

Greetings, I ask that the following comment be added to the public comment record on Removal Activities.

----

## **2. Elements for structured consultation and further work.**

### **a) Definitions: Discuss the role and potential elements of definitions for this guidance, including “Removals”.**

Defining CDR technologies via an MRV+ Rating System:

Both Nature-based CDR techniques and Engineered CDR technologies have their own individual strengths and weaknesses at the STEM, policy, and socioeconomic levels. It is proposed here to create and routinely update a scale showing where any one of the large number of CDR techniques rest on an MRV scale, plus policy/socioeconomic value scales, along with a 'speed of scale up' value measure, as a dynamic comparison tool. Such a comprehensive and routinely updated MRV+ rating system may help many general stakeholders and even experts stay up with this highly complex, extremely fast moving, and critically important field of comparisons.

Explaining the MRV+ Spectrum:

A low MRV+ value can be represented by the classical OIF studies that showed the final C sequestration numbers are what is today referred to as having a low MRV value due to C sequestration volume/time questions. Planting trees as a CDR method would also have a low MRV value due to relatively short-term C storage of trees and forests. Both have value on many levels, yet both have soft MRV values. On the high side of this proposed MRV+ spectrum, we may not be able to point to a current 'ideal' engineered CDR tech package being proposed in today's literature, yet we can create an idealized criteria that defines what a superior engineered CDR system of systems likely needs to be.

That alone can provide global guidance for policy makers, developers, and the general public even if such a high standard, such a complex balancing of highly comprehensive goals with profoundly complex STEM options, is never actually achieved. Routinely updating the high end MRV+ criteria, as relevant STEM, policies, and socioeconomics evolve, would be key to keeping the work globally relevant.

The highest MRV+ value criteria imaginable today, speaking for myself, will likely require, among other things:

--- An ultra-high degree of CDR accountability, possibly using even a high degree of physical confinement of the engineering processes to achieve the most accurate MRV+ values with the least socioeconomic, environmental, and/or policy risks.

--- Confinement of deployment to oceanic deserts offers a unique international governance structure, and that governance structure is mature enough to craft policies specifically for vast scale oceanic desert mCDR deployments.

--- Use of largely self-replicating mCDR/C storage infrastructures would be ideal due to the need for rapid scale up, such self-replicating tech options may actually be possible using bio-plastics and other advanced materials.

--- Being broadly beneficial at global, regional, and local socioeconomic levels, jobs/ profitability is a complex and pivotal issue. Yet, around 107M forcibly displaced persons need better than what is provided, oceanic desert mCDR platforms should have physical residency potential with basic water, energy, and nutrient nexus tech available for an almost unlimited number of displaced persons.

--- High acceptability at the international, regional, and local governance and population levels can be largely achieved by oceanic desert use as such areas are currently of little value to any cultural group or even nation states.

--- All of the above might lead to highly reliable geological time scale storage at GtC/y rates with an absolute minimum negative impact on socio-environmental and policy issues while using infrastructure that largely self-replicates rather rapidly.

Call for such self-replicating CDR tech, call for self-replicating C storage infrastructure, call out for sites that avoid the bulk of societal, policy, and environmental issues as top MRV+ values even though the technology is still young. One can not achieve what one can not imagine in detail.

----

## ***B. Monitoring and Reporting:***

### ***1. What timeframes and related procedures should be specified for these elements referred to in A6.4-SB003-A03?***

An idealized MRV+ governed and engineered for marine CDR operation would have overlapping reporting time frames. In that, real-time ship-to-shore communications can be made available for 24/7 data exchange to monitor virtually every operational aspect, and a wide range of on-going environmental data streams.

#### ***a. For initial monitoring and submission of monitoring reports (paragraph 3.2.14);***

Nation states, NGOs, and/or individuals can volunteer to follow what the NOAA mCDR team recommends now and in the future. That team is currently building standards and providing guidance for early stage field testing of most all mCDR tech proposals.

