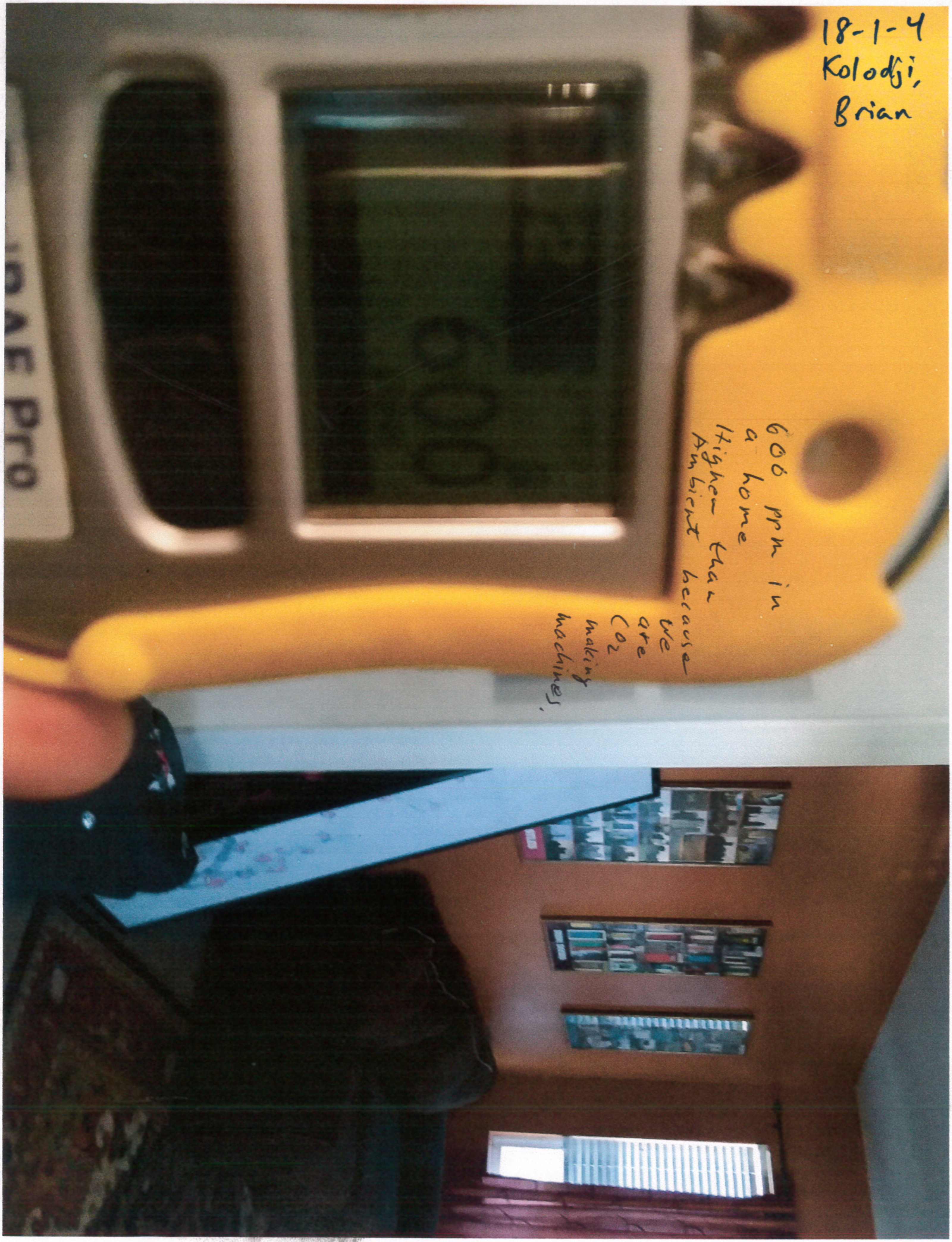
