July 31st, 2023

Further Input – Removal Activities Under the Article 6.4 Mechanism

Dear Article 6.4 Supervisory Body,

We greatly appreciate the request for additional input regarding removal activities under the Article 6.4 mechanism. We are grateful for the opportunity to provide a carbon dioxide removal project developer's perspective.

1PointFive is an integrated Carbon Capture, Utilization and Sequestration (CCUS) platform that is working to help curb global temperature rise to 1.5°C by 2050 through the deployment of decarbonization solutions, including Carbon Engineering's (CE) Direct Air Capture (DAC) and AIR TO FUELS™ technologies alongside geologic sequestration hubs. 1PointFive is a wholly-owned subsidiary of Occidental (Oxy). More at 1PointFive.com (https://www.1pointfive.com/).

1PointFive is currently building the world's largest DAC facility. The project will be the first commercialization of CE's DAC technology and will be located in Ector County, Texas. This first of a kind (FOAK) 1PF DAC project, STRATOS, is designed to annually capture up to an initial 500,000 metric tonnes of carbon dioxide (CO_2) from the atmosphere and will have the capability to scale up to 1,000,000 metric tonnes. 1PointFive's parent company and sequestration partner, Oxy, currently stores up to 20 million metric tonnes of CO_2 annually in secure geologic reservoirs as part of its operations in the Permian Basin while providing robust and transparent measurement of the sequestered carbon. Oxy has an unparalleled 50 years of experience with integrated carbon management and large-scale carbon separation.

Oxy has received U.S. EPA approval of three secure geologic sequestration Monitoring, Reporting and Verification (MRV) plans for its sequestration operations in the Permian Basin. Two of these plans were the first-ever approved MRV plans by the EPA for simultaneous CO_2 - EOR operation and sequestration. The MRV plan approval process provides a credible and transparent framework for assessing the suitability of underground formations for safe and highly durable geologic sequestration and for reporting the amount of CO_2 sequestered.

Drawing from this experience and expertise in geologic carbon storage, we emphasize the importance of including a durability metric when it comes to carbon removal solutions.

We advocate for a robust framework for Measurement/Monitoring, Reporting, and Verification (MRV) throughout the carbon removal lifecycle. While still being field tested, embracing digital MRV systems would enhance data collection, improve data management, and lead to more timely, efficient, reliable, and cost-effective CDR verification.

In support of facilitating insurance and compensation for reversals, we acknowledge the use of the historical buffer pool mechanism. Additionally, we propose innovation through the separation of risk management duties, involving various risk actors, such as insurers/reinsurers, actuaries,

and rating agencies. By implementing an effective risk framework, we can foster the growth of durable carbon removal initiatives on a significant scale. By increasing the carbon yield of a project through risk innovations, more projects can be developed at scale and with more rigorous risk management via third party innovations in loss history, modeling, risk diversification pooling, capital participation, and regulatory development.

Thus, we welcome the introduction of independent insurers/reinsurers, auditors, raters, technology innovators, and government regulatory bodies to manage the risk of reversal resulting from carbon removal activities. Transitioning away from traditional buffer pool approaches would offer several benefits, including more effective risk management, incentives for innovation, and improved overall governance of risks associated with larger trillion-dollar risk markets. This is a natural evolution from today's smaller $2-3bn VCM market to a more mature risk ecosystem similar to those found in P&C (property and casualty) risk, credit risk and other large asset categories.

As part of this consultation, we provide specific answers to relevant questions, offering our perspectives and insights to contribute to policy development. We are enthusiastic about engaging in further discussions with the UNFCCC directly to support and advance the global efforts toward sustainable carbon removal solutions.