***(a) For subsequent monitoring and submission of monitoring reports (paragraph 3.2.14);***

The London Convention/Protocol, The International Seabed Authority, the reinsurance market, even the International Maritime Organization can have reports as requested. The above level of actors would be the only initial 'governance structure' for oceanic desert mCDR operation beyond UNFCCC sanctioned work. What is proposed here at the technical level can comply with all currently known technical restrictions concerning any vast scale oceanic desert mCDR operation. It's not as much a technical issue at that level as it is a management quality level concern. The use of a NOAA/USDA approved MRV+ value scale by UNFCCC, can likely be approved by the other parties.

***(b) For monitoring and submission of monitoring reports following an observed event that could potentially lead to a reversal (paragraph 3.2.14);***

Operational failures would be widely publicized and evaluated at length. Compensation for reversals can be deducted from other mCDR services, separate MRV+ accounts. A 'basket' of mCDR technologies can keep separate MRV+ accounts, and likely would need to do so to avoid double counting or under counting.

***(c) For monitoring and reporting, including any simplified reporting, conducted after the end of the last crediting period of activities involving removals (paragraphs 3.1.10 and 3.2.13).***

***2. Discuss any further considerations to be given to the core elements for monitoring and reporting in A6.4-SB003-A03; where possible, identifying the applicable scope, i.e., relevance to all 6.4 mechanism activities, to removals activities, or to specific removal activity categories or types.***

The rather recent flush of intellectual property claims in the CDR field can possibly block, to some degree, advancements in field operations. The IP management will always require accurate 'production' records as a defense against fraud claims and/or to properly pay for negotiated rights, services, and goods.

***C. Accounting for removals:***

***1. Discuss any further considerations to be given to the core elements for accounting for removals in A6.4-SB003-A03; where possible, identifying their applicable scope, i.e., relevance to all 6.4 mechanism activities, to removals activities, or to specific removal***

***activity categories or types.***

A vast scale multi mCDR tech platform will likely go through continuous changes to removal, storage, and usage tech and their operating practices. If such, the MRV+ value scale can help multidisciplinary teams stay focused on leading edge developments while routine maintenance and adjustment are managed.

***2. For activities involving removals that also result in emissions reductions, what are the relevant considerations, elements, and interactions between this guidance and the requirements for the development and assessment of mechanism methodologies, including.***

Offshore multi mCDR tech platforms likely will have robust water, energy, and nutrient nexus production capabilities as some mCDR technologies offer a wide range of coproducts. Renewable fuel production is a priority yet so is food/feed/fertilizer etc.

***D. Crediting period:***

***Discuss any further considerations to be given to the core elements for crediting periods in A6.4-***

***SB003-A03; where possible, identifying the applicable scope, i.e., relevance to all 6.4 mechanism activities, to removals activities, or to specific removal activity categories or types.***

A quarterly report covering all operational data can be published in multiple formats. Gaining and maintaining public confidence requires data transparency.

***E. Addressing Reversals:***

***In order to minimize the risk of non-permanence of removals over multiple NDC implementation periods, and, where reversals occur, ensure that these are addressed in full.***

A dynamic MRV+ valuation scale can reflect failures or reversals found in any one mCDR tech within a large basket of other mCDR techs, trigger the publishing of an explanation of the event involving that one tech, while maintaining the other mCDR operations. Production security is found in using multiple mutually supporting mCDR technologies, no one tech failure should trigger a whole systems operational failure.

***1. Discuss the applicability and implementation aspects of these approaches, including as stand-alone measures or in combination, and any interactions with other elements of this guidance:***

From a US citizen's perspective, I propose working closely with the NOAA mCDR team, and a team from CDR relevant USDA offices, and field trial self-replicating marine cultivation/processing infrastructures, self-replicating C sinks, provide MRV+ value updates, etc.

Both teams will set 'best practice' standards, and both teams can accelerate evaluation of any proposed tech changes in the future. Other actors will likely be interested.

***a. Non-permanence risk buffer (pooled or activity-specific);***

***b. Insurance / guarantees for replacement of ERs where reversals occur (commercial, sovereign, other);***

The use of multi mCDR tech platforms helps reduce gross CDR production related value fluctuations if one or more individual CDR techs becomes obsolete, is under a temporary stand-down order, etc. Future proofing investments in a rapidly changing tech field is a significant institutional investor's long-term concern, a well planned and advertised STEM evolution can help avoid market crashes linked to non functioning mCDR tech.