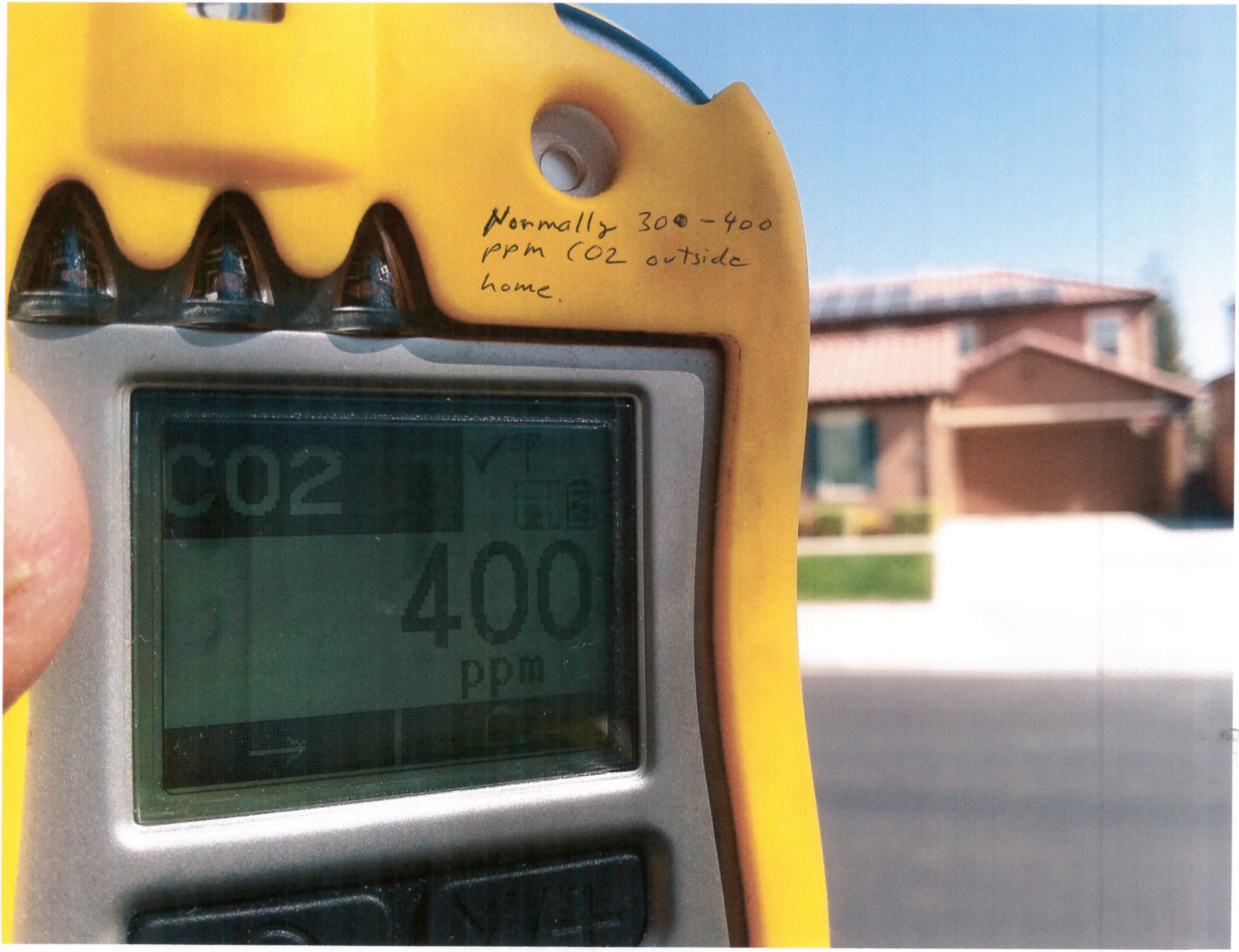