For inquiries on behalf of 1PointFive, a research and innovation company, please contact shannon.gray@1pointfive.com

	Our Response
2.1. Monitoring and reporting	
5. Should the activity proponent be required to periodically update its monitoring plan every five years and/or at the end of the crediting period?	Yes, periodic updates should be required for removals. The time period should reflect both the type of removal project/monitoring required and be dependent upon the volatility of the monitored environment. For example, a geologic reservoir has a different level of change / risk compared to carbon being stored in carbon products or an ocean with an open monitoring environment. There should also be a mandatory review period during a change of project ownership (physical or legal) to ensure continuity of monitoring and reporting for the project. Regular updates to monitoring plans are essential to incorporate improvements in MRV methods and account for changes over a project's lifetime. We recommend requiring updates at least every 5 years, and at the conclusion of each crediting period. More frequent updates should be encouraged if feasible, especially given the pace of advancement in monitoring technologies. Ideally the frequency of monitoring should scale relative to the size of the project. A scaling principle linked to frequency of reporting is in line with basic risk principles. Smaller facilities with infrequent monitoring can be subject to random sampling in line with standard ISO quality sampling practices. This reduces monitoring burdens on smaller projects while maintaining environmental integrity and effectiveness.
6. Should monitoring reports be submitted within the first [2] [5] [X] years of activity implementation? After the first report, at least once every [2] [5] [X] years?	Annual or in sync with the issuance frequency. The time constant and ability to verify and issue credits will be the rate limiting step for these time periods. The key is to issue credits at the rate which maintains the environmental integrity of the removals. See prior answer.

	Our Response
7. Do the “reversal notification” reports referred to in SB 003 recommendations involve, e.g. digital notification of an observed event that could lead to a possible reversal of removals; submission of notification within [90] [120] [X] days of the observation; follow-up submission of a full monitoring report within [6 months] [1 year] [X timeframe]?	The reversal notification reports should require digital notification of an observed event that could lead to a possible reversal of removals where possible. Project developers should be required to submit notification of a reversal to the Supervisory Body (or appointed body) within 30 days of a reversal being known. A follow-up submission of a full monitoring report should be submitted by the project developer within 6 months where a significant reversal event occurred. Significant may be defined as 20% of the total project area or a greater than 2% fugitive (unplanned) reversal. Alternatively, to obtain increased accuracy on a project-specific basis, significant may be defined as two standard deviations of the average delivery performance for each methodology. We recognize this might be complex from an execution perspective, which is where the 20% across the board provides an option. The tradeoff is simplicity for accuracy. For reversals less than significant, project developers may continue to follow their existing monitoring reporting schedule. Prompt notification of potential reversals is critical but defining "significant" events will require further consideration to balance accuracy and simplicity. We suggest: - Initial digital notification within 30 days of a detected reversal - Follow up with a full report within 1 year for reversals exceeding a threshold such as 20% loss or 2 standard deviations from project baseline. Allow flexibility in requirements based on project type and reversal magnitude.

	Our Response
8. To ensure and demonstrate the continued existence of removals, are activity proponents required to undertake monitoring and address reversals:	Long-term monitoring is essential to ensure durability of removals, but responsibilities will need to transfer to capable entities as projects conclude. We recommend: - Minimum 15 years of monitoring post-crediting and or performative expectations. Likely provided by a public entity or trust with a likely economic lifetime going beyond the specific project or its developers. - Longer timeframes where national regulations are lacking. - Development of mechanisms for oversight to continue beyond the initial monitoring period (e.g., government bodies, funds). - Flexibility in requirements based on removal risk and durability factors. - Standards and methodologies should account for extended time frames in project design and pricing.
(a) Only during active crediting period(s) or	No.
(b) Also [15] [X] years after the last active crediting period?	See above.
(c) The longer of [9(a)] [9(b)] or a timeframe specified by the host Party (e.g. communicated in LoA or earlier)	The active monitoring period for a removal project should depend on 1) the type of removal project, 2) the declared environmental effective duration of the project activity, 3) the reversal risk, and 4) the standard of proof required to close the monitoring period. These should be in line with standard risk management practices found in other long term environmental exposure environments and scaled relative to the size of the project C@R (carbon at risk). For smaller projects, random statistical audits analogous to quality sampling should be used to ensure compliance while balancing cost effectiveness. The timeframe required to monitor long term storage projects, such as geologic carbon storage, can often outlast the companies/proponents that create them. A more suitable approach could be a shared liability framework between the local governments and the project proponent.

