भारत सरकार / **Government of India**
श्रम एवं रोजगार मंत्रालय / **Ministry of Labour & Employment**
खान सुरक्षा महानिदेशालय/**Directorate General of Mines Safety**

DGMS(Tech.) Circular No. 03 **of 2020** **Dhanbad, dated** 16/01/**2020**

To

All Owners, Agents and Managers of Opencast Coal Mines.

Subject: Guidelines for Scientific Study under Regulation 106 of Coal Mines Regulations, 2017

Sir,

Regulation 106(2) of the Coal Mines Regulations, 2017 (CMR, 2017) mandates that before starting a mechanized opencast working, the owner and agent of the mine have to ensure that the mine, including its method of working, ultimate pit slope, dump slope and monitoring of slope stability, has been planned, designed and worked as determined by a scientific study and a copy of the report of such study has been kept available in the office of the mine. Further, Regulation 106(3) of the same requires the owner, agent and manager of every such mechanized opencast mines to ensure that the recommendations made in the report of scientific study referred to in sub-regulation (2) are complied with.

However, recent scrutiny by officers of this Directorate, of reports of scientific study undertaken in different mines to meet the above statutory requirements revealed several serious discrepancies like unconnected subjectivity, inconclusiveness, factual mistakes, etc. Invariably, recommendations made on any particular activity were completely devoid of logic. In nut shell, such reports appeared to have been made without any scientific basis and justification, thereby defeating the very essence of the statute to enbling the mine level management with scientific backing in respect of planning and execution of mining activities.

Therefore, with a view to reviewing the prevailing status and standardizing the basic elements of a scientific study as referred above, a technical workshop on the subject captioned "scientific study and slope monitoring in opencast mines and way forward" was organized by DGMS on 06.12.2019 at DGMS Western Zone, Nagpur. The workshop was attended by about 79 officials and experts from regulator, various coal mining companies and research/academic institutions, like DGMS, CMPDI, CSIR-CIMFR, IIT Kharagpur, VNIT Nagpur, M/s SECL, M/s MCL, M/s NCL, M/s WCL, M/s ECL, M/s SCCL, M/s NLC, M/s SAIL, etc.

After detail deliberations and discussions, the following considerations emerged in respect of any scientific study to be made under Regulation 106(2) of the CMR - 2017.

1.0 General:

1.1 No part of the report shall contradict with any provision made under the Mines Act, 1952, rules, regulations, byelaws or orders made there under.

2.0 Scope of the study:

2.1 The scope of the said scientific studies conducted in a mine shall address on systematic and scientific mining for the planned life of the mine, and shall include clear recommendation on

i) suitable method of mining for new mine, or review and validation of existing method of mining and with/without modifications,

ii) sequence of mining and sequence of dumping, specially with reference to various geological disturbances traversing the mine, operational slope, ultimate slope,

iii) mechanization including the type/size/capacity, etc., in accordance with the designed capacity of mine,

iv) design of bench geometry including inter-ramps (height, width, slope, etc.), considering blasting/cutting/mechanization, etc., including conditions of deployment of large specialized machinery like draglines, bucket-wheel-excavators, surface miners, etc.,

v) type of drilling and blasting methods including controlled blasting, if so warranted,

vi) transport layout including the haul road dimensions, provision of one-way traffic, separate road for different type/capacity of dumpers/vehicles, layout of other modes of transport like conveyor, etc.,

vii) layouts of various surface facilitations,

viii) slope monitoring as an integral part of planning,

ix) water management viz-a-viz in-pit sump design, de-silting of sumps, design of effective drainage system, requirement of pumping, pre-mining hydrostatic depressurization of bench slope, provision of weep holes, monitoring of profile of water table, hydrological study, etc.,

x) type of dump – external or internal, site selection, dump foundation design to bear the ultimate load of the dump, height, slope, benching/terracing, limiting gradient of base floor for internal dumping, distance from the active workings/quarry edge, other facilities, drainage system, reclamation, etc., and

xi) effect of fire or spontaneous heating on bench/dump stability,

2.2 Care shall also have to be taken to ensuring validation of the pre-existing data by laboratory test, if used for designing the slope, and to ascertain that the data considered for designing/study, is truly site-specific and representative of the mine under study.

3.0 Factor of safety:

3.1 Factor of safety for design of pit bench & dump shall be determined considering all concerned parameters such as geo-mechanical properties of rock-mass, ground water condition, hydro-geological studies, seismic effect, method of mining, etc.

3.2 However, the Minimum Factor of Safety to be considered for design of pit, bench & dump slope shall in any case not be less than 1.50 for permanent or long-standing slopes and 1.30 for all other cases.

4.0 <u>Monitoring scheme for bench and dump slopes</u>:

4.1 The study report shall, among others, categorically specify/recommend

i) a specific methodology of slope monitoring suitable to address the potential level of danger prevailing in the mine,

ii) a suitable system of slope monitoring customized to the local needs, detailing type of instrumentation, frequency, pattern of data collection and analysis and organization for monitoring and

iii) different customized trigger points of observed values, like Warning Level, Withdrawal Level, etc., that may be included in trigger action response plan (TARP).

5.0 In addition to the above, the study report may contain any other aspect concerning planning, design and monitoring in the mine which may be warranted in view of the prevailing local conditions as well as features expected to be encountered in future.

6.0 **The Owner and Agent shall ensure that an appropriate scheme for mining and slope monitoring for the mine(s) under their control on the basis of the scientific study inputs/ report is prepared and a copy thereof is kept maintained at the mine office. The workings and operations of the mine shall strictly adhere to the mining scheme so prepared.**

7.0 The scientific study and the scheme as mentioned above in para 6.0 shall be reviewed time to time or whenever there is any significant change in the mine.

8.0 Notwithstanding the above, before reaching the final stage of mining as designed, the ultimate pit slope shall be again assessed by a fresh scientific study conducted based on experience gained, additionally required inputs, geological disturbances encountered, etc., till then.

Accordingly, all Owners, Agents and Managers of all opencast coal mines are advised to follow the above guidelines for the purpose of preparing the report under Regulation 106(2) of CMR - 2017 based on Scientific Study and implementing the same.

16/1/2020

(R. Subramanian)
Chief Inspector of Mines and
Director General of Mines Safety.