ADVANCED MATERIALS

ASX Announcement
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5E Advanced Materials Files Foundational U.S. Patent to Protect Closed-Loop In-situ Boron Mining and Production Technology

Claims Would Strengthen Competitive Moat and Reinforce Market Leadership

Omnibus Application includes 167 Invention Claims Covering 5E's End-to-End Borate Mining, Bolstering Long-term IP Protection

HESPERIA, CA / ACCESS Newswire / December 18, 2025 / 5E Advanced Materials, Inc. ("5E" or the "Company") (Nasdaq:FEAM) (ASX:5EA), a U.S. development-stage company focused on becoming a vertically integrated global leader and supplier of refined borates and advanced boron derivative materials, has filed an omnibus application with the United States Patent and Trademark Office (USPTO) for a proprietary, closed-loop in-situ leach (ISL) mining and production process that has lowered 5E's operating costs, reduced its environmental footprint, and, if granted, will create meaningful barriers to competitors seeking to replicate the Company's ISL technology. The patent application includes 167 claims covering 5E's mining process and production for boric acid, gypsum, sodium chloride, as well as the management of metal impurities. Over the coming weeks, 5E intends to file several additional standalone applications. The patents would form a cornerstone of 5E's intellectual property portfolio, covering key steps from injection to recovery, processing, and reinjection.

"With 5E filing the omnibus application, we are taking an important step to secure the intellectual property that underpins our differentiated ISL mining and processing platform that has led to our technical successes," said Paul Weibel, Chief Executive Officer of 5E Advanced Materials. "5E performed ISL pilot operations in the 1980's and has been mining consistently for nearly two years. Building on this experience, our team developed a closed-loop process designed to lower costs, improve sustainability, and enhance mining efficiency. This patent filing is intended to protect that know-how and support our long-term commercial and strategic objectives through the protections provided by the USPTO."

ISL borate mining techniques at the Fort Cady Project trace back to pilot programs in the early 1980s with the discovery of mineral resources dating to 1964. Primary exploration work and land acquisition occurred over the next two decades. A series of ISL pilot programs occurred on three separate occasions from 1981 to 1982, 1986 to 1987, and 1987 to 1988. The major permitting initiative commenced in 1990 with the Record of Decision from the United States Bureau of Land Management and a Conditional Use Permit and Reclamation Plan from the California Department of Conservation and San Bernardino County obtained in 1994. This unique history, combined with permits from federal, state and local agencies, positions 5E with one of the most strategically advanced and de-risked ISL boron assets in the United States.

5E obtained its approval to commence mining from the United States Environmental Protection Agency in November 2023 and recommenced ISL mining in January 2024. Mining occurs via ISL technology and initially utilized four vertical injection-recovery wells where recovered leached solution is processed at 5E's Small-Scale Facility (SSF). In July 2025, two vertical injection-recovery wells were converted to horizontal wells with downhole fiber optics to pilot ISL techniques and demonstrate baseline head grades, temperatures, impurity profiles, injection rates, and recovery rates. Mined solution is processed into boric acid and gypsum at the SSF where it has demonstrated meeting the highest commercial product specifications.

The novel processing technology produces boric acid, gypsum and calcium chloride via ISL technology while regenerating hydrochloric acid via aqueous chemistry, with the overall mining process being a closed loop where mining feedstock is regenerated and recycled. This closed-loop ISL approach is designed to minimize waste, reduce reagent consumption, lower water and energy use, and limit surface disturbance compared with conventional open-pit mining. These advantages are aligned with increasing demand from customers and end-markets for more sustainable mineral production.

By submitting for patent protection for its proprietary ISL process in the United States, 5E aims to underpin a secure, domestic source of boron, a U.S.-designated critical mineral used in defense, clean energy, and high-tech applications, at a time when supply chain resilience has become a strategic priority for both government and industry. The patent filings align with 5E's strategy to advance toward scaled production and long-term offtake discussions.

About 5E Advanced Materials, Inc.

5E Advanced Materials, Inc. (Nasdaq: FEAM) (ASX:5EA) is focused on becoming a vertically integrated global leader and supplier of refined borates and advanced boron materials, complemented by calcium-based co-products, and potentially other by-products such as lithium carbonate. The Company's mission is to become a supplier of these critical materials to industries addressing global decarbonization, energy independence, food, national security, and the defense sector. The Company believes factors such as government regulation and incentives focused on domestic manufacturing and supply chains and capital investments across industries will drive demand for end-use applications like solar and wind energy infrastructure, neodymium-ferro-boron magnets, defense applications, lithium-ion batteries, and other critical material applications. The business is based on the Company's large domestic boron resource, which is located in Southern California and designated as Critical Infrastructure by the U.S. Department of Homeland Security and with the U.S. Government's 2025 Critical Minerals List following boron's inclusion.

Forward Looking Statements

Statements in this press release may contain "forward-looking statements" that are subject to substantial risks and uncertainties. Forward-looking statements contained in this press release may be identified by the use of words such as "may," "will," "should," "expect," "plan," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential" or "continue" or the negative of these terms or other similar expressions, and include, but are not limited to, statements regarding the success and enforceability of the Company's patent applications and other intellectual property protections, development plans, production capabilities, commercialization strategy, offtake discussions, customer qualification processes and success thereof, market demand for boron and lithium, the potential applications of its products across energy, defense, and industrial markets, and ability to access and secure any government-based financing. Any forward-looking statements are based on 5E's current expectations, forecasts, and assumptions and are subject to a number of risks and uncertainties that could cause actual outcomes and results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to, the timing, outcome, and enforceability of the Company's patent applications and other intellectual property protections and statements regarding the Company's development plans, production capabilities, commercialization strategy, offtake discussions, customer qualification processes, market demand for boron and lithium, and potential applications of its products across energy, defense, and industrial markets, and ability to access and secure any government-based financing. For a discussion of other risks and uncertainties, and other important factors, any of which could cause our actual results to differ from those contained in the forward-looking statements, see the section entitled "Risk Factors" in 5E's most recent Annual Report on Form 10-K and its other reports filed with the SEC. Forward-looking statements contained in this announcement are based on information available to 5E as of the date hereof and are made only as of the date of this release. 5E undertakes no obligation to update such information except as required under applicable law. These forward-looking statements should not be relied upon as representing 5E's views as of any date subsequent to the date of this press release. In light of the foregoing, investors are urged not to rely on any forward-looking statement in reaching any conclusion or making any investment decision about any securities of 5E.

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