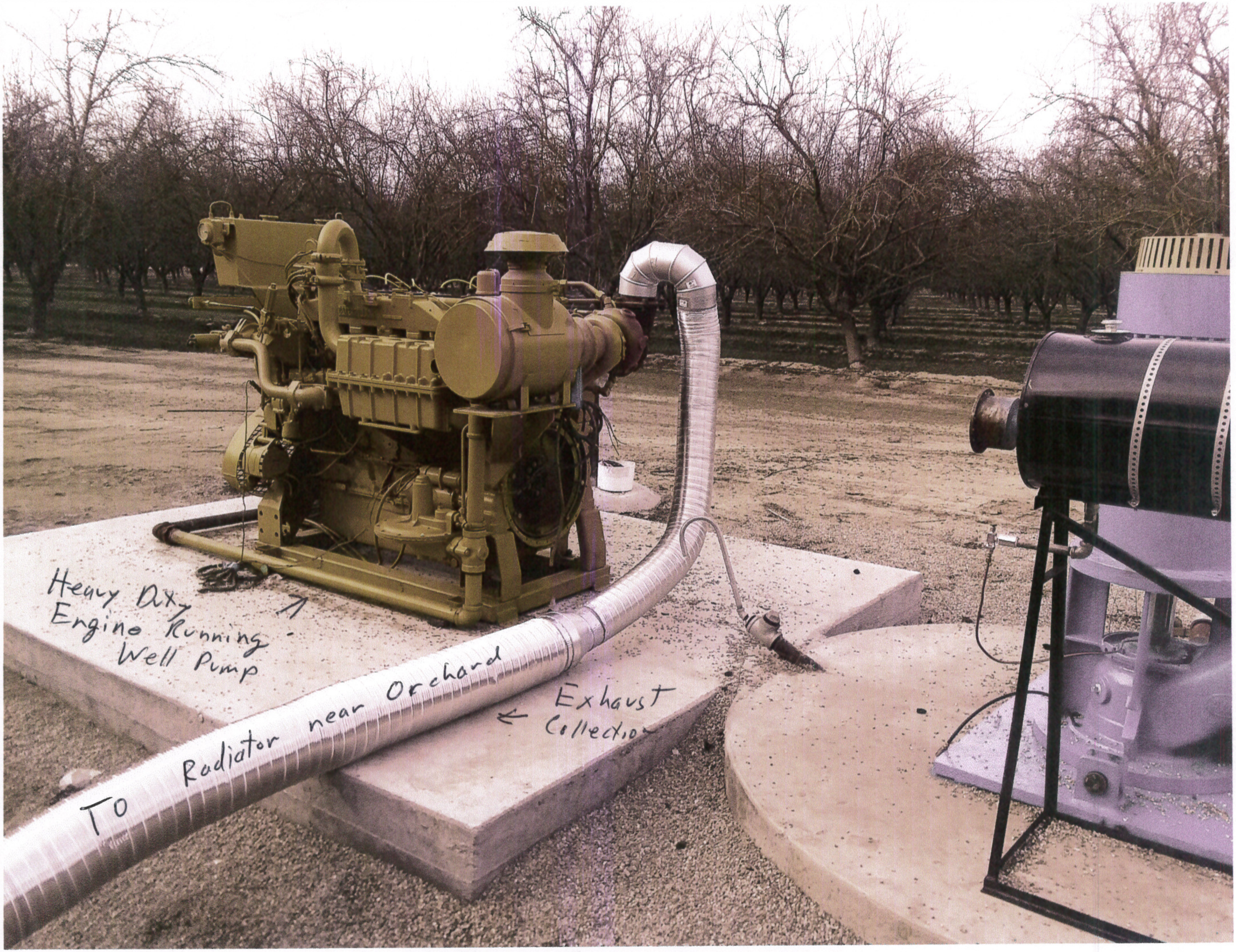
18-1-4
Kolodji,
Brian