***c. Other measures for addressing reversals in full.***

Multiple use mCDR tech platforms should and can offer large amounts of general commodity storage at low long-term costs. Storage revenues can be counted against CDR operational costs, at some practical levels, to provide a form of operational cost insurance pool.

***2. Discuss the appropriate time frame(s) for applying the approaches, including any interactions with other elements of this guidance and the applicable scope, i.e., relevance to all 6.4 mechanism activities, to removals activities, or to specific removal activity categories or types.***

Cost of Confinement:

Surprisingly, deployment of a largely self-replicating marine infrastructure requires no significant engineering R&D beyond current developments. The use of High Density Polyethylene, in bioplastic form, allows for self-replication at the basic materials level. Preparations for deployment may start today.

***3. What risks of non-permanence need to be minimized, and how can these risks identified, assessed, and minimized?***

Robust data capture, use, and dissemination is a basic MRV technical need. Offshore mCDR centers can provide data capture points for a wide range of sensors.

***4. In respect of risk assessment, how should the following elements be considered in the implementation of the approaches in (a) and any other relevant elements in this guidance?***

***a. Level of non-permanence risk assessment, e.g., activity- or mechanism-level***

The more comprehensive that the production data stream becomes, the more comprehensive the response performance can be. Machine learning is an active CDR support discussion.

***b. Timing for risk assessment(s)***

Getting an approval from the NOAA mCDR team and the USDA CDR team for a mCDR 'new farmer' tech starter loan program would require such a detailed review as to make any deep risk assessment highly speculative until that level of approval is gained. All risk assessment questions asked in this UNFCCC forum will likely be considered by both teams in their own terms.

***c. Entity(ies) responsible for risk assessment(s), e.g., activity proponent, 6.4SB, actuary***

Creating two new legal entities, an mCDR STEM, policy, and socioeconomic studies focused non-profit organization, and a mCDR mission statement driven for-profit Social Purpose corporate group, might help define legal responsibility structures between study and practice. If both new entities have largely identical mission statements, and a UNFCCC supported MRV+ measuring scale is used, the CDR MRV+ value/rate of change should be reliable for most parties.

***5. How should the following elements be considered in the implementation of the approaches in (1) above and any other relevant elements in this guidance?***

***a. Methods for determining the level of buffer pool contributions***

***b. Composition of buffer pool, including in relation to ER vintages and contributing activity types or categories***

***c. Intentional and unintentional reversals***

***d. Treatment of uncanceled buffer ERs, including after the end of the last crediting period of the contributing activity***

***e. Specifications for ERs that cancelled for compensate for reversals, including in relation to ER vintages and contributing activity types or categories***

***f. Replenishment in case buffer cancellations exceed contributions; slide language on re-raising baseline level of storage before new crediting***

***6. In the event of a reversal, what interactions and implementation aspects should be considered in respect of other elements of the activity cycle?***

***F. Avoidance of Leakage:***

***Discuss any further considerations to be given to the core elements for leakage avoidance in***

***A6.4-SB003-A03; where possible, identifying the applicable scope, i.e., relevance to all 6.4***

***mechanism activities, to removals activities, or to specific removal activity categories or types.***

The higher the level of physical confinement, the more control one will have over leakage.

***G. Avoidance of other negative environmental, social impacts***

***Discuss considerations to be given to core elements for avoidance of other negative environmental, social impacts; where possible, identifying the applicable scope, i.e., relevance to***

***all 6.4 mechanism activities, to removals activities, or to specific removal activity categories or types.***

Avoidance of socioeconomic and policy complexities is recognized as a strategic necessity, oceanic desert-based multiplexed mCDR STEM, policy, and socioeconomic investments, under UNFCCC standards, standards shared by other ocean-centric actors, can create a global mCDR-based C credit value system, or UNFCCC MRV+ value scale.

Thank you for this public comment opportunity.

Best regards  
Michael Hayes  
Hayes Limnology Lab  
360 503 3711