SUMMARY OF COMMENTS & RESPONSES ON THE DRAFT FOREST PROJECT REPORTING PROTOCOL

Wood Products

7 sets of comments were received on the Wood Products guidance in the Draft Forest Project Reporting Protocol, Version 3.0. Staff from the California Climate Action Registry (CCAR) and the forest protocol workgroup worked together to respond to these comments.

The comment letters can be viewed in their entirety on CCAR's website at www.climateregistry.org/tools/protocols/project-protocols/forests.html

Comments received by:

1. American Forest & Paper Association (AF&PA)
2. California Biomass Energy Alliance (CBEA)
3. Equator LLC (Equator)
4. Solid Waste Industry for Climate Solutions (SWICS)
5. The Pacific Forest Trust (PFT)
6. Terry Collins (T.Collins)
7. The Wilderness Society (WS)

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General Comments

1. The current draft of the CCAR wood products guidance allows only a small fraction of the value of the carbon stored in wood products to be credited. CCAR, by not valuing this carbon, is making a subjective (and inappropriate) decision that wood products carbon is less valuable. CCAR undervalues wood product carbon by:
    1. Not recognizing that for sustainably managed forests, by definition, the renewable supply of annually harvested material is always additional.
    2. Not calculating carbon stored in wood products relative to CO_2 decay rates in the atmosphere, thus undervaluing their effectiveness as an offset to emitted carbon by a factor of two.
    3. Not crediting carbon stored in landfills (e.g., landfills equipped with methane capture and use systems).
    4. Requiring that creditable wood products come from project lands.

    The net effect will be that by design, little, if any, forest product carbon will be credited under the CCAR program. **(AF&PA)**

    RESPONSE: Noted.

    1. **A renewable supply of harvested material is additional to the extent that it exceeds baseline carbon and meets the complete set of rules in the protocols.**
    2. **The fact that approximately 50% of the emitted CO_2 is cycled back to terrestrial ecosystems within 100 years is what enables the protocols to make a reasonable claim of permanence at 100 years. The additional 50% of the carbon that has not cycled back continues to persist in the atmosphere for longer periods of time.**
    3. **The work group based crediting decisions on the carbon in use over 100-years and not the estimated carbon will go to a landfill after 100 years.. While some reasonable evidence exists concerning current landfill rates for wood products carbon, future rates are expected to vary and projected alternative uses (biomass, composting, etc.) will have different accounting dynamics altogether. For this reason, landfill carbon will not be credited.**
    4. **A GHG project is a discreet activity that demonstrates climate benefits relative to a business as usual scenario. The net increase in carbon in harvested wood products caused by a project is the only basis on which credit can be given.**

2. Equator believes that including the carbon stored in wood products is crucial to both the atmospheric and financial integrity of any future carbon offsets market, however we feel that addressing the following issues would improve the application of the wood products protocol:
    - Expansion of the guidelines for accounting for mill inefficiencies
    - Addition of a plan to acknowledge the reported landfill stores of wood
    - Elimination of the financial analysis requirement **(Equator)**

    RESPONSE: Noted.

    The final draft will provide language for accounting for mill inefficiencies.

    Accounting for landfill carbon is conducted for thoroughness but is ignored in determining net sequestration for the purpose of issuing CRTs. Although data exists

from the U.S Department of Energy 1605(b) about the quantity of carbon from wood products that goes to landfills, there is still too much uncertainty about future trends and the sequestration rates for other options such as composite wood products and composting/mulching.

The financial analysis requirement is associated with baseline determination for Improved Forest Management Projects. It is important that the baseline meet an economic feasibility test to ensure that the baseline characterization is reasonable and credited reductions are not overstated.

3. Given [all the] circumstances, we believe the approach reflected in this new guidance is a reasonable one. We look forward to continuing our participation in the workgroup and with the stakeholders to craft a final revised forest project protocol for consideration by CCAR. **(PFT)**

RESPONSE: Noted

4. The draft language on Harvested Wood Products Guidance proposed for inclusion in the Draft Forest Project Protocol registered by the California Climate Action Registry will overestimate the benefits of carbon stored in wood products due to several data gaps and unfounded assumptions. **(WS)**

RESPONSE:

The work group believes that the data used to make the decision for crediting wood products is reasonable and balanced. The work group also believes that the accounting of wood products is essential for accurate and conservative accounting.

5. SWICS strongly requests that clarifying language be added to the Forest Protocol to indicate that benefits or credits from the disposal, recycling, composting or energy recovery from forest products, or from waste and materials generated by the Forest Project but managed offsite and outside the operational control of the Forest Project, are not incorporated or otherwise embedded into the protocol. [Please see SWICS formal public comment submission for more detail.] **(SWICS)**

RESPONSE: Noted. The key rationale in accounting for harvested carbon is to accurately and conservatively determine the impacts of changes to management activities. To accomplish this, the Project Developer must account for 'permanent' harvested carbon in both baseline and project activity. This accounting includes a life cycle analysis that estimates the carbon that sequestered in the standing live forest or the harvested forest product as long as the carbon stays sequestered for the100 year period. The life cycle accounting, will not credit the estimated carbon sequestered in landfills due to the reasons pointed out in the response to Public Comments #1 and #2.

