

**DOCKETED**

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**Brian Kolodji Comment on May 2020 Business Mtg Item 12 GFO-19-503**

*Additional submitted attachment is included below.*

Revised Comments 05232020

Chair Hochschild,

**“-then the Lord God formed the man out of the dust of the ground and blew into his nostrils the breath of life, and the man became a living being.”**

I begin with this, because I am amazed with the power of breath, especially God's breath, especially as a chemical engineer with many family members in the health field (two nursing students, a premed, and emergency room nurse wife.) As a chemical engineer, I would make man a living being would be a much more complicated job, starting with fabricating bones, muscles, attaching them, etc. He did it with dust and breath...simply amazing. Others believe it took evolution, this is just as amazing.

I start with this story, because breath is amazing. I mention this fact for a reason. Industrial, Power, and Transportation Sectors around the globe are heading toward production of 100 billion tons of CO<sub>2</sub> per year with machines. Unbeknownst to many, the growing human population and living animals (fauna), in expelled breath through the biological process of respiration, produce in excess of 10 billions tons of CO<sub>2</sub> per year- only a chemical engineer would be interested in this fact, for which I did a rough calculation. CO<sub>2</sub> is necessary for life. This is because that CO<sub>2</sub> is picked up by plants and trees (flora), which reversed the respiration process using photosynthesis to manufacture oxygen, which is what is inhaled by the previously mentioned fauna to produce CO<sub>2</sub>, and the cycle continues. God made this wonderful cycle, and I am inspired (through prayer) to use it to solve the global warming crisis caused by the imbalance caused by these man made sectors producing CO<sub>2</sub>.

Chair Hochschild, I must admit to some frustration in this new "modern" way of addressing the board. With this new process I can only appeal to you with the written word, and not with the passion that I usually express with the breath of my body (poor Grants Ombudsman Jennifer Martin-Gallardo, and staff members such as CEC Grant Managers Phil Dyer and Marissa Sutton whom I have met in person, and the scoring team lead by Kevin Mori have listened to me so well.) In short Kolodji Corp, owned by Brian Kolodji, the author, has intellectual property (patent/patent pending) for energy carbon management in another company called Black Swan, LLC. Both of these companies are incorporated in the state of California, and my taxes are paid. Brian Kolodji is a chemical engineer who first attended Compton College, then graduated from USC, thanks to a full California State

scholarship (with Governor Brown's name on the top of the letter.) With over 50 years experience as director, manager, chief process engineer, staff engineer for the largest oil and gas producing, chemical manufacturing, engineering/ construction service companies in the world, I am now self employed (my wife say I need a real job that makes money, which is why I am appealing to you.)

In short, I plan to explain how Black Swan's pending technology is the only technology to date that can accelerate (by 2030 with CEC's help) and make a healthy profit (making billions of tons of food, saving/recovering water, and producing less CO<sub>2</sub>/NO<sub>x</sub>/CO) from the California state's mandated drive to carbon neutrality, much faster than the 2050 date. Further, I, and I hope the assembled Kolodji Corporation GFO-19-503 Phase II Application Team can convince, you, Chair Hochschild, and other members of the assembled California Energy Commission that awarding these grants to other candidates vying for GFO-19-503 and even GFO-19-504 funds, for which Kolodji Corp has passed screening and qualified, and in the case, GFO-19-503 Phase II is the only qualified candidate, and ranked No. 1, are not leading the state and the world in the right direction.

To start with, I focus on Post Combustion Waste Heat Recovery concepts from all three qualified GFO-19-503 candidates. The two other qualified GFO-19-503 candidates are focusing only on solely heat exchange equipment. This is a basic error and does not comprehensively "Demonstrate Replicable, Innovative, Large-Scale Heat Recovery Systems in the Industrial Sector", which is the title of the Grant Funding Opportunity GFO-19-503. To prosecute this statement against the other applicants is to understand the basics of thermodynamics, chemistry, and atmospheric dispersion which will take just a few words. Claimed by both competing applicants is high waste heat recovery efficiency (65 to 90+%) from industrial sources of flue gas, a gas which has between 5 to 20% CO<sub>2</sub>, that is 50,000 to 200,000 ppm CO<sub>2</sub>. "Waste heat recovery", as specified in the solicitation manual on page 17 in Table 1a, is lower quality and more difficult "heat recovery", because it is at a lower temperature (less than 400F) that usually appears after conventional "heat recovery" (recovering heat from over 400F.) As the efficiency of recovery of waste heat approaches 100%, the temperature of the emitted flue gas get closer to the ambient temperature of say 100F to keep it simple. Thus the stack gas when cooled with waste heat recovery at 90% efficiency, the stack gas emission temperature, which is not mentioned by any of the applicants, is dropped from 400F to 130F per the calculation:  $400 - (0.9 \times (400 - 100)) = 130F$ . When the temperature of the stack gas is reduced, the stack gas density is increased. Further, the flue gas or stack gas emission with high concentration of CO<sub>2</sub> at 50,000 ppm to 200,000 ppm CO<sub>2</sub> also

contributes to making the density of the stack gas higher with respect to the density in air which has only 400ppm CO<sub>2</sub>. Higher density of the stack gas reduces the buoyancy and dilution/ dispersion effect of the gas in air, or can even cause the plume to slump from the stack towards grade, roof tops, or even into building openings. Personnel exposure to these levels of CO<sub>2</sub> is dangerous, as the CO<sub>2</sub> level in the stack gas is at unhealthy/ dangerous levels (as defined in CalOSHA's permissible exposure limit of 5000ppm CO<sub>2</sub>\* and the National Institute of Health and Safety's immediately dangerous to life and health level of 40,000 ppm CO<sub>2</sub>\*\*).

\*The **PEL** or **OSHA PEL** is a legal, regulatory **limit** on the quantity or concentration an employee can be **exposed** <https://www.osha.gov/dsg/annotated-pels/tablez-1.html>

\*\*The term **immediately dangerous to life or health (IDLH)** is defined by the US [National Institute for Occupational Safety and Health](#) (NIOSH) as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." [Immediately dangerous to life or health](#)

Black Swan comprehensively resolves and manages this problem by containment, delivering, conditioning, distributing and dispersing the cooled and concentrated CO<sub>2</sub> in stack gas to crops at a level of 600ppm. Since it is managed, cost benefits are multiplied, because even a higher percentage of the waste heat with lower temperatures is now allowed and water is recovered. This produces even higher CO<sub>2</sub> concentrations, and correspondingly reducing the volumetric flowrate of the stack gas. Thus in combination with reduced temperature, the associated piping/blower/quench system size and cost is reduced.

Membrane Air (oxygen) enrichment is a pre-combustion qualifying technology that reduces natural gas firing by 30% with potential to 50%, and also generates correspondingly less GHG and waste heat. Black Swan innovatively uses conventional membrane air separation to produce combustion air oxygen enrichment, proven industrially for decades. This process economically extracts oxygen and CO<sub>2</sub> from air, sending it to a natural gas fired device to reduce the natural gas consumption by minimum 30% but potentially up to 50% (more than triple the other qualified applicants). Further this method of combustion does not reduce the duty and produces lower priority pollutants of CO and NOX.

This is a complicated problem requiring comprehensive inspired solutions. I end, Chair Hochschild with this statement below on the power of how God's breath caused mankind's rebirth...

”Jesus said to them, again, “Peace be with you. As the Father has sent me, so I send you.”

And when He had said this, he breathed on them and said to them, “Receive the Holy Spirit.”

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2019/2020 Chair Carbon Mgt and Sustainability,  
AIChE National Meetings

"...Peace be with you..."