GOVERNMENT OF INDIA
MINISTRY OF COAL

RAJYA SABHA
UNSTARRED QUESTION NO. 838
TO BE ANSWERED ON 28.07.2025

CRITICAL MINERALS IN COAL MINE WASTE AND COAL ASH

838. SHRI K.R. SURESH REDDY:

Will the Minister of Coal be pleased to state:

(a) whether; it is a fact that rare earth elements have been found in waste of coal mines in the country;
(b) if so, the details thereof;
(c) whether Government is taking any steps to promote Research & Development (R&D) in critical minerals extraction from coal ash; and
(d) if so, the details thereof, if not, the reasons therefore?

ANSWER
MINISTER OF COAL AND MINES
(SHRI G. KISHAN REDDY)

(a) & (b): The coal-derived fly ash and bottom ash samples collected from Singareni Thermal Power Plant (STPP) and overburden clay samples have been analyzed for trace elements and Rare Earth Elements (REE) and results show that the total REE in fly ash and clays is about 400 ppm.

Further, overburden, lignite and fly ash samples, collected from mines and thermal power plants of NLC India Limited at Neyveli, were also analyzed for Rare Earth Element (REE) and trace elements. It was found that fly ash from thermal power plant contains a concentration of REE (2100 mg/kg) comprising of both lighter & heavier REE with Yttrium content of 300 mg/kg.

(c) & (d): The Government has approved establishment of National Critical Mineral Mission (NCMM) on 29.01.2025, for the period from 2024–25 to 2030–31. Under the Mission, ₹100 crore has been allocated for pilot projects focused on recovery of critical minerals from sources such as overburden, tailings, fly ash, and red mud. Additionally, guidelines for establishing the Centre of Excellence (CoE) under NCMM have been approved on 06.04.2025.

Coal India Limited (CIL) has undertaken the following Research & Development (R&D) projects related to rare earth elements found in coal mine waste:

1. Results from assessment of REE and other economic resources from the North Eastern Region (NER) Coalfield, indicate that total REE is low, but Heavy REE contents are relatively high.

2. Results from appraisal of Gondwana Sediments (Coal, Clay, Shale, Sandstone) for Trace Elements & REE concentration in the Singrauli coalfield, indicate that REE are "promising" in nature (with an enrichment of ≈250 ppm on a whole coal basis in Coal Samples & ~400 ppm in Non-Coal samples). However, the economical extraction of the REE is subject to technical advancement and economy of scale.

3. Development of indigenous technology for extraction of critical minerals, including REE, from overlying strata of North eastern coalfields has been undertaken with an objective to develop (i) enrichment technique of critical metals from non-coal strata by physical separations and (ii) extraction technique of critical metals from non-coal strata and Acid mine drainage by Ion-Exchange Resin.

The Singareni Collieries Company Limited (SCCL) has signed MoUs with Institute of Minerals and Materials Technology (IMMT), Bhubaneswar; Non-Ferrous Materials Technology Development Centre (NFTDC), Hyderabad; and IIT, Hyderabad for research in this field.

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