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(एक महारत्न कंपनी)
सामग्री प्रबंधन विभाग
कोल भवन, प्लाट सं.-ए.एफ-३, एक्शन एरिया-१ए
न्यू टाउन, राजरहाट, कोलकाता - ७००१५६
फ़ोन: ०३३-२३२४४१२७, फैक्स: ०३३-२३२४४११५
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दिनांक- 21.08.2023

Domestic Open e-Tender No. CIL/C2D/Bulk Explosives/2023-25/391 dated 05.08.2023
Tender ID: 2023_CILHQ_285284_1
Scope of Tender: Conclusion of Running Contracts (RCs) and empanelment as Reserve RC holders for a period of two years for supply of Bulk Explosives to all the subsidiary companies of CIL

Corrigendum-2

A. The Due Dates of the Tender are extended as follows:

Ref.	Details of the Tender	Revised Date & Time
1	Downloading of Tender Document Closes on	05.09.2023 upto 17.00 hours (IST)
2	Online Submission of Offers Last Date and Time	05.09.2023 upto 17.00 hours (IST)
3	Due date and time of Opening of Techno-Commercial Bids of Tenders (Cover-I)	06.09.2023 at 11.00 hours (IST)

B. The following Clauses of the NIT are amended to the following extent only:

Clause Ref.	Amended Clause
(**New**) 10.2A, Sec-VI, TSS	CIL reserves the right to determine the Benchmark Powder Factor (BMPF) with improved methodology in a phased manner and its applicability during the RC period.
(**New**) 10.2B, Sec-VI, TSS	BMPF (along with +/- 2% range) for mine/ part of mine having the same method of production shall be decided with the approval of the CMD of the company after the determination of BMPF by improved methodology. The modalities of the BMPF with improved methodology are placed as **Annexure-12**. The BMPF determined with improved methodology will be communicated to the vendor preferably at the start of the quarter in the relevant financial year. Till the time, BMPF determined with improved methodology is communicated to the vendor, the existing provisions i.e Average Achieved PF of previous FY, shall continue. BMPF once determined shall continue unless it is reviewed for exceeding +/-20 % range or any drastic change in geo mining conditions, with the approval of the CMD of the company. For the method of production where both Cartridge explosives and Bulk explosives are concurrently being used, the BMPF with improved methodology shall not be applicable till the Cartridge RC is concluded or use of cartridge explosives concurrently with Bulk explosives is discontinued. In no case two parallel BMPF will be applicable in any method of production, to avoid disputes in concurrent RCs.
10.5, Sec-VI, TSS	In case of new opencast mines i.e. new projects/patches including outsourcing and hired HEMM patches, new seam of existing opencast mine or change in method of work, any significant change in geo-mining conditions, which may come up during the tenure of the contract and for which BMPF is not determined and any changes in the BMPF methodology during the tenure of the contracts necessitating changes in the existing

	BMPF of mine/part of mine/projects/patches/benches; then BMPF for such mine/part of mine/projects/patches/benches shall be determined in presence of the authorized representatives of CIL Sub. Cos and CMPDIL and shall be decided with the approval of the CMD of the company. The approved BMPF shall be communicated by Subsidiary companies to RC holders through email/fax/letter with copy endorsed to CIL ***and shall be effective from the date of communication to RC holders (preferably start of quarter). However, for new mines the achieved powder factor may be observed for a period of one year for better evaluation and reconsideration of BMPF.***
10.6, Sec-VI, TSS	Mine wise benchmark PFs may be reviewed by the CMD of the Sub. Cos. in consultation with CMPDIL on financial year basis, for the tenure of the contract (1st FY Year, 2nd FY Year, remaining period of proposed RC during FY 2025-26), if the deduction/bonus at such mines exceeds 20 % of the price of explosives. The revised PF, if any, shall apply during the tenure of the contract ***including the respective financial year for which BMPF was reviewed***. For e.g. in case contract starts in November 2023 and if benchmark PF for FY 1st year is required to be reviewed for the period November 2023 to March 2024 (1st FY), then the reviewed PF will be the BMPF for FY1st year and will be applicable from November 2023 to March 2024 in this case. The supplier has to lodge claim within three (3) months of receipt of annualized APF statement of the relevant year with the respective Subsidiary in case the deduction exceeds 20% of the price of explosives. The claim of the supplier shall be settled by respective Subsidiaries within three (3) months of lodging the claim. Any claim by suppliers after the above period shall not be entertained. If bonus exceeds 20% of the price of explosives, the respective Subsidiary shall initiate review immediately after completion of the relevant year. ***While reviewing the BMPF for the preceding financial year, the relevant applicability clause shall be followed.***
14.1, Sec-VI, TSS	The mine-wise achievement of powder factor should not be less than the benchmark powder factors. In the event of supplied item not providing satisfactory results, penalty will be imposed by way of Deduction from price of these items. For every percentage decrease in powder factor of Coal/OB compared to the benchmark powder factors, same percentage deduction of the price (without GST) of explosives shall be made. ***In case of applicability of BMPF with improved methodology, the mine-wise achievement of powder factor should be in the range of benchmark powder factors assigned. In the event of supplied item not providing satisfactory results, a penalty will be imposed by way of Deduction from the price of these items. For every percentage decrease in the powder factor of Coal/OB compared to the BMPF below the range prescribed, the same percentage deduction of the price (without GST) of explosives shall be made. For example when the achieved PF is 97% of the BMPF assigned, then the penalty levied will be 1% of the price (without GST) of explosives.***
14.2, Sec-VI, TSS	In case the achieved powder factor is above 105% of the benchmark powder factor, then Bonus may be paid @ 0.3% (zero point three percent) of the price of explosives (without GST) for every percentage increase in powder factor over 100% of the benchmark. Thus for achievement of powder factor between 100% to 105% of the benchmark, there will be no bonus. For e.g. when achieved PF is 106%, bonus to be paid will be equal to 0.3% x 6 x Price of the explosives. ***In case of applicability of BMPF with improved methodology, if the achieved powder factor is above 107% of the BMPF, then Bonus may be paid @ 0.3% (zero point three percent) of the price of explosives (without GST) for every percentage increase in powder factor over 102% of the BMPF. Thus for achievement of powder factor in between 100% to 107% of the BMPF, there will be no bonus. For e.g. when achieved PF is 108%, bonus to be paid will be equal to 0.3% x 6 x Price of the explosives (without GST).***

Annexure-12

Improved Methodology for Determination of Bench Mark Powder Factor

1. Scope of Work

i. Study of mine plans, inspection of mine site, Geo- Mining condition, GR/PR of Mine/Project/block
ii. Method of Mining.
iii. Study of previous record of achieved Powder Factor of the mine.
iv. Designing of blast pattern based on the technical parameters with consultation with mine management before trial Blast.
v. Conducting trial blasts in each bench of OB/Coal and evaluation of blast performance.
vi. Fragmentation analysis of each trial blast using WipFrag/ dedicated software.
vii. Measurement of the actual volume of Blasted material by determining of Initial RL of OB/Coal bench before blasting & final RL of the same after mucking.
viii. Explosive used in each trial blast.
ix. Determine the achievable optimum benchmark Powder Factor.
x. Designing of blast pattern after correlating the all blast results.

2. Base-line Study

i. Prediction of Hardness of Strata.
ii. Testing of Bulk/ cartridge Explosives used.
iii. Fragmentation assessment of each Blast.
iv. Estimation of PPV due to blasting.
v. Measurement the actual volume (with the pre and post survey) after blasting as well as mucking.
vi. To estimate the Powder Factor of each Blast.
vii. Design of blast Patten based on analysis of blast results & Hardness of Strata.

3. Instruments & Software Used

Methodology for determination of Bench Mark Powder Factor has incorporated Velocity of Detonation, actual measurement of the blasted material pre & post survey, Compressive Strength of the rock, Fragmentation analysis. The following instruments have been used:

- Seismograph / Vibrometer
- VOD Meter and Delay Timer
- Schmidt Hammer
- Fragmentation Analysis Software
- Digital Weighing Machine
- Other Equipment

4. Methodology

i. Compressive Strength measurement of Rock

Compressive strength is the resistance that the rock can withstand before failure. Based on the compressive strength, the rocks can be classified as hard, medium hard or soft. Rebound hammer test using Schmidt Hammer will be used for calculating the compressive strength of the rock.