	Our Response
9. Is simplified annual reporting required to ensure and demonstrate the continued existence of removals? In what cases and how long?	We support an annual reporting requirement for maintaining the continued performance of removals. The frequency of reporting does not dictate if the removal exists; rather, the frequency of reporting informs the performance of the removals project and provides the necessary transparency to allow these types of markets to function. Not necessarily. If a project is already submitting monitoring reports annually or even biennial, simplified reporting may be redundant. If a project is doing monitoring reports every three to five years for a nature-based solution, then simplified reporting may be cumbersome due to the remote nature of some of these projects (ex. most ARR). However, as it specifically relates to nature-based projects, advancements in dMRV may prove extremely beneficial for facilitating simplified annual reporting. As dMRV options become more readily available, they can be the basis for requiring simplified annual reporting. Simplified annual reporting provides ongoing assurance of sustained removals, particularly for less frequently monitored projects. Remote monitoring technologies should be leveraged where possible to minimize burdens.
10. Are measures required to address the residual risk of reversals beyond the monitoring timeframe? If so, for how long, and what are the options for, e.g. the mechanism(s), responsible entity(ies), oversight?	If the monitoring time frame reflects the represented risk profile/duration of the credit, then this is acceptable. Exceptions can be made for highly regulated projects, such as geologic carbon storage projects, in jurisdictions with relevant experience and mandatory requirements for managing residual project risk post closure. However, for less regulated project types, after the monitoring time frame, only residual reports required for health and safety should be expected. Yes, mechanisms should be established to manage reversal risks beyond initial monitoring periods. Options include national regulations, liability funds overseen by the Supervisory Body or other groups, and transfer of oversight responsibilities to recognized and capable entities.

	Our Response
11. What type of risk rating is used to calculate an activity's buffer contributions?	We first note the term "buffer" doesn't necessarily need to be applied to removal activities. Buffers are of course a commonly used risk management tool in the carbon markets, but there are other risk management tools – such as insurance – that could replace and/or work in collaboration with buffer entities. As we consider new forms of risk management for removal activities, we encourage thinking more broadly when defining effective risk mitigation measures. Risk-based buffer contributions should be calculated using detailed assessments tailored to each activity's characteristics and reversal factors. Standardized approaches may have a role in simplified frameworks but reduce accuracy. Beyond buffers, a range of risk mitigation options should be considered such as insurance to provide financial resilience while encouraging quality through market incentives.
(a) The results of an individual activity's risk assessment;	These should be rated by a regulatory body established to review and acknowledge recognized risk raters analogous to the OCR recognized credit raters found in the US. https://www.investopedia.com/terms/b/bond-rating-agencies.asp These rating agencies use agreed statistical approaches to risk yet have the latitude to interpret data within some qualitative bounds. This allows for innovation and divergence of opinion while limiting ratings to "recognized authorities".
(b) A standard rate determined by the 6.4SB;	See earlier comments. Risk of a certain rating can be made risk equivalent using insurance products, back stops or other mechanisms for fungible equivalence to the compliance delivery standard that may be proscribed. Fungible equivalence means environmental effect in GWP year terms that is equivalent on a duration of effect, likelihood of outcome and impact expected.

	Our Response
(c) Either measure could be appropriate, depending on the circumstances (in this case, what factors should determine the use of an activity-specific or standard risk rating)?	Best practice should be used whenever possible. It is important to acknowledge that removals as a new technology evolving over many domains will constantly be facing new loss history data (reversal data) and scientific research on performance. As such, it is vital that the regulatory statutes are not overly prescriptive but may be petitioned for revisiting and review by stakeholders to assure the most accurate assessments of the risks involved, innovations for managing those risks and changes in the actors, technologies and roles that may evolve to manage those risks.
12. What are the options for circumstances/triggers and/or periodic milestones for reviewing and possibly updating activity baselines, risk assessments (so, risk ratings), and monitoring plans, including in relation to:	There are three options that can be implemented alone or in cooperation. We recommend implementing all three options. 1. A fixed schedule of reporting points linked to the methodology / lifecycle with mandatory quantitative and qualitative data verified by a third party (or at least some fraction is verified). 2. Dynamic reporting linked to a risk metric or loss above a threshold that has a mandatory reporting period. 3. The project publishes mandatory details on the activity (project areas, planned activity, loss locations etc.) sufficient such that third parties can offer digital MRV services that can be paid for by buyers or later made public. Reviews of baselines, risks, and monitoring should occur on fixed schedules and in response to trigger events like: - Start of crediting period - Verified reversals - Milestones per methodology - Changes in ownership or project parameters Advance public reporting and dMRV can also strengthen oversight.
(a) Verified reversals of removals; and	Material thresholds for reversals in excess of statistically expected variance should force an event of report. Most likely a 2 standard deviation variance should trigger a report and re-assessment of the project.

	Our Response
(b) The stages of activity cycle implementation?	Risk is unlikely to be a linear temporal function. Project types likely vary in terms of risk profile. It is important that regulation acknowledges the need to adapt risk profiling and monitoring to be in line with different types of projects and the ongoing discovery of changes to the temporal risk horizons. As new technologies, monitoring, and understandings emerge, more accurate risk weightings over the lifetime of a project may be assigned.
13. On what basis could requirements provide for the use of simplified/standardized elements or mandate the use of more frequent, full, or activity-specific elements and what are the requirements that may be relevant? (a) Activity type or category; (b) Risk rating level (e.g. above versus below a given %-based threshold); (c) Risk assessment contents (e.g. nature, number, variety of risk factors); (d) Monitoring plan (e.g. complexity, frequency, responsible entity).	Simplified reporting is by definition a “fit for purpose” application. Situations involving low-risk, low-frequency monitoring based on robust evidence or literature likely require simplified reporting. A principles-based approach to reporting requirements should be sought at all times where the burden of reporting in terms of frequency, cost, and complexity is in line with the scale and magnitude of the risk presented. Small risk, light reporting. Large risk, heavy reporting. It is important that risk be weighted proportionally to the 3 dimensions in which risk exists: 1. Duration of exposure 2. Likelihood of event (failure/reversal etc.) 3. Magnitude of event (scale of failure) These 3 dimensions of risk allow for quantifying and normalizing environmental risks across projects and domains. While not a perfect form of equivalence, risk could be managed in portfolios of exposure using such an approach. Quantitative risk factor-based frameworks will be required for the multi-trillion-dollar carbon removal market of the future. Example 2040 5gt/yr x $100/ton= $500bn. With likely 30-40 GT cumulatively removed beforehand representing trillions of C@R.

	Our Response
14. Should procedures take the same or different approaches to instances of reversals that are	As the majority of reversal risks are at the project level, it is important that activity proponents are incentivized to manage and minimize risks as they are best placed to do so. Intentional and unintentional reversals should definitely be treated differently. Where there is an intentional reversal, the activity proponent must be required to rectify the situation. This may entail retiring some of their own credits, providing money directly to the Supervisory Body (or other appointed body), buying credits from another project with similar characteristics, or suffering some other form of penalty as outlined in their contractual agreements. Combining insurance with a buffer pool is the optimal way to manage unintentional reversal risk for activity proponents while providing a guarantee for credit buyers.
(a) intentional/planned versus	See above
(b) unintentional / unplanned?	See above
(a) How/would other tools to address reversals involving direct credit replacement (including use of insurance / guarantees) be used in combination with a buffer pool?	We recommend reviewing Kita's proposals submitted to this body on mixed insurance and buffer pool approaches. This approach could be 0-100% of both approaches and involve a mix of public/private sector actors to manage the extreme durations such as 100 years associated with the environmental effects being purchased and expected.
Questions for structured call for inputs on recommendations for activities involving removals 3 of 3 2.2.2. Reversal risk tools—General: Buffer pools, direct credit replacement, insurance/guarantees	

