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Pacific Northwest
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Voucher Opportunity 5-15: Independent Assessment of Monitoring, Reporting, and Verification (MRV) Technologies and Practices for Enhanced Rock Weathering (CRADA 718) Abstract

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Abstract

Development of robust, transparent, and precise monitoring, reporting, and verification (MRV) technologies and practices is critical for carbon dioxide removal (CDR) project developers to comply with regulatory and permitting requirements, voluntary carbon market (VCM) protocols, and to ensure safety while reducing environmental impacts. Enhanced rock weathering (ERW)-based CDR technologies focus on removing atmospheric carbon through conversion into thermodynamically stable solid or aqueous carbonate forms for permanent storage (i.e., mineralization). This highly durable form of CDR enhances naturally occurring silicate rock weathering cycles by optimizing application of finely-ground silicate rock particles (i.e., from basalt) on terrestrial agricultural lands to accelerate natural silicate rock weathering and mineralization. Enhanced rock weathering may also provide improved crop yields and enhance soil health. A critical aspect for commercialization of these technologies is the development of MRV to quantify the net removal and durable storage of atmospheric CO_2. For ERW systems, it is essential to accurately characterize the mineral feedstock selected for application to establish the baseline geochemical composition, mineral dissolution rates, and carbon removal potential of the feedstocks to estimate overall net removal. Given the difficulty with conducting MRV for ERW in diverse soil/environment types, over large application areas, and due to complex chemical reaction networks, this project will accelerate understanding towards consensus on best practices for MRV. The overall objectives of the proposed voucher project are to: 1) Characterize and analyze feedstock(s) intended for ERW field application by Lithos Carbon ("Voucher Recipient"/ "CRADA Participant") to determine overall mineralization potential; 2) Facilitate knowledge transfer and documentation of experimental protocols, instrumentation, and other relevant best practices; and 3) Support the Voucher Recipient's broader technology commercialization and ERW Research Facility development plans. This work will align with the Voucher Recipient's MRV plans for field sites and build upon complementary efforts conducted by PNNL on mineralization MRV.