EXHIBIT B

REPORT OF DR. TOMISLAV VUKINA AND ACCOMPANYING SPREADSHEET

Case No. 1:17-cv-01875-RMC

Review of the Cost-Benefit Analysis Conducted by AMS in Support of Rescission

of the Organic Livestock and Poultry Practices Final Rule

Tomislav Vukina, PhD.

Introduction

This paper reviews the March 2018 economic arguments set forth in support of the USDA's "reassessment" of the economic analysis it offered in support of its January 2017 rulemaking.

Background

On January 17, 2017 AMS published a final rule in the Federal Register, *Organic Livestock and Poultry Practices* (the *"OLPP"*), 82 Fed. Reg.7042-7093, and simultaneously posted online its Regulatory Impact Analysis and Final Regulatory Flexibility Analysis ("*OLPP RIA*")

On December 17, 2017 AMS published in the Federal Register a proposed rescission of the OLPP, *Proposed Rule: Organic Livestock and Poultry Practices—Withdrawal*, 82 Fed. Reg. 59988-992, and simultaneously released online *Preliminary Regulatory Impact Analysis Organic Livestock and Poultry Practices Withdrawal* (December 2017) ("*Proposed Rescission"*)

On March 18, 2018 AMS published *Organic Livestock and Poultry Practices--Withdrawal*. ("the *Rescission*") in the Federal Register, 83 Fed. Reg. at 10775-83, and simultaneously released online *Regulatory Impact Analysis Organic Livestock and Poultry Practices Withdrawal*[1] ("*Rescission RIA*").

> As a result of reviewing the calculation of estimated benefits, AMS reassessed the economic basis for the rule making as well as the validity of the estimated benefits. On the basis of that reassessment, AMS finds little, if any, economic justification for the *OLPP* final rule.

Rescission, 83 Fed. Reg. at 10782. AMS characterized the need for reassessment:

> In reviewing the *OLPP* final rule, AMS found the calculation of benefits contained mathematical errors in calculating the present value of estimated benefits using discount rates of 7% and 3%. AMS also found the estimated benefits over time were handled differently than were the estimated costs over time. In addition, the range used for estimating the benefit interval could be replaced with more suitable estimates.

Proposed Rescission, 82 Fed. Reg. at 59990.

---

[1] The final Regulatory Impact Analysis was identical to the Preliminary Regulatory Impact Analysis.

The *Rescission* relied on a "recalculation" of the benefits estimation that was conducted for the *OLPP*. *Rescission RIA*, at p. 6 ("Correction of those errors shows that estimated benefits likely were overstated in the *OLPP RIA*.") Because there was no new data, and the *Rescission* was based on a "recalculation" of the benefits of the *OLPP*, this analysis accepts the estimated costs (restated in the *Rescission* as "cost savings") and transfers exactly as they appear in the *Rescission* and the accompanying *Rescission RIA*.[2]

The *Rescission's* reassessment of estimated economic benefits associated with the *OLPP* was based on the discovery of three purportedly material errors in the economic analysis underpinning *OLPP*.

(1) AMS identified two mathematical errors in the calculation of the present value of estimated benefits. The first error was caused by the use of the wrong present value formula when using the 3% discount rate where the quantity (1+r) in the denominator is raised to the second power in all 15 years instead of power corresponding to the proper year. For the 7% discount rate present value calculation, the expression (1+r) in the denominator was always raised to the power of one in all years.

(2) The second error was not mathematical in nature. The OLPP estimated that the typical consumer's willingness to pay a premium for one dozen eggs from birds that had access to the outdoors was approximately $0.21-$0.49.[3] *See OLPP RIA,* pp. 28-31 ("Section C-- Consumer Willingness-to-Pay") The Rescission determined this range was incorrect. *See Rescission RIA,* p. 10 (benefit range "overstated" in OLPP) The *Rescission* found that the willingness to pay range originally used in the *OLPP* was too high because it reflected consumers' willingness to pay for a dozen eggs produced by chickens raised in a cage-free environment, without induced molting, and with outdoor access. *Id.* Stating that the first two production practices were already required in the production of organic eggs, the *Rescission* concluded the OLPP final rule only added specificity to the existing requirement for the outdoor access.[4] *See e.g. Rescission,* at 10781-82; *accord OLPP RIA,* p. 10 ("The OLPP rule only added specificity to the exiting requirement of outdoor access.") Because of this the *Rescission* reduced the estimated range for willingness to pay for outdoor access to $0.16-$0.25 per dozen organic eggs. *Id.*

---

[2] AMS altered the "costs" values slightly from those used in the *OLPP RIA* by adding the "paperwork" burden, assessed at $3.9 million for Scenario 1 and $1.95 million for Scenarios 2 and 3. *See Rescission RIA*, at 8. This analysis tracked the *Rescission* and included the added "costs" of "paperwork" exactly as was done in the *Rescission RIA*.

[3] The *OLPP RIA* acknowledged that there is "limited quantitative data" regarding the role particular production practices play in consumer purchasing decisions. *OLPP RIA* at 31. AMS determined that the "research and survey data" it used was "accurate" and "from diverse sources." *Id.*

[4] The *Rescission* does not explain why there is a new section in the *OLPP* prohibiting "forced molting." *See OLPP* at p. 7089 (new Section 205.23(c)(10)) This suggests to this author that, contrary to the findings in the *Rescission,* forced molting is not directly prohibited by the NOP. If correct, the reduction in the consumer willingness to pay range was overstated in the *Rescission.*

(3) The third error relates to the treatment of cost and benefits over time. The *Rescission* contends the *OLPP RIA* inadvertently held costs to be constant over time but the estimated benefits were straight line reduced over time. The *Rescission* resolved this tension by applying straight-line depreciation of benefits to *both* costs and benefits.[5] *See e.g. Rescission RIA,* at 11.

In the *Rescission RIA* AMS said,

> In initial drafts of the OLPP final rule RIA, AMS applied a straight line reduction in both costs and benefits over time to reflect the economic life of egg and broiler producing structures. Both benefits and costs declined every year as a fraction of the industry structures became fully depreciated and reached the end of their economic lifetimes. For lack of better information, AMS assumed that the age distribution of these structures was uniform so an equal amount was depreciated every year. In the OLPP final rule RIA, AMS adopted a different approach, inadvertently leading to an inconsistency in the treatment of costs and benefits over time. Costs were instead estimated to be constant over time, but benefits were still straight line reduced over time. The same reasoning should have applied to the benefits to make the calculation of costs and benefits consistent.

Rescission RIA at 11 There is no example given of a depreciated "benefit." Nor could there be. Straight line depreciation is defined as:

> The system of accounting for depreciation on an asset by taking an assumed life, say n years, and charging depreciation at the rate of $(1/n)$ of its cost each year until it is fully written down. The system is so named because if the remaining value is plotted against time on a graph the result is a downward-sloping straight line.

Oxford Dictionary of Economics, John Black et al. 4th ed. (Oxford University Press 2009) (quick reference definition) Despite this well settled and bedrock definition AMS concluded, "The same reasoning should have applied to the benefits to make the calculation of costs and benefits consistent." *Id.* This statement is unsupported by any reference to economic literature or any comment in the administrative record.

Analysis

The *OLPP RIA* applied straight line depreciation to the estimated benefits of the *OLPP* and failed to apply straight line depreciation to the estimated costs. The *Rescission RIA* noted the

---

[5] The reliance by AMS on a straight-line reduction in *benefits* to make the calculation of cost and benefits consistent is inconsistent with conventional enterprise budgeting practices. Whereas it is perfectly legitimate to reduce *costs* on a year-to-year basis to take into account annual depreciation of the physical capital (chicken houses and equipment), the same is not required when computing the annual stream of benefits. This is because the annual accrual of benefits has nothing to do with the amortization/depreciation of physical capital as quantitative benefits only depend on the number of organic eggs produced and the consumers' willingness to pay for the enhanced animal welfare attributes of those eggs.

asymmetry and concluded both costs and benefits should be identically treated. This solution was incorrect. The correct solution would have been to apply straight line depreciation to the costs, and *not to the benefits.* Applying straight line depreciation to benefits is an economic modeling error and conflicts with the accepted approach in economic enterprise budgeting.

The calculations appearing in Attachment 1 applied the identical formula for calculating benefits that was used in the *OLPP RIA* and the *Rescission* with one exception: it does not apply straight-line depreciation to the estimated benefits. *Compare OLPP RIA* at p. 97, fn. 94 (outlining formula—factor 4-"Apply straight-line reduction of that amount…")

Specifically, it accepts the (1) the lower range of estimates for the willingness to pay for outdoor access for laying hens ($0.16-$0.25 per dozen organic eggs); and (2) the revised values for the calculation of present value of the stream of future benefits; and (3) I accepted and precisely followed the description of three potential scenarios of how organic egg producers would respond to *OLPP's* new requirements. I then attempted to verify the results obtained by AMS in the *Rescission RIA*.