Hardness of Rock is considered while deciding blast design parameters like burden, spacing, stemming and amount of explosive to be used for good fragmentation.

ii. Blast Geometry

Scientific Formulae has been considered while deciding given Parameters and these formulae for Blast design is modified if needed based on local geological condition which varies mine to mine. Different parameters are:

- Burden
- Stemming Height
- Stemming Material
- Sub-drilling
- Spacing
- Blast Hole depth
- Delay Interval

iii. Intrinsic Properties and Functional Requirement of the Explosives

Velocity of detonation (VOD) of explosives plays an important role for desired fragmentation. Soft strata require lesser VOD and more gas formation for breakage while the hard strata requires high VOD in order to get optimum fragmentation. Density of the explosive is a very important factor that can be measured by water displacement method. Relative Bulk Strength (RBS) is the measure of the energy available per unit volume of explosive as compared to an equal volume of bulk ANFO at 0.81gm/cc density.

iv. Fragmentation Analysis by Using WipFrag Software

The fragmentation study of the blast will help us in determining the percentage of % of oversize Blasted Material & mean Fragment Size as well as muck pile profile formed in a blast. The allowable boulder size depends upon the type of equipment used for mucking of the material. Fragmentation analysis software like Fragblast, WipFrag can be gainfully used for fragmentation analysis to obtain both the fragment size distribution, boulder percentage calculation and the muck profile analysis. If the fragmentation is not satisfactory then such blast will not be considered for determination of powder factor.

v. Blast Induced Ground Vibration

The use of explosives to execute blasting activities will always lead to concern as to its effects on the environment. The ground vibration induced due to blasting impact the nearby localities & surrounding of the mines. In order to determine the induced ground vibration, measurement of PPV was carried out with seismograph at different distances from SME charged blasting sites.

vi. Pre & Post Blast Survey

In order to determine the powder factor of the mine, the actual amount of blasted rock that has been removed from the blast is necessary for measurement. It can be achieved by carrying out pre (before blasting) and post blast (After material is mucked) survey of the location. It will bring accuracy in the measurement of amount of material removed in a blast. This excavated blasted volume divided by explosives consumed will give us the actual powder factor that can be achieved in the mine under present geo-mining conditions.

5. Benchmark Powder Factor for a Mine

The following formulae to be used for determination of powder factor:

PF (m^3/kg) for OB = (Sum of total volume (m^3) of overburden for all available benches in OB) / (Sum of total quantity of explosives used in all above blasts in OB benches)

PF (Te/kg) for Coal = (Sum of total tonne of coal of all benches) / (Sum of total quantity of explosives (kg) used in all the above blasts in coal benches)

6. Designing of blast pattern based on correlating the all blast results and Hardness of Strata

Blast design will be given after correlating of all blast results and Hardness of Strata, so that optimum fragmentation can be achieved at desired Powder Factor.

7. Existing Methodology vis-à-vis Proposed Improved Methodology

Sl. No.	Existing Methodology	Proposed Improved Methodology
a.	For subsequent year, the average PF achieved in previous financial year shall be fixed as Bench Mark PF.	Benchmark determined with improved methodology and will be fixed with an allowable Range of (+/- 2%). Once fixed the BMPF range will remain the same for subsequent years until reviewed.
b.	As per NIT of Coal India Limited, bench Mark PF shall be fixed in notional manner through a committee.	The Bench Mark PF (BMPF) shall be fixed by proposed improved methodology through a committee.
c.	Limited Instruments used.	Numerous Scientific instruments such as: • Schmidt Hammer • Digital VOD Meter • Software for fragmentation assessment. • High resolution camera for Fragment photograph and its analysis. • Vibration Monitor • Digital Weighing Machine • GPS etc.
d.	Hardness of Strata is not measured.	Hardness of Strata has been considered for fixation of BMPF. Hardness of strata is measured by Schmidt Hammer.
e.	Fragmentation is visually Analyzed.	Fragmentation assessment is done by WipFrag Software. Mean Fragment Size and over size fragmented material is analyzed by dedicated software.
f.	VOD & Density of Explosive is not measured.	VOD and Density of Explosive has been considered.
g.	Mine Surveyor for measuring depth, spacing and burden of each hole at the blast site. Measured In-situ Volume of the rock. Actual volume of Blasted material is not Measured.	Mine Surveyor for measuring depth, spacing and burden of each hole at the blast site and additionally measure the actual volume of Blasted material by determining of Initial RL of OB bench before blasting & final RL of the same after mucking.
h.	Blast design is given.	Blast design is given as per analysis of trial blast as well as Harness of Strata.

All other terms and conditions of the NIT remain unchanged.

Executive Director (M&C)