600 ppm in a home higher than ambient because we are CO_2 making machines.


CO2
400
ppm
Normally 300-400
ppm CO2 outside
home.


In an orchard -
CO_2 is consumed,
dropping ambient
levels.
200
ToxiRAE Pro
CO_2


Heavy Dxy Engine Running Well Pump
To Radiator near Orchard
Exhaust Collection


Blower
Radiator
TO
COOL
Exhaust

Ref CO_2 and Biosphere
Ed. by Rozema, Lambers et al, 1992

Table 2. World rank, photosynthetic type, number of CO_2 studies, and selected references for 10 major crops.

Crop	World rank (acreage)	Photosynthetic pathway	Number of CO_2 studies*	Selected references
Wheat	1	C_3	48	Havelka *et al.* 1984a, Sionit *et al.* 1981c
Rice	2	C_3	12	Imai *et al.* 1985, Yoshida 1973
Corn	3	C_4	57	King & Greer 1986, Surano & Shinn 1984
Barley	4	C_3	10	Ford & Thorne 1967
Sorghum	6	C_4	10	Chaudhuri *et al.* 1986, Mauney *et al.* 1979
Soybean	7	C_3	89	Acock & Allen 1985, Havelka *et al.* 1984b
Cotton	9	C_3	29	Kimball *et al.* 1989
White potato	12	C_3	12	Goudriaan & de Ruiter 1983
Sweet potato	16	C_3	8	Bhattacharya *et al.* 1985
Alfalfa	–	C_3	8	Goudriaan & de Ruiter 1983, Morison & Gifford 1984

* This column updated; all other information, Cure and Acock (1986).

Table 3. Percent change ± 95% confidence limits in four key variables of 10 major crops due to a doubling of ambient CO_2 concentration. Data from Cure and Acock (1986) computed by regression analysis; N numbers and references were provided.

Crop	Transpiration	Photosynthesis	Biomass	Yield
Corn	− 26 ± 6	+ 4 ± 13	+ 9 ± 5	+ 29 ± 64
Wheat	− 17 ± 17	+ 27 ± 20	+ 31 ± 16	+ 35 ± 14
Soybean	− 23 ± 5	+ 42 ± 10	+ 39 ± 5	+ 29 ± 8
Sorghum	− 27 ± 16	+ 6 ± 16	+ 9 ± 29	–
Barley	− 19 ± 6	+ 14 ± *	+ 30 ± 17	+ 70 ± *
Cotton	− 18 ± 17	+ 13 ± 19	+ 84 ± 126	+ 209 ± *
Rice	− 16 ± 9	+ 46 ± *	+ 27 ± 7	+ 15 ± 3
White potato	− 51 ± 24	–	− 15 ± *	+ 51 ± 111
Sweet potato	–	–	+ 59 ± 18	+ 83 ± 12
Alfalfa	–	–	+ 57 ± 277	–

* Data points too few to calculate.

crop yield, all other factors remaining the same. Once-in-a-while a reported experiment shows little or no effect, but these are few and far between. As crop simulation models mature over the next decade, we should be in an excellent position to predict and even take advantage of direct response of crops to CO_2. In his 1989 address before the Agricultural Science Centennial in Steinkjer, Norway, Dr. J. E. Newman (1989) concluded that rising atmospheric CO_2 should provide benefits to agriculture through direct fertilization and enhanced water use efficiency on local, regional, and global scales. Increased CO_2 is an important aspect of the future, and farmers, growers, and producers of foods are expected to adjust their practices to take advantage of this CO_2 subsidy. Based on current projections, there is every reason to believe that this will occur. Strategies designed to assure future global food security must include a consideration of crop responses to elevated atmospheric CO_2.

Techical Paper accepted for National AIChE Meeting in April 2018 (Orlando, Florida)
(American Institute of Chemical Engineers)

Deadline Reached

The deadlines for abstract submissions and modifications for this program have been reached.

View Submission (no changes allowed.)

Extended Upload

Abstract #512818

Remove/ Use Gigatons of CO2 from Flue Gas withoutÂ CO2 Recovery or Purification

Brian Kolodji, Independent Consultant, Bakersfield, CA

Abstract Text:

No, its not a perpetual motion machine. This paper will introduce a watershed patent pending process where raw flue gas, when routed and applied properly in a sustained fashion will triple the rate of production of an ubiquitous sustainable "green" commodity product easily absorbed by the market. Beneficially CO2 in the flue gas is reduced with very minimal energy input, yielding a net negative GHG contribution most cost effectively, as it does not require CO2 recovery or purification. To be successful in reducing Gigatons of CO2 per year levels, it will require significant investment by industry (and government) in infrastructure, as expected for any solution of the growing magnitude of the GHG dilemma. In effect this is a solution with an infrastructure impact just like that required by the culprit utilities of electricity and hydrocarbon fuel before their use became widespread.

Session Selection:
Plant Design and Energy Integration

Title:
Remove/ Use Gigatons of CO2 from Flue Gas withoutÂ CO2 Recovery or Purification

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Preferred Presentation Format:
Oral Only

Keywords:
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