Benefits of Wood Carbon

6. The climate benefits of sustainably managed forests, when coupled with timber production, provide several positive carbon benefits that are quite significant. These include:

Carbon storage in wood products:
• Approximately one-third of the carbon in wood harvested for the industry ends up in long-lived products such as lumber and wood-based panels, and is sequestered in some cases for decades, even centuries. Even paper products in controlled landfills (which dominate existing disposal paths) provide 10 to 100 year storage prior to use for heat value. EPA is working towards meaningful quantification techniques for this benefit.
• *Long term storage of carbon in such products is internationally recognized by climate scientists and policymakers, including the recently released guidelines by the Intergovernmental Panel on Climate Change.*
• The U.S. government estimates that the amount of carbon stored in forest products is equivalent to removing over 100 million tons of carbon dioxide from the atmosphere every year. This is equivalent to eliminating the carbon dioxide emissions from 18 million passenger cars - 13% of all passenger cars on the road in the U.S.

Lower Carbon Footprint:
• Wood as a building material requires less energy to extract, process, transport, construct and maintain over time and is a better insulator than other building materials such as cement and steel.
• In addition, harvested wood that is not made into products is used as a carbon neutral substitute for fossil fuels often through co-generation which further amplifies the benefits of using this GHG-neutral fuel. Wood fiber for other uses, such as packaging material, provides many of the same advantages. According to the latest DOE figures, in 2002, 89 percent of electricity generated at paper mills was cogenerated.
• Energy production from biomass from sustainably managed forests is carbon neutral. Biomass, unlike fossil fuels, contains carbon that was only recently removed from the atmosphere and as part of a natural carbon cycle does not affect atmospheric levels of CO_2.
• Moreover, economic returns to active forest management provides substantial positive incentive on landowner decisions about whether to convert forests to non-forest uses and serves to maintain and increase forest carbon pools.

As such forests and forest products provide huge social benefit that should be encouraged (not discouraged) by carbon accounting protocols and policy. This objective is thwarted by the policy decisions made in forming the CCAR protocols and should be corrected.
[Please see all references for this comment in the formal comment submission by AF&PA.]
(AF&PA)

RESPONSE: Noted. Accounting for project-related activities in an FPP project requires high quality data that can be consistently measured, monitored, and verified. In cases where this is not possible, the accounting rules must be conservative in order to avoid overstating the credited reductions of a project. The protocols have followed this philosophy in accounting for sequestered carbon in wood products.

Although studies indicate that wood is a favorable building material from a climate perspective, we are not able to consider substitution effects at this time due to the difficulty in quantifying project-specific impacts.

Combustion of biomass in place of fossil fuels also appears to have climate benefits, but allocating credits from this activity to the forest sector is beyond the scope of the FPP at this time.

Additionality

7. For sustainably managed forests, by definition, the renewable supply of annually harvested material is always additional. On average, sustainably managed forests maintain their level of carbon stocking over time. Harvested material from sustainably managed forests is therefore incremental to existing carbon stocks and a net benefit to the atmosphere. Requiring that wood product harvesting be included in the baseline essentially means that a landowner that harvests its growth increment each year (typical of most commercial forestry operations) would not likely be eligible for any credits for long-lived harvested wood products. **(AF&PA)**

RESPONSE: The FPP requires project activities to be additional to baseline activities. Simply harvesting sustainable quantities of wood products from a sustainable forest base does not meet the test for additionality because there is no change in activity relative to the baseline. For a further explanation of the concept of "additionality" as it relates to carbon offsets, see the response to Comment #155 in the "Summary of Comments & Responses on The Draft Forest Project Reporting Protocol (FPP)."

8. Many current forest products industry practices reduce greenhouse gases. In 2006, AF&PA member pulp and paper mills generated 64 percent of the energy they used from biomass; members' wood products facilities generated 74 percent of their energy from biomass. Currently, our industry is a leader in the use of energy efficient combined heat and power (CHP) systems (29 percent of all U.S. co-generated electricity is produced by pulp and paper mills). The carbon that U.S. forests and forest products currently store each year is enough to offset approximately 10 percent of all U.S. CO_2 emissions. More than half the forestland in the U.S. is privately owned—roughly 424 million acres. Of that, 354 million acres are actively managed for timber. Private landowners in the U.S. plant about 4 million trees each day. EPA estimates that the amount of carbon stored annually in forest products in the U.S. is equivalent to removing more than 100 million tons of CO_2 from the atmosphere every year.

As climate policies often focus on incentivizing additional energy efficiency improvements, use of renewable fuels, or carbon sequestration in forests, they often fail to recognize the benefits of existing business practices that avoid GHG emissions and sequester and store carbon. In effect, this creates disincentives for existing users of renewable energy and owners of forests, distorts markets, and disadvantages those landowners and forest products manufacturers who are leaders now in the use of energy efficient combined heat and power, carbon neutral biomass, and forest and product sequestration. Unintended consequences (i.e., disincentive for responsible carbon mitigation behaviors) occur when policies reward new entrants and disadvantage those that are currently engaged in the desired activity. **(AF&PA)**

RESPONSE: Noted. Strong additionality rules are necessary to ensure the value and environmental integrity of an offset program. This is a key difference between offset programs and policies that seek to broadly subsidize beneficial activitiesPlease see responses Public Comments #6 and #7.

Process 1 – Carbon Harvested and Transferred to Wood Products Pool

9. In Process 1, in the paragraph just above Table A.1., it says "1 metric ton = 2,240 pounds". I believe it should be: "1 metric ton = 2,204 pounds". **(T.Collins)**

   RESPONSE: Agreed. This correction will be made in the final draft.

10. In the second paragraph in Process 1, you refer to Table A.4., and I think you mean Table A.1. **(T.Collins)**

    RESPONSE: Noted. All formatting will be corrected in the final draft.