The three scenarios presented in the *Rescission* are after six years of implementation (the year 2022):

Scenario 1: 100% of existing organic egg producers comply with the new regulation and production increases by the historical growth rate of 12.7%.

Scenario 2: 50% of existing organic egg producers comply with the new regulation and production increases by the historical growth rate of 12.7%.

Scenario 3: 50% of existing organic egg producers comply with the new regulation and there is no growth in organic egg production that would not satisfy the new regulatory requirement.

For each scenario, the published formula for calculating estimated benefits was strictly observed and the published estimate of the number of organic eggs was always used. *See OLPP RIA* (pp. 96-97 and fn. 89 and fn. 94) (estimating the number of organic eggs produced when this rule is fully implemented in 2022 as 710,578,652 dozen)

1. Benefits are calculated by simply multiplying the willingness to pay per dozen eggs estimate by the number of organic eggs (in dozens) produced by layers that are estimated to newly have outdoor access in 2022; and
2. Benefits begin in 2022 and no benefits will be realized in the earlier years; and
3. The stream of future benefits has been discounted back to 2016 using a 3% or 7% discount rate, so the numbers are expressed in constant 2016 dollars.[6] Hence all dollar figures are expressed in millions of constant 2016 dollars at annualized basis for 15-year period 2017-2031; and
4. The projected number of organic eggs produced in 2022 is 710,578,652 dozen and then the average annual growth rate of 12.7% is used to forecast future organic egg production; and

---

[6] The calculation of the present value of the stream of future benefits is necessary because of price inflation and positive time preference for money. The same principle applies to costs and benefits.

5. Only 50% of organic eggs would newly have access to outdoors when this rule is implemented, and as such would be the source of the newly created benefits of the proposed regulation. The remaining 50% of organic eggs have already being produced according to the newly proposed standards and hence would not generate any additional benefits in terms of increased consumers' willingness to pay.

6. Apply the revised "willingness to pay" estimates in the range of $0.16 (Low) and $0.25 (high) per dozen eggs.

Conclusions

The results of the calculations for the foregoing analysis are set forth in a spreadsheet appearing as Attachment A. Based on these calculations I conclude:

1. The *OLPP RIA* mistakenly applied straight line reduction to the estimated benefits not to the estimated costs and the *Rescission RIA* correctly applied the reduction to estimated costs but reproduced the mistake of applying it to the estimated benefits, thus artificially reducing the estimated value of the benefits relied upon in the *Rescission*.

2. The sources of economic data used in the *OLPP RIA* and the *Rescission RIA* were identical.

3. The formula for calculating the estimated benefits of the *OLPP* was published in the *OLPP RIA* at fn. 94 and no different formula was published in the *Rescission RIA*. The correction of mathematical errors in the computation of the stream of present values of benefits described in the *Rescission RIA* simply changed the values plugged into the existing formula but there was no restatement of the formula.

4. The calculations in the *Rescission* and *Rescission RIA* of the estimated value of the benefits of the *OLPP* cannot be replicated using the published formula that included straight line reduction of benefits. It appears that either different number of eggs or different formula was used but is nowhere disclosed.

5. The calculations appearing in the spreadsheet in Attachment A follow the published formula, *OLPP RIA*, fn. 94, except the straight-line reduction in benefits was discarded and a straight line depreciation of costs in accordance with conventional economic modeling, was used.

6. Attachment A demonstrates that the correct calculations of the estimated value of the benefits of the *OLPP* are in each case higher than the corresponding estimated value of the benefits of the *OLPP* calculated and published in in the *Rescission*.[7] *Compare*

---

[7] A quick comparison of Table A in the *Rescission,* at p. 6. to Table C in the *Rescission,* at p. 12, discloses that the transfers estimates did not change, the benefit estimates become somewhat larger and the cost estimates became somewhat smaller in Scenario 1 and remained unchanged in Scenario 2 and 3. I was unable to determine the formula or what computational interventions were exactly performed to arrive at these results.

Attachment A, Alternative Benefits Calculation in the Summary Table in Columns I, J, K and rows 45-52 with *Rescission RIA,* Table B on p. 9 (designated as corrected values)

   a.   This is true in all three market scenarios, for low and high willingness to pay rates and for 3% and 7% discount rates. *See Id.*

7.   A mid-point to mid-point comparison between the estimated costs savings appearing in the *Rescission* and the correctly calculated estimated value of the benefits (without the straight-line depreciation) of the *OLPP* appearing in the attached spreadsheet demonstrates that in all three market scenarios posed by AMS the estimated benefits of the *OLPP* exceed the estimated costs by a large margin. *Compare Attachment A* Column E and Column J, rows 45-52.

8.   The calculations I conducted in the attached spreadsheet do not impose a straight-line depreciation formula to a future estimated benefits stream as occurred in the *Rescission* because such depreciation is in conflict with conventional enterprise budgeting and is fundamentally flawed and produces incorrect results.

9.   If "forced molting" is not directly prohibited by the NOP, the reduction in the estimate of "consumers' willingness to pay" that was relied upon in the *Rescission RIA* was incorrect and artificially lowered the estimated value of the benefits of the *OLPP*.

LOW (16 cents)   12.7% growth, 100% continues organic, 50% have new access to outdoors

year	Eggs	Benefits - 0.16	PV1_3%	PV1_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 56,846,292.16	$ 47,607,874.73	$ 37,879,084.73
2023	800822141	$ 64,065,771.26	$ 52,091,334.78	$ 39,896,942.52
2024	902526553	$ 72,202,124.21	$ 56,997,023.59	$ 42,022,293.66
2025	1017147425	$ 81,371,793.99	$ 62,364,704.45	$ 44,260,864.45
2026	1146325148	$ 91,706,011.83	$ 68,237,885.36	$ 46,618,686.20
2027	1291908442	$ 103,352,675.33	$ 74,664,171.65	$ 49,102,111.54
2028	1455980814	$ 116,478,465.10	$ 81,695,651.89	$ 51,717,831.50
2029	1640890377	$ 131,271,230.16	$ 89,389,320.08	$ 54,472,893.55
2030	1849283455	$ 147,942,676.39	$ 97,807,537.60	$ 57,374,720.59
2031	2084142454	$ 166,731,396.30	$ 107,018,538.72	$ 60,431,130.94
Average per year			$ 49,191,602.86	$ 32,251,770.64

HIGH(25 cents)   12.7% growth, 100% continues organic, 50% have new access to outdoors

year	Eggs	Benefits - 0.25	PV1_3%	PV1_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 88,822,331.50	$ 74,387,304.27	$ 59,186,069.90
2023	800822141	$ 100,102,767.60	$ 81,392,710.60	$ 62,338,972.69
2024	902526553	$ 112,815,819.09	$ 89,057,849.36	$ 65,659,833.85
2025	1017147425	$ 127,143,428.11	$ 97,444,850.71	$ 69,157,600.70
2026	1146325148	$ 143,290,643.48	$ 106,621,695.87	$ 72,841,697.18
2027	1291908442	$ 161,488,555.20	$ 116,662,768.20	$ 76,722,049.28
2028	1455980814	$ 181,997,601.71	$ 127,649,456.08	$ 80,809,111.71
2029	1640890377	$ 205,111,297.13	$ 139,670,812.63	$ 85,113,896.17
2030	1849283455	$ 231,160,431.86	$ 152,824,277.51	$ 89,648,000.92
2031	2084142454	$ 260,517,806.71	$ 167,216,466.75	$ 94,423,642.09
Average per year			$ 76,861,879.47	$ 50,393,391.63

LOW (16 cents)   12.7% growth, 50% moves to cage-free, 50% have new access to outdoors

year	Eggs	Benefits - 0.16	PV2_3%	PV2_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 28,423,146.08	$ 23,803,937.37	$ 18,939,542.37
2023	800822141	$ 32,032,885.63	$ 26,045,667.39	$ 19,948,471.26
2024	902526553	$ 36,101,062.11	$ 28,498,511.80	$ 21,011,146.83
2025	1017147425	$ 40,685,897.00	$ 31,182,352.23	$ 22,130,432.22
2026	1146325148	$ 45,853,005.91	$ 34,118,942.68	$ 23,309,343.10
2027	1291908442	$ 51,676,337.66	$ 37,332,085.83	$ 24,551,055.77
2028	1455980814	$ 58,239,232.55	$ 40,847,825.95	$ 25,858,915.75
2029	1640890377	$ 65,635,615.08	$ 44,694,660.04	$ 27,236,446.77
2030	1849283455	$ 73,971,338.20	$ 48,903,768.80	$ 28,687,360.29
2031	2084142454	$ 83,365,698.15	$ 53,509,269.36	$ 30,215,565.47
Average per year			$ 24,595,801.43	$ 16,125,885.32

HIGH(25 cents)   12.7% growth, 50% moves to cage-free, 50% have new access to outdoors

year	Eggs	Benefits - 0.25	PV2_3%	PV2_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 44,411,165.75	$ 37,193,652.14	$ 29,593,034.95
2023	800822141	$ 50,051,383.80	$ 40,696,355.30	$ 31,169,486.34
2024	902526553	$ 56,407,909.54	$ 44,528,924.68	$ 32,829,916.92
2025	1017147425	$ 63,571,714.05	$ 48,722,425.36	$ 34,578,800.35
2026	1146325148	$ 71,645,321.74	$ 53,310,847.94	$ 36,420,848.59
2027	1291908442	$ 80,744,277.60	$ 58,331,384.10	$ 38,361,024.64
2028	1455980814	$ 90,998,800.86	$ 63,824,728.04	$ 40,404,555.86
2029	1640890377	$ 102,555,648.56	$ 69,835,406.31	$ 42,556,948.08
2030	1849283455	$ 115,580,215.93	$ 76,412,138.75	$ 44,824,000.46
2031	2084142454	$ 130,258,903.36	$ 83,608,233.37	$ 47,211,821.04
Average per year			$ 38,430,939.73	$ 25,196,695.82

LOW (16 cents)   No growth, 50% moves to cage free, 50% have new access to outdoors

year	Eggs	Benefits - 0.16	PV3_3%	PV3_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 28,423,146.08	$ 23,803,937.37	$ 18,939,542.37
2023	710578652	$ 28,423,146.08	$ 23,110,618.80	$ 17,700,506.88
2024	710578652	$ 28,423,146.08	$ 22,437,493.98	$ 16,542,529.80
2025	710578652	$ 28,423,146.08	$ 21,783,974.74	$ 15,460,308.22
2026	710578652	$ 28,423,146.08	$ 21,149,490.04	$ 14,448,886.19
2027	710578652	$ 28,423,146.08	$ 20,533,485.48	$ 13,503,631.95
2028	710578652	$ 28,423,146.08	$ 19,935,422.79	$ 12,620,216.78
2029	710578652	$ 28,423,146.08	$ 19,354,779.41	$ 11,794,595.12
2030	710578652	$ 28,423,146.08	$ 18,791,047.97	$ 11,022,986.09
2031	710578652	$ 28,423,146.08	$ 18,243,735.89	$ 10,301,856.16
Average per year			$ 13,942,932.43	$ 9,489,003.97

HIGH(25 cents)   No growth, 50% moves to cage free, 50% have new access to outdoors

year	Eggs	Benefits - 0.25	PV3_3%	PV3_7%
2017			$ -	$ -
2018			$ -	$ -
2019			$ -	$ -
2020			$ -	$ -
2021			$ -	$ -
2022	710578652	$ 44,411,165.75	$ 37,193,652.14	$ 29,593,034.95
2023	710578652	$ 44,411,165.75	$ 36,110,341.88	$ 27,657,042.01
2024	710578652	$ 44,411,165.75	$ 35,058,584.35	$ 25,847,702.81
2025	710578652	$ 44,411,165.75	$ 34,037,460.53	$ 24,156,731.60
2026	710578652	$ 44,411,165.75	$ 33,046,078.19	$ 22,576,384.67
2027	710578652	$ 44,411,165.75	$ 32,083,571.06	$ 21,099,424.93
2028	710578652	$ 44,411,165.75	$ 31,149,098.11	$ 19,719,088.72
2029	710578652	$ 44,411,165.75	$ 30,241,842.83	$ 18,429,054.88
2030	710578652	$ 44,411,165.75	$ 29,361,012.45	$ 17,223,415.77
2031	710578652	$ 44,411,165.75	$ 28,505,837.33	$ 16,096,650.25
Average per year			$ 21,785,831.92	$ 14,826,568.71

Summary Table:

Scenario	Low	High	Cost Paper reduct	Midpoint
100% compliance - 7% 3%	28.7	31	3.9	33.75
50% compliance - 7% 3%	11.7	12	1.95	13.8
50% no growth - 7% 3%	8.2	8.2	1.95	10.15

Estimated benefits from Final rule withdrawal

High	Mean	Low
30.4	21.7	13
31.6	22.6	13.6
8.4	6	3.6
8.7	6.2	3.7
7.6	5.5	3.3
8	5.7	3.4

Alternative benefits computation

High	Mid
50.4	41.3
76.7	62.95
25.2	20.65
38.4	31.5
14.8	12.15
21.8	17.85

Low
32.2
49.2
16.1
24.6
9.5
13.9