	Our Response
15. Regarding reversal risk buffer pools, direct credit replacement, and insurance / guarantees:	Please refer to our responses in Q11 and Q14 which discuss how insurance can play a role as a reversal risk tool. We focus our response below on insurance specifically, given the nature of Kita's role within the insurance market. (a) Current practice: within the wider voluntary carbon market, current practice is linked to buffer pool contributions, either on a flat or risk adjusted basis, with that risk managed by issuer bodies. While some Carbon Standards, e.g. Climate Action Reserve and American Carbon Registry, already allow third-party insurance for project developers to enable lower 'premium' payments into the buffer pool, insurance is not yet a commonly proposed tool. This historically useful approach to risk has crowded out the innovation space for traditional risk management to emerge leading to little incentive for insurance companies to develop insurance products, dMRV specific to this space, and as such there is little insurance currently available. It is important to recognize that an evolved regulatory environment can enable global best risk practices to be applied to carbon risk management with significant outcomes for safer, better carbon risk management. If of interest, please see further details on how insurance interlinks with existing VCM buffers from Kita's UNFCCC submission. (b) How insurance could become required or supplemental: Current practice relies heavily on buffers, limiting innovation in risk management. Insurance brings expertise, data analytics, financial resilience and incentive alignment that could strengthen the system. We recommend: - Allowing flexible, risk-based use of buffers, insurance, guarantees and other mechanisms of risk transfer, diversification, management, monitoring, and governance. - Developing clear guidance on supplemental and mandatory use cases - Ensuring reversals are fully addressed but encouraging diverse protection mechanisms.

(a) What is the current practice with these reversal risk tools, including the extent and nature of their use (respectively and in combination), transaction costs and how these are financed, and potential roles of the Host Party in multi-decadal compensation requirements;	Current risk reversal tools (buffer pools) reflect legacy rather than best practice. Here is an outline of potential risk management approaches for carbon removals drawing on examples from insurance and credit markets: I. Risk retention Self-insurance by project developers through withholding credits as a buffer Retention pools funded by fees on credit issuance managed by an industry remote regulatory body or recognized re-insurer type entities. Example: catastrophe reserves held by insurance companies to cover large losses II. Risk transfer A. Private solutions Insurance policies for specific perils like reversals Insurance wraps for entire projects or portfolios Securitization and credit risk transfer products (CDOs, CDS) Example: mortgage insurance transfers risk from banks to insurers B. Public-private solutions Public backstops and reinsurance for private market Risk pools with blended public-private capital Public loans or guarantees for higher risk projects Examples: Flood insurance, deposit insurance III. Risk modeling and quantification Collect data and build models to enable risk-based pricing Apply lessons from insured loss models in property insurance Develop open-source models and data repositories Examples: catastrophe models, credit scoring systems IV. Prevention and resilience Improved measurement and monitoring technologies Design buffers and portfolios for diversification

	Our Response
	Engineer reversal resistance into projects Examples: Building codes, credit risk modeling V. Governance and oversight Set standards for buffer, insurance, disclosures Require stress testing and public reporting Audits and reviews of reversal response plans Example: Financial regulations like Basel III VI. Incentive alignment Return unused buffers to incentivize performance Lower contributions for projects reducing reversal risks Example: Insurance premium discounts for risk mitigation
(b) The circumstances under which the use of a given tool may be required or supplemental—for example, for intentional versus unintentional reversals, or during versus beyond the last active crediting period—and rationales. 2.2.3. Reversal risk tools: Specific	Every removal has unique characteristics associated with the expected v. unexpected rates of reversal. The important task is to address and declare both of these risks using robust methods, including the: 1. Nature of the reversal scale duration etc. for ongoing. Nature of a failure for fugitive (unpredictable) reversal. 2. Scale of the reversal. 2 Stdev range of the potential event. 3. Duration with which the declaration is provided and supported. Quantified Risk has 3 dimensions. Likelihood, duration, and impact. This allows for treatment of risks and instruments using “factors” relative to the expected environmental effect of the carbon.

	Our Response
16. What are options for robust buffer pool design, including conditions and procedures for its use, ER composition, replenishment, and administration.	Buffer pools are one of many risk management mechanisms. Insurance, using other instruments accordingly. We strongly suggest studying other means of measuring and transferring risk among actors, including insurance, back-stops, performance guarantees and other approaches which would allow for innovation and the development of risk management and transfer mechanisms in a more robust way. Buffer pools are a “more of the same " approach to risk which may actually increase risk concentration whereas allowing the offtaker to bundle or aggregate assets with risk characteristics that meet a statistically expected environmental performance and portfolio effect due to managed correlation exposure may be a better means of managing risk. 10 tons with an insurance policy using 10 diversified tons on call with a 1% likelihood of failure diversifies project activities, drives innovation, and enables diversification of exposures. Buffer pools play an important role but have limitations. Other mechanisms like insurance should be explored to enable innovation in risk modeling, diversification, incentives, and financial resilience. Bundled buffered-insured portfolios could provide comprehensive coverage efficiently.
17. The need for additional procedures and guidance for the 6.4SB, PPs, insurers/ guarantors to implement options for direct ER replacement, including for insurance or guarantees.	Yes, there is a need subject to innovative solutions required to solve these problems. Markets that need to scale to the multi-trillions of dollars will need solutions that can work at the multi-trillion-dollar level.

	Our Response
18. Are uncancelled ERs in the buffer pool returned to the activity proponent to incentivize performance and/or automatically canceled, and is this done periodically throughout the activity cycle or only after the end of the activity lifecycle or the host Party NDC timeframe?	The idea of returning the uncancelled ERs to the activity proponent or a contracted designee is attractive to incentivize good performance and active monitoring. This could be done mid-lifecycle if good risk management is evident, at the end of the activity lifecycle (including any post-monitoring requirements), or in line with the host party NDC timeframe. However, if this timeframe is too long and markets trend towards a newer vintage preference, the activity proponent might not wish to receive unused Emissions Reductions. If that is the case, maybe a cash payment could be provided back to the activity proponent instead and the remaining ERs canceled. Returning unused buffer credits to proponents incentivizes performance and risk reduction. This should occur periodically when risk levels remain stable or decline. Alternatives like cash payments should be considered if vintage preferences limit credit viability.
19. Whether the options for treatment and timing are mutually exclusive or could be applied in combination (e.g. returning some but not all ERs to proponents).	Recommend approaching this problem from a higher-level perspective: the risks and risk management of either buffer or insurance should be matched as efficiently as possible following the principles from accounting that match insurance to assets. This approach may be too prescriptive to support innovation; however, broad principles such as matching risks duration, nature, and likelihood to instrument or approach should be pursued.
20. Possible basis for periodically returning ERs to proponents (e.g. metrics for activity performance, activity cycle milestones).	Two issues are being conflated here - the scientific principle for quantifying the risk and the third-party review/governance board. This is the entire reason the insurance industry is regulated and separate from the assets they register.

	Our Response
21. Procedures for the SB's periodic review and ongoing management of buffer contributions (e.g. buffer composition, stress-testing the sufficiency of risk coverage).	Proper operation of buffers, with or without insurance, is critical to maintaining scheme integrity. We recommend that buffers should report their coverage levels publicly at least once a year. Along with procedures for buffer contributions, required time frames and any significant losses should all be documented. Furthermore, we recommend that risk-reporting standards and best practices from the asset management industry are adopted. For example, limiting and reporting on buffer concentration risks within single projects or regions and systematic risks, such as natural catastrophe risks, climate change or political risks. Once the buffer constituents and risk exposure are reported, stress testing under different loss scenarios transparently demonstrates the robustness of the buffer. Regular public reporting on buffer coverage, risks, and stress testing results following asset management industry best practices will ensure transparency and integrity. Adopting risk quantification and modeling standards from insurance can further strengthen oversight.