11. In Process 1, I like the idea of basing carbon in wood products on log scale volume. There's a pretty direct conversion from cubic feet to pounds of dry wood. However, logs are usually sold by the Thousand Board Feet, so there should be some standard conversion factor for converting MBF into Cubic Feet, somewhere in the range of 140-160 cubic feet per MBF. **(T.Collins)**

    RESPONSE: Noted. The work group will consider adding a standard conversion factor converting MBF into Cubic Feet.

12. Process 1 applies specific gravity (green weight basis) to the volume of logs harvested to calculate weight of logs harvested and their carbon content. Mixing very different species into a "miscellaneous" category introduces unnecessary inaccuracy to the estimates – it should be possible to track individual species and apply species-specific density factors.**(WS)**

    RESPONSE: Agreed. Where quality biomass equations exist within the USFS Forest Inventory Assessment (FIA) data base, the Reserve will provide guidance for individual species.

13. In Table A.2. [Table A.6?], I wondered whether industrial lumber, which is generally remanufactured into mouldings, window frames or furniture parts, is lumped in with construction lumber in the category of Softwood Lumber. The larger trees yield a higher percentage of industrial, or shop lumber, which might have a lower recovery of solid wood products than construction lumber. However, the residues from the remanufacturing process probably go into composite wood products much of the time. I don't want to complicate things. I guess I'm fine with the idea that 67.5% of the volume of logs delivered to a sawmill ends up in softwood lumber. **(T.Collins)**

    RESPONSE: Noted. The Reserve will provide data for mill efficiencies from the different assessment areas. Where this cannot be determined, U.S. Department of Energy (DOE) 1605b guidance will apply.

Process 2 – Mill Inefficiencies

14. SWICS supports the retention of this provision and requests that the Forest Protocol be further clarified in the final text to state that no GHG reduction credits are sought in the Forest Protocol that are attributable to the subsequent use of pre-consumer mill wastage. [Please see full comment in the SWICS formal public comment submission.] **(SWICS)**

RESPONSE: Noted. See the response to Public Comment #5. Further clarification of this issue will depend on policy decisions by the California Air Resources Board where emissions boundaries on inter-sectoral transfers are drawn.

15. A.3. [A.5] Process 2. Accounting for mill inefficiencies - The calculation for mill efficiency included in the draft protocol require the use of the Pacific Southwest mill efficiency multiplier regardless of actual geographic location of the mill.

As it is written, the value that is entered into the wood products worksheet is obtained by, "multiplying the carbon tons from Process 1 by 0.675." This multiplier is derived from the 67.5% Pacific Southwest mill efficiency and should only be used for making estimations from these mills. Although the CCAR has stated it will provide mill efficiencies for each assessment area, it is not indicated these regionally specific values will then instead be used as the new multiplier. To address this issue, the value of "0.675" in the sentence above could be replaced with "a multiplier derived for the appropriate regionally specific mill efficiency." **(Equator)**

RESPONSE: Agreed. The language in the final draft will clarify that specific regional mill efficiencies are to be used. The Reserve will provide data for mill efficiencies from the different assessment areas. Where this cannot be determined, U.S. Department of Energy (DOE) 1605b guidance will apply.

16. Process 2 applies mill efficiencies from 1605(b) tables to estimate the mass of wood embodied in finished products. There are several problems with use of these tables for this purpose.

First, any fuelwood included in total harvest volume should be deducted before applying the parameters in Table A.1 of the CCAR HWP draft. Fuelwood will release its carbon content immediately rather than entering the long-lived wood products processing stream.

Second, the 1605(b) tables for the Pacific Southwest apply to softwood only, and do not distinguish between sawlogs and pulp. Parameters from the softwood table should not be applied to any hardwood material harvested. If hardwoods are harvested from an enrolled project, the project will need to provide its own project-specific data on uses rather than applying inappropriate softwood parameters. Processing efficiency is generally lower for hardwoods, particularly when secondary processing losses are included. Separate factors should be developed for sawlogs and smaller diameter material, as less of the smaller material will be processed into long-lived products.

Third, the 1605(b) tables reflect processing losses at the primary mill, but do not fully reflect losses in secondary processing (construction of cabinetry, flooring, or windows and doors, for instance). Secondary losses are assumed at 10% of roundwood volume, but in many cases losses will be much higher.

Finally, 1605(b) tables are based on average values across very large regions, and processing efficiencies and end-product mix will vary widely in particular localities. The draft mentions that CCAR will provide more specific data for assessment areas based on mill surveys. Offset projects wishing to register wood product carbon storage should cover the cost of these supplemental surveys, since the information is required in order for these projects to be credible. An alternative approach would be for projects that harvest timber to periodically sample their own market outlets to provide project-specific data on mill efficiencies and end uses. This process will be less onerous than field sampling of forest carbon pools, and is equally important if project accounting is to reflect actual carbon stores. Inclusion of project-specific

wood processing factors would also provide incentives to reduce wood waste and extend product life for material generated by an offset project property. **(WS)**

RESPONSE: Noted. The FPP treats harvested fuelwood as immediately emitted and fuelwood is not included on the 1605(b) list of materials. While less of the harvested hardwood volume becomes a product, this is offset by the lower rate of decay with hardwood products. The 1605(b) tables include losses due to trimming waste built into the early decay numbers for these products.

On the third point, all projects are required to account for wood products if the project activities or the project baseline include harvesting. In cases where the baseline assumes harvesting at a higher rate than the project activity, failing to account for wood products will lead to significantly over-estimating the reductions generated.

