or oral, between the Parties, preceding the date of this Agreement.

17.9 **Amendments and Assignment**

This Agreement may be amended only by written agreement duly executed by an authorized representative of each party. This Agreement shall not be assigned by either party without the express, written consent of the other party.

17.10 **Severability**

If any provision or provisions of this Agreement shall be held unenforceable for any reason, then such provision shall be modified to reflect the parties' intention. All remaining provisions of this Agreement shall remain in full force and effect for the duration of this Agreement.

17.11 In case of non performance of any provision of the contract by either of the party, the non defaulting party shall issue a notice to the defaulting party to perform that portion of the contract which has not been performed within the stipulated period provided in the Notice. In case of non rectification of the breach within the period stipulate, the non defaulting party shall have a right to seek damages for the loss suffered by it due to the non performance of other party.



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This **AGREEMENT** document has been prepared and signed in two counterparts, one signed copy to be retained by each of the signatories.

In witness where of the **PARTIES** have executed this **AGREEMENT** on this.....31st..... day of the monthAugust..... of the year 2022.

For and on behalf of
Indian Institute of Technology (Indian
School of Mines),
Dhanbad-826004

For and on behalf of
Steel Authority of India Ltd.,
Research & Development Centre for
Iron Steel,
Ranchi - 834 002

Dean (Research & Development)
Indian Institute of Technology
(Indian School of Mines)
Dhanbad - 826004 (INDIA)

Signature
Name & Designation with seal

Witness 1: Prof. R.K. Gangwar
A.D.-SRIG

Witness 2:

(A.R. Dixit)
HOD/Mechanical
Engg.

पी. पाठक
P. PATHAK
मुख्य महाप्रबंधक(रोलिंग मिल्स)
Chief General Manager(Rolling Mills)
आर.डी.सी.आई.एस., सैल रोची - 834002
RDCIS, SAIL, Ranchi - 834002

Signature
Name & Designation with seal

Dr. S. Rath
GM(FR&T) & HOD

Witness 1:

(S. Jha)
GM & HOD (SR)

Witness 2: