US012443899B2

(12) **United States Patent**
Geislinger et al.

(10) **Patent No.: US 12,443,899 B2**
(45) **Date of Patent: *Oct. 14, 2025**

(54) **SYSTEM AND METHOD FOR ADJUSTING LEACHING OPERATIONS BASED ON LEACH ANALYTIC DATA**

(71) Applicant: **FREEPORT MINERALS CORPORATION**, Phoenix, AZ (US)

(72) Inventors: **Dana Geislinger**, Chandler, AZ (US); **Travis Gaddie**, Phoenix, AZ (US); **Margaret Alden Tinsley**, Titusville, FL (US); **Muneeb Alam**, Alexandria, VA (US); **Steven Chad Richardson**, Thatcher, AZ (US); **Akaash Sanyal**, Boston, MA (US); **Raquel Crossman**, Mesa, AZ (US); **Tianfang Ni**, Boston, MA (US); **Cory A. Demieville**, Scottsdale, AZ (US); **Luke Gerdes**, Framingham, MA (US); **Robyn Freeman**, Menlo Park, CA (US); **Oleksandr Klesov**, Lexington, MA (US); **Luciano Kiniti Issoe**, Sao Paulo (BR)

(73) Assignee: **FREEPORT MINERALS CORPORATION**, Phoenix, AZ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **19/064,968**

(22) Filed: **Feb. 27, 2025**

(65) **Prior Publication Data**

US 2025/0209388 A1 Jun. 26, 2025

Related U.S. Application Data

(63) Continuation of application No. 18/736,402, filed on Jun. 6, 2024, now Pat. No. 12,288,169, which is a (Continued)

(51) **Int. Cl.**
G06Q 10/00 (2023.01)
C22B 3/06 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G06Q 10/04*** (2013.01); ***C22B 3/06*** (2013.01); ***C22B 15/0067*** (2013.01);
(Continued)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,167,793 B1 1/2001 Nyfelt
6,319,389 B1 11/2001 Fountain et al.
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2573936 5/2010
CA 3059069 8/2021
(Continued)

OTHER PUBLICATIONS

J Benndorf, MWN Buxton (Sensor-based real-time resource model reconciliation for improved mine production control—a conceptual framework)—Mining Technology, 2016—journals.sagepub.com (Year: 2016).*
(Continued)

Primary Examiner — Hafiz A Kassim
(74) *Attorney, Agent, or Firm* — Snell & Wilmer L.L.P.

(57) **ABSTRACT**

The method may comprise receiving historical data (e.g., mineralogy data, irrigation data, raffinate data, heat data, lift height data, geographic data on ore placement and/or blower data); training a predictive model using the historical data to create a trained predictive model; adding future assumption data to the trained predictive model; running the forecast
(Continued)