The Reserve will provide data for mill efficiencies from the different assessment areas. Where this cannot be determined, U.S. Department of Energy (DOE) 1605b guidance will apply. Additional surveys on wood processing emissions and mill efficiencies will be considered for incorporation into future updates to the FPP.

17. SWICS requests that the Forest Protocol be further clarified to state that no GHG reduction credits are sought in the Forest Protocol that are attributable to the subsequent use by a third party of pre-consumer mill wastage. **(SWICS)**

RESPONSE: Noted.

Accounting for landfill carbon is conducted for thoroughness but is ignored in determining net sequestration for the purpose of issuing CRTs. Although data exists from the U.S Department of Energy 1605(b) about the quantity of carbon from wood products that goes to landfills, there is still too much uncertainty about future trends and the sequestration rates for other options such as composite wood products and composting/mulching. Further clarification of this issue will depend on policy decisions by the California Air Resources Board where emissions boundaries on inter-sectoral transfers are drawn.

Process 3 – Wood Product Accounting [formerly "Decay"]

18. AF&PA recommends the 100 year method be allowed as an additional alternative method for wood product carbon accounting. The "100-yr" method has been accepted internationally by forest products associations and the DOE and USDA as an alternative methodology.

Forest products companies around the world have endorsed the 100-year method for products in-use, and working through the International Council of Forests and Paper Associations (ICFPA), have developed an easy-to-use calculation tool, which simplifies corporate calculations.

The ICFPA tool is based on the principles outlined in the Technical Guidelines and allows the use of time-in-use decay curves to determine the amount of carbon remaining in products in-use after 100 years. This method can also utilize the average decay for the same time horizon of 100 yrs. The tool allows companies to use their annual production to estimate their contribution to product sequestration. Using annual production data, a company can either 1) let the model

assign typical uses (and thus life times) to the production or 2) specify the uses of its products. For example, a mill that produces lumber can specify that the lumber is used exclusively for building houses, assign the lumber to a variety of end-uses, or let the model use statistical averages. Thus the amount of sequestered carbon can be accurately estimated for products in use.

Additionally, the model is available in a spreadsheet format with a user-friendly interface that prompts users for data, thus making the process clear and easy to understand. To simplify the accounting process, AF&PA recommends that the latest version of the ICFPA calculation tool be incorporated by reference into the CCAR. The tool, which is maintained by the National Council for Air and Stream Improvement (NCASI), is available free of charge on their website at NCASI.org. **(AF&PA)**

RESPONSE: Noted. This tool, and other tools, will be evaluated in the future. The Reserve will use the standardized methodology in the FPP while other tools are under development.

19. By not calculating carbon stored in wood products relative to CO_2 decay rates in the atmosphere, the CCAR wood products guidance undervalues their effectiveness as an offset to emitted carbon by a factor of almost two. When reviewing the decay curves in the supporting documentation for the wood products guidance it is apparent that soft wood lumber in use and carbon dioxide in the atmosphere decay at similar rates. It would be more appropriate to calculate the effectiveness of carbon storage in wood products relative to atmospheric decay rates to better reflect the effects on the atmosphere and wood products true ability to offset emissions of CO_2. The current use of the average CO_2 stored after 100 years undervalues the wood products storage capacity and should be adjusted accordingly. For example, for softwood lumber, the multiplier should be 0.979 rather than 0.47. This is for products in use only and does not include the actual additional value of products in landfills which would be much higher (an aggregate multiplier of approximately 1.5 for softwood lumber. **(AF&PA)**

RESPONSE: Noted. While we recognize the debate over the longevity of CO2 in the atmosphere persists, the FPP is using 100 years as a standard for defining the length of time an entire ton must be out of the atmosphere. In contrast, a ton of CO2 emitted in the atmosphere at time 0 has approximately 50% of the same ton remaining in the atmosphere at 100 years. The over-compensation during the first 100-year period is managed by under-compensating the period carbon remains in the atmosphere beyond 100 years. Since forest carbon offset projects are considered a bridge to new energy sources, over-compensating early emissions is considered a conservative strategy.

20. The workgroup has made its best effort to find a middle ground that does not overstate nor understate the 100-year stores in the harvested wood product pool. As with many aspects of this protocol, PFT believes that this is an area that will benefit in particular from improvements to knowledge and systems over time. Going forward, this initial framework should be able to readily incorporate more specific initial measurements of carbon in round logs by species, more specific primary and secondary manufacturing losses, more specific estimates of the duration of wood in use by product types, better accounting for direct and indirect emissions along the chain of custody, and a better understanding of the final disposal of the wood. **(PFT)**

RESPONSE: Noted.

21. I like the idea of using the average carbon that persists over a 100-year period in wood products so that once the carbon goes into the wood products pool, it doesn't have be reduced year after year by some complicated half-life formula. **(T.Collins)**

RESPONSE: Noted.

22. Process 3 tracks the rate of disposal of finished products over time. These data also have some serious limitations. [Please see Wilderness Society formal comment submission for graphs and tables referenced below.]

First, assumptions about the form of equation describing product disposal (labeled 1st order below) used in the 1605(b) tables result in much higher estimates of wood product carbon stores when compared to assumptions made by other programs around the world. In the face of uncertainty, offset protocols should adopt conservative assumptions so as not to overcount actual carbon storage.

Second, the values in Table A.2 [see formal comment submission by Wilderness Society] are variously described as "100-year in use value" or "average value over 100 years". They are neither. The formula uses a five-year interval rolling average. This generates an exaggerated value at the end of each 5-year interval, because it averages current amounts with the amounts present 5 years previously, and disregards the lesser amounts present in intervening years. Because the disposal path is nonlinear, this approach results in exaggerated estimates of average carbon stores. To illustrate the anomalous results generated by the five-year interval averaging procedure, take the extreme case where a wood product is stored for less than one year, with 100% of its carbon present in Year 0 and 0% remaining in Year 1. Such a short-lived product would release its CO_2 just as rapidly as the mill waste that receives no offset credit, and would contribute nothing to mitigating climate change. Yet the formula proposed in the CCAR HWP draft would generate "average" carbon storage estimates of 5% over 100 years (even though none of the carbon was actually stored as much as a single year!). The chart below illustrates actual carbon stores and the periodic average values generated by the proposed CCAR formula.

If CCAR insists on using an average value, the simplest approach would be to sum the estimated amounts of carbon for each year and divide by the number of years. Year 0 should be excluded from this averaging, because it represents carbon that is not stored for any amount of time at all. The table below shows CCAR proposed values, followed by actual 100-year averages.

We strongly discourage use of an average value for crediting harvested wood product carbon, however. For a long-term policy objective like climate change mitigation, the time path of CO_2 losses from wood products in-use is important. Short-term storage has no beneficial impact on the climate. CCAR is promoting the acceptance of 100 years as equivalent to permanent storage, and requires that forest carbon stores be retained for at least this period of time in order to earn offset credits. To be consistent with this in-forest standard, only wood products carbon stored for at least 100 years should be eligible for credit.

The DOE 1605(b) registry, using a conservative approach appropriate to carbon accounting, credits only the wood expected to remain in use 100 years after harvest. This approach is a reasonable compromise that undercounts carbon stored during the first 100 years but overcounts carbon stored thereafter (since the amount is treated as fixed, but will actually shrink

over time as products are disposed of after the 100-year date). We strongly urge a return to the 1605(b) approach to crediting of wood products carbon. **(WS)**

RESPONSE: The methodology in the FPP is conservative because it will understate the amount of credited reductions compared to approaches where the sequestration of carbon in harvested wood products is ignored for projects where the baseline harvesting exceeds the project harvesting. This is because appropriate accounting for harvested wood products in the baseline will keep a project from over crediting project activities. For example, with an Improved Forest Management Project that results in less harvested wood products and more standing live trees than a baseline characterization, the crediting of CRTs will be considerably more if the accounting approach assumes any harvested tree represents an immediate emission. On the other hand, accounting appropriately for wood products will only allow credited reductions through management activities that increase both onsite live trees and longer term increases in the productivity of wood products, which is a much slower process.

The result of averaging of annual data is very similar to the averaging of the periodic data. The rationale for periodic averaging is to develop a less complex and more conservative approach to baseline characterization and additionality as explained in the above paragraph. Reporting the annual decay rates of wood products would force landowners to track wood products decay based on the year the product was produced and this tends to become increasingly complex as years go by.

23. We urge the CCAR to reconsider accepting either forest or wood products carbon stored for 100 years as fully equivalent to fossil fuel emissions reductions. The acceptance of a 100 year term is based loosely on popular statements that carbon dioxide has an "atmospheric lifetime" or "residence time" of 100 years. Yet credible scientific sources emphasize the impossibility of defining an atmospheric lifetime for this gas. According to IPCC Fourth Assessment Report, Working Group I, Chapter 10, "the lifetime of a gas in the atmosphere [is] defined as the time it takes for a perturbation to be reduced to 37% of its initial amount. While for CH_4, N_2O, and other trace gases… such lifetimes can be reasonably determined, a lifetime for CO_2 cannot be defined." Because CO_2 has no well-defined atmospheric lifetime, even dramatic decreases in CO_2 emissions will fail to stabilize atmospheric levels because a portion of any new CO_2 remains for millennia and joins with past residuals to have a significant cumulative effect on the atmosphere [Please see chart in Wilderness Society formal comment submission which shows the impacts of various reductions in CO_2 emissions compared to current emissions levels].

Archer et al [please see referenced text in formal comment submission] clearly explain the arbitrary nature of the popular assumption of 100 years as an atmospheric lifetime for carbon dioxide: "In practice, the tail [of carbon dioxide remaining in the atmosphere for thousands of years] is generally thrown out of GWP [global warming potential] calculations by truncating the integral at 100 years, a timescale that we argue arises from our own lifetimes rather than anything intrinsic about the carbon cycle."

An atmospheric lifetime for carbon dioxide of 50 to 200 years was first reported in the Second Assessment Report of the IPCC. This result was generated by models that predicted the time it would take for ocean and atmosphere to reach a new equilibrium after a pulse of carbon dioxide is released into the atmosphere. The results ignore the essentially permanent increase of CO_2 that remains in the atmosphere after a new equilibrium is reached. Subsequent IPCC reports revised the atmospheric lifetime range for CO_2 to 5 to 200 years, reflecting even more rapid short-term uptake by terrestrial sinks, but still ignoring the essentially permanent increase in

atmospheric levels. Finally, in IPCC's Fourth Assessment Report, Working Group 1 stated unequivocally that "while more than half of the CO_2 emitted is currently removed from the atmosphere within a century, some fraction (about 20%) of emitted CO_2 remains in the atmosphere for many millennia". Modeling by Archer et al shows that either a larger pulse of CO_2, which could overwhelm sink capacity, or warming of the oceans, which would decrease the solubility of carbon dioxide in seawater, could increase the percentage of residual atmospheric carbon dioxide substantially (up to 40%).

Because a significant portion of fossil carbon dioxide released to the atmosphere has such a very long term impact on atmospheric GHG levels, it is critical that we not substitute short term (100 years or less) carbon sequestration for fossil emissions. Recognizing that forest landowners may hesitate to make permanent commitments, one option to introduce greater flexibility would be for offset project contracts to be cancellable at any time by replacing the offsets with unused emissions allowances purchased for the purpose. This approach would support forest offsets as a bridge strategy that can buy the time necessary to develop the fossil-free technologies required to truly address climate change. **(WS)**

RESPONSE: Please see the response to Public Comment #19.

Process 4 - Landfill Storage

24. Credit should be given for carbon stored in landfills. In the case of the softwood lumber example presented in the supporting materials, this amounts to about 30% of the wood products creditable storage value. The U.S. EPA includes product carbon both in use and stored in landfills when calculating the annual U.S. national inventory reported to the UNFCCC. **(AF&PA)**

RESPONSE: Noted. Accounting for landfill carbon is conducted for thoroughness but is ignored in determining net sequestration for the purpose of issuing CRTs. Although data exists from the U.S Department of Energy 1605(b) about the quantity of carbon from wood products that goes to landfills, there is still too much uncertainty about future trends and the sequestration rates for other options such as composting/mulching.

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25. A.3. [A.5] Process 4. Landfill Storage – The draft forest protocol requires project proponents to report the volumes of wood stored in landfills, but stipulates that these emission reductions will not be included in verification reports and thus are not eligible to earn offset credits.

Excluding the wood products stored in landfills from the calculation of project emissions reductions is appropriate at the current time due to difficulty in assessing the volume and duration of stores of wood products in landfills over 100 years. Nevertheless, the cost and administrative burden that the requirement to report these values places on project proponents should be acknowledged; especially considering the information obtained from these efforts is likely to benefit future project proponents by enhancing the accuracy and verifiability of the volumes of wood products stored in landfills. In addition, despite the difficulty in calculating these types of emissions reductions, the atmospheric benefits are real and additional and should be credited when verification becomes possible. To address this issue, CCAR should stipulate the intention to preserve the reports submitted by project proponents for the purposes of developing a mechanism to acknowledge these reductions in the future. **(Equator)**

RESPONSE: Noted. Accounting for landfill carbon is conducted for thoroughness but is ignored in determining net sequestration for the purpose of issuing CRTs. Although data exists from the U.S Department of Energy 1605(b) about the quantity of carbon from wood products that goes to landfills, there is still too much uncertainty about future trends and the sequestration rates for other options such as composting/mulching. It is also unknown how accounting will be conducted for this pool in the future.

26. Process 4 estimates wood carbon stored in landfills, although the current draft does not propose to credit these stores. For most solid wood products, exclusion of landfills from project accounting is an appropriately conservative assumption, given vast uncertainties about landfill behavior over 100-year timeframes. If paper is included as a wood product eligible for storage credits, however, it will be critical to account for the effects of landfill methane. A much higher percentage of paper than solid wood decomposes relatively rapidly in landfills, and about half of its carbon will be released as methane, with a global warming potential 25 times that of carbon dioxide. Life-cycle analyses show paper as a strong net emitter of greenhouse gases. Including the climate effects of landfill methane generation for any paper storage claimed would provide incentives to boost the recycling rate and to recapture more landfill methane for energy generation, actions that could produce significant climate benefits.

    The CCAR Forest Project Protocol draft issued in December, 2008 also contained some procedures relevant to wood products. In particular, that draft proposed no uncertainty discount for harvested wood products, apparently under the assumption that these can be measured with great precision. It is true that roundwood is measured with relatively high precision, since it forms the basis for payments made by brokers or mills to landowners. However, estimates of carbon stored over time as a result of processing this roundwood are extremely uncertain. They are based on very broad measures of harvest and mill production across large regions, and broad nationwide patterns of consumer use and disposal. The wood processing chain is likely to vary considerably in specific localities, and the rate of disposal of wood products is likely to change dramatically over 100 years, given consumer preferences and technological changes that could either extend product life or increase the proportion of disposables. It is entirely consistent with the measurement protocol for forest pools to impose a discount for uncertainty of wood products estimates. **(WS)**

    RESPONSE: Noted. Over discounting wood products will impact the baseline more than project activities for most projects, and therefore increase the amount of credited reductions generated by a project in the early years. Therefore it is more conservative, as in preventing the overstatement of credited reductions, to provide an appropriate accounting for wood products.

27. The Forest Protocol should not assume credit for any GHG reduction benefits that are under the operational control of Solid Waste Disposal Facilities. **(SWICS)**

    RESPONSE: Please see the responses to Public Comments #5, #14, and #17.

Project Accounting Boundaries

28. CCAR should not require that wood products credit be generated only from forestry project lands. Given the costs and complexities involved in developing a forestry project (for often

limited return) under this protocol, many, particularly small, landowners may not participate. Wood product manufacturers should be allowed to initiate a wood products project under the CCAR project protocol provided it can show clear title to the carbon and chain of custody back to a sustainably managed forest. 1605b protocols, upon which CCAR is based, also contain manufacturing level look up tables. **(AF&PA)**

RESPONSE: Noted. Currently no protocols exist for sawmills or other wood product manufacturing facilities. An assumption of credit would require that the manufacturers develop a baseline methodology that accounts for emissions under a business as usual scenario, whether that scenario were to be developed for each facility or as a standardized approach for a group of facilities. A manufacturing facility would then be able to demonstrate progress toward reducing emissions by improvements to the baseline, as measured in reduced emissions.

29. SWICS strongly requests that clarifying language be added to the Forest Protocol to clarify that benefits or credits from the recycling or energy recovery from forest products or Forest Project wastes and materials (that are managed offsite from the Forest Project or outside of the operational control of the Forest Project) are not incorporated or otherwise embedded into the protocol. [Please see full comment in the SWICS formal public comment submission.] **(SWICS)**

RESPONSE: Please see the responses to Public Comments #5, #14, and #17.

30. We would like to note that the accounting for harvested wood products is especially challenging as compared to on-site carbon stores as once the logs are delivered to the mill, the carbon is outside the control of the project developer. Absent an economy-wide cap on greenhouse gas emissions and a chain of custody tracking system, the fate of the carbon stored in wood products will continue to be difficult to quantify with the same accuracy and verifiability as on-site stores. Under these circumstances, project protocols are compelled to make assumptions about the amount and duration of carbon stored in the harvested wood pool. **(PFT)**

RESPONSE: Noted.

31. It is critical that CCAR incorporate a very large missing piece in its wood products carbon accounting framework. When wood products are included as part of a forest project, the project boundaries are essentially extended geographically and temporally to the final use and disposal of those products. Long-term storage of harvested wood clearly would be impossible without transforming and transporting that wood, and those processes generate GHG emissions. The carbon registered by forest offset projects has value only because of public policies that permit "outside-the-cap" entities like forests to sell the carbon they remove from the atmosphere. This publicly-conveyed value should not treat in-forest carbon, which has no associated fossil fuel emissions, as equivalent to wood products carbon, which has significant fossil emissions.

    It is often claimed that wood processing and transport emissions are already covered under an economy-wide cap, so that forest projects cannot possibly increase emissions in capped sectors. Even when such a policy is in place, however, a forest project claiming wood products carbon credits places an additional burden on the processing sectors through harvest activity subsidized by carbon credit sales. Crediting the full value of wood products carbon to the landowner, while placing the burden of related emissions allowances on capped entities, is not an equitable policy approach. **(WS)**

RESPONSE: Noted. In sector-wide accounting, it is not clear if the forest landowner or if downstream users would report their emissions related to the manufacturing of wood products. Until sector-level accounting is addressed as a policy issue, the FPP will account for the decay of wood products outside of the possession of the forest landowner. This is largely because, absent accounting of wood products, climate benefits of forest management are more likely over-estimated than under-estimated. See responses to Public Comments #22 and #26.

32. A related claim asserts that wood products substitute for materials that have higher GHG emissions, and this may in fact sometimes occur. But this effect cannot be assumed in all cases, and if projects want to claim substitution credit they would need to document that substitution actually occurs. For most wood uses, wood is already the "business as usual" material, with limited opportunities for further substitution, so a 1:1 substitution with other materials is unlikely when harvest increases. This substitution claim also treats demand for houses and other long-lived wood products as constant. In fact, as climate policy increasingly favors a shift to a low-carbon economy, total demand for housing (both number and average size) should decrease as the costs of building and maintaining those homes rises. Because of uncertainties associated with a possible substitution effect, wood products should be favored as a GHG-friendly approach through such voluntary standards as green building codes, rather than through crediting through offsets which must be fully equivalent to emissions reductions.

Processing emissions can far exceed the CO_2e stored in products and landfills at 100 years, and transport for some products can emit more than twice the CO_2e storage value. We recommend that CCAR develop emissions factors for wood products processing sectors through a survey of available life-cycle assessments, and that forest projects wishing to credit wood products stores use these emissions factors, plus direct calculations of transport emissions for their own unique wood stream, to deduct fossil emissions from wood carbon stores credited to the project. Including emissions associated with wood products in the offset accounting would boost incentives to reduce energy use and reduce transport distances, practices which generate clear climate benefits. **(WS)**

RESPONSE: Noted. The primary effects associated with wood products accounting are those emissions directly associated with the project activity. Although studies indicate that wood is a favorable building material from a climate perspective, we are not able to consider these substitution effects at this time due to the difficulty in quantifying project-specific impacts.

33. The Forest Protocol should not assume credit for any GHG benefits or reductions that are under the operational control of Waste Biomass Recycling, Composting Facilities or end users of these materials. **(SWICS)**

RESPONSE: Agreed. Accounting for landfill carbon is conducted for thoroughness but is ignored in determining net sequestration for the purpose of issuing CRTs.

34. The Forest Protocol should not assume credit for any GHG reduction benefits that are under the operational control of Waste Biomass Energy or Fuel Facilities. **(SWICS)**

RESPONSE: Noted. Combustion of biomass in place of fossil fuels appears to have climate benefits, but allocating credits from this activity to the forest sector is beyond the scope of the FPP at this time. Further clarification of this issue will depend on policy decisions by the California Air Resources Board where emissions boundaries on inter-sectoral transfers are drawn.

35. SWICS requests that CCAR clearly recognize the following key points in the final language of the Revised Forest Protocol:
    a) Operational Control: The Forest Protocol does not have any operational control over the management of waste forest products in solid waste disposal facilities, recycling facilities, composting facilities or biomass to energy facilities – except those that may be owned by the Forest Project operator.
    b) Enforceability: The Forest Sector is not in a position to ensure that waste forest products are managed in such a way so as to produce GHG reduction credits. Only the owner and/or operator of the waste forest product disposal or recycling or biomass facility can be held accountable for generating or maintaining any credits associated with the operation of those facilities.
    c) Double-Counting: The Forest Protocol cannot assume any GHG reduction credits associated with the disposal or recycling of forest products. Those benefits or credits are most appropriately within the purview of the owner or operator of those disposal or recycling activities. **(SWICS)**

RESPONSE: Noted. Further clarification of this issue will depend on policy decisions by the California Air Resources Board where emissions boundaries on inter-sectoral transfers are drawn.

36. California's biomass facilities are typically the endpoint in the management of this forest waste. CBEA's view is that that owners and/or operators of our facilities have "operational control" and ownership of the biomass forest materials that flow into these facilities – and pursuant to established CCAR protocol any GHG emissions or sinks are the responsibility of, and attributable to, the owner and operator of these facilities.

    Biomass-to-energy facilities generate renewable low carbon energy from the combustion of waste forest products – that effectively displaces high carbon fossil fuel energy production. Biomass-to-energy facilities are very interested in being recognized for the GHG gas benefits that are derived from displacing fossil fuel combustion with the production of energy and fuel from low-carbon forest product materials. This is already true with respect to renewable energy credits (RECs) that may be generated by such facilities.

    The Forest Protocol should **not** assume credit for any GHG benefits that are under the operational control of Waste Biomass Energy or Fuel Facilities. CBEA requests that CCAR clearly recognize this in the final language of the Revised Forest Protocol.

    The use of wood waste from the forest as fuel in a biomass-to-energy facility is beneficial to reducing overall GHG emission, and is a benefit that should be attributable to the owner/operating of the facility – not the forest sector for this activity. **(CBEA)**

RESPONSE: Noted. Further clarification of this issue will depend on policy decisions by the California Air Resources Board where emissions boundaries on inter-sectoral transfers are drawn.

Baseline Calculation

37. Despite our best efforts to understand the protocol there is still much confusion about the baseline calculation. There seem to be discrepancies between the written text and how the protocol has been explained to us by various stakeholders. Both in the written text and in descriptions by various stakeholders the baseline model has been described as business as usual, regulatory, baseline year subject to an FIA mean, and maximizing financial returns. It is imperative that the methodology for calculating baselines is clarified (ideally using example calculations) and another opportunity for public comment is provided. **(AF&PA)**

RESPONSE: Agreed, The final draft has been edited for clarity and expanded to include examples for Project Developers.

38. The baseline should be the amount of carbon in the project at its inception or "baseline year". The baseline year approach is transparent, measureable and not subject to gaming where credit is given for the difference between a hypothetical, and clearly unrepresentative, baseline and actual carbon levels. We recognize that the baseline year approach may give credit for some forest growth that may have happened naturally. However, landowners have the option every year to convert their land to other uses, to not regenerate, or to discontinue harvests altogether, so to assume a baseline based on continued forest management and continued harvests is not appropriate given the options most land owners have to manage their land. We propose that if landowners can show that they are sustainably managing their forest (most likely with third party certification), that this is a practice that is above and beyond normal practice and should be sufficient to meet any additionality test. **(AF&PA)**

RESPONSE: Noted. The FIA data provide a reasonable, unbiased and objective method to assess 'common practice.' In order to assure a consistent approach to baseline characterization of live standing carbon pool, the FPP will continue to require that all Improved Forest Management projects use the methodology referencing the average stocks derived from the USDA Forest Service FIA data. The additional constraints on initial baseline levels of standing live carbon stocks are to prevent the FPP from creating an incentive for a landowner to take forest inventory levels down to lower levels prior to initiating an Improved Forest Management Project. These additional constraints will remain in the FPP at this time to ensure reductions are additional and conservative.

39. Baselines based on future projections of current practices are not appropriate. There are two fundamentally flawed assumptions inherent in this type baseline approach. The first is the assumption that BAU actually exists in dynamic markets. This should be abundantly clear given the unforeseen recent economic development in global markets. Decisions made three or six months ago are no longer valid. Second, is that the assumption that BAU baseline carbon levels will be maintained in a market system that does not recognize their value. Unless policymakers recognize the need to credit continued actions by those managing land (and carbon) in a

responsible, sustainable way, this carbon storage will be lost to other more lucrative uses. **(AF&PA)**

RESPONSE: Noted. The standardized baseline approach is designed to ensure additionality across a wide pool of landowners within an assessment area. The work group sought an approach that considers that, in the absence of the project, project lands would have been managed like other comparable lands in the assessment area. The most unbiased and objective measure of common practice within the assessment area was determined to be achieved through US Forest Service Forest Inventory and Assessment (FIA) data.

40. Section 6.2.1.1 Private Forest Lands – The draft forest project protocol requires that CCAR perform a financial analysis of the relevant costs and returns in their evaluation and justification of the baseline scenario.

This requirement provides an inappropriate level of influence over the financial decisions of private forested land owners. The ability to dispute the financial feasibility of baseline scenarios would allow CCAR to determine what would be acceptable profit margins, whereas this decision rightly belongs to the land owner. The guidelines provided for meeting the permanence requirements are sufficiently designed to ensure that project proponents can meet their obligations. This issue can be addressed by removing this financial analysis requirement from the baseline estimation section. **(Equator)**

RESPONSE: Noted. The financial test is intended to demonstrate that the proposed baseline approach is reasonable. The test is simple to do and helps to ensure project additionality.