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Environmental Land Management  
1602 11<sup>th</sup> Drive NE  
Austin, MN 55912

RE: Agronomist Review for Smithfield Packaged Meats Corp – Sioux Falls, SD Permit# 00-SDP-06-13

The following is an agronomic review of waste products applied from the Smithfield Packaged Meats Corp facility (formerly called the John Morrell & Co. facility) to land in two Iowa counties; Sioux & Lyon Counties under permit # 00-SDP-06-13. A brief description of the regulated waste product will be given to provide context of the review and a brief discussion of the land application sites, application rates and site characteristics will be done as well.

Product Description:

Smithfield Packaged Meats Corp application rates are required to follow appropriate agronomic requirements. An application of rate of approximately 1.8 dry tons per acre of industrial sludge will supply about 103 pounds of available nitrogen and about 87 lbs. of P<sub>2</sub>O<sub>5</sub> and 9 lbs. of K<sub>2</sub>O, assuming incorporation after 48 hours. The organic nitrogen in the product will be slowly converted to plant available nitrate as soil microbes convert it – thus, its availability will depend on numerous environmental conditions including, soil temperature, moisture, drainage and pH. It should be noted that the product does not contain significant levels of arsenic, lead or mercury.

A corn crop with a yield of 200 bushels per acre will require approximately 180-190 pounds of nitrogen and will remove about 64 pounds of phosphorus and 44 pounds of potassium per acre. A soybean crop with a yield of 50 bushels per acre will require approximately 190 pounds of nitrogen (fixed on its own), 36 pounds of phosphorus and 60 pounds of potassium per acre each year. From an agronomic perspective, soil fertility in the high range is preferred. This translates to  $\pm 21$  ppm for phosphorus using the Mehlich test and  $\pm 180$  ppm for Potassium (dried). The opinion in this review will be based on characteristics and rates of the applied waste product, current soil tests and land application site conditions.

Land Application Sites for 2025 Crop Year:

Approximately 1,649 acres were utilized for land application of the Smithfield Packaged Meats Corp by-product. The average application rate of the Industrial Sludge by-product was approximately 1.4 dry tons per acre. The equates to approximately 90 pounds of available Nitrogen, 60 pounds of P2O5, 7.5 pounds of K2O and 7.5 pounds of Sodium applied per acre. The potassium represents a very low risk, and the phosphorus represents a low to moderate risk of nutrient loading and potential harm to water and soil quality. A summary of applications is shown below:

Site	Permitted Acres	Acres Applied	RATE	Dry Tons Applied	Byproduct	Application Period
<b>Verbeek 284</b>	284	110	1.4	152	Industrial Sludge	4th Quarter
<b>Lknoblock 35</b>	40	21	1.4	30	Industrial Sludge	4th Quarter
<b>TerWee Sioux 8E</b>	189	100	1.6	164.6	Industrial Sludge	4th Quarter
<b>Rath Rock 20</b>	149	149	1.8	264.3	Industrial Sludge	4th Quarter
<b>Feucht 146</b>	146	80	1.5	122.4	Industrial Sludge	4th Quarter
<b>Matt Bruggeman 80</b>	69	69	1.5	106	Industrial Sludge	4th Quarter
<b>Kooima 76</b>	76	76	1.5	115.4	Industrial Sludge	4th Quarter
<b>Verbeek 140</b>	140	70	1.5	103.1	Industrial Sludge	4th Quarter
<b>Verbeek Rock 31</b>	122	122	1.3	162.5	Industrial Sludge	4th Quarter
<b>TerWee Sioux 10N</b>	168	92	1.4	131.8	Industrial Sludge	4th Quarter
<b>Martin 145</b>	145	73	1.3	97.5	Industrial Sludge	4th Quarter
<b>LKnoblock 190</b>	141	141	1.3	179.5	Industrial Sludge	1st Quarter
<b>Mark Bruggeman 80</b>	71	25	1.5	36.5	Industrial Sludge	4th Quarter
<b>Martin 130</b>	130	58	1.2	67.3	Industrial Sludge	1st Quarter
<b>Lknoblock 75</b>	75	35	1.4	48.4	Industrial Sludge	4th Quarter
<b>Rens Larchwood 26</b>	68	68	1.3	86.9	Industrial Sludge	1st Quarter
<b>Lknoblock 35</b>	40	14	1.3	18.3	Industrial Sludge	1st Quarter
<b>Verbeek 150</b>	150	150	1.5	221.8	Industrial Sludge	2nd Quarter
<b>TerWee Sioux 18</b>	275	105	1.7	173.8	Industrial Sludge	2nd Quarter
<b>Rens Larchwood 15</b>	112	112	1.4	156.4	Industrial Sludge	2nd Quarter
<b>Rens Larchwood 14</b>	219	219	1.4	309.5	Industrial Sludge	2nd Quarter
<b>Rens Larchwood 22N</b>	149	149	1.4	213.8	Industrial Sludge	2nd Quarter

The fields used for land application were evaluated for soil phosphorus levels, salts and soil pH. Farms with a soil pH below 6.0 should receive an application of agricultural lime. Salt levels should be managed to maintain levels below 1.0. Fields with a phosphorus level exceeding 31 ppm in the Mehlich P should be managed so that fertility levels do not increase, thus applying nutrients at crop removal rates. A summary of field characteristics is shown below – site specific discussion follows (fields receiving more than one by-product on the same acres are shown in Bold font):

Farmer	Site	pH	MEH-3P	Salts	NetP205	NetK20
Tim Verbeek	Verbeek 284	5.7	28	0.2	-7	-44
Lynn Knoblock	Lknoblock 35	5.6	61	0.3	6	-36
Mike TerWee	TerWee Sioux 8E	6.2	11	0.2	6	-42
Ron Rath	Rath Rock 20	5.5	63	0.4	7	-45
Tim Feucht	Feucht 146	5.7	76	0.1	0	-43
Matt Bruggeman	Matt Bruggeman 80	6.4	38	0.2	5	-40
Todd Martin	Kooima 76	5.8	44	0.2	0	-43
Tim Verbeek	Verbeek 140	5.6	34	0.2	-3	-43
Tim Verbeek	Verbeek Rock 31	5.6	24	0.2	-9	-43
Mike TerWee	TerWee Sioux 10N	6.3	45	0.4	-10	-47
Todd Martin	Martin 145	6.6	22	0.2	-2	-39
Lynn Knoblock	LKnoblock 190	6.1	85	0.4	-12	-44
Mark Bruggeman	Mark Bruggeman 80	6.3	19	0.1	23	-72
Todd Martin	Martin 130	6.0	40	0.2	-12	-41
Lynn Knoblock	Lknoblock 75	6.0	84	0.4	-7	-43
Jerry Rens	Rens Larchwood 26	6.1	31	0.3	-16	-47
Lynn Knoblock	Lknoblock 35	5.6	61	0.3	15	-26
Tim Verbeek	Verbeek 150	5.6	61	0.3	0	-41
Mike TerWee	TerWee Sioux 18	5.8	28	0.2	3	-44
Jerry Rens	Rens Larchwood 15	5.9	30	0.2	-5	-43
Jerry Rens	Rens Larchwood 14	6.2	29	0.2	-11	-47
Jerry Rens	Rens Larchwood 22N	6.1	28	0.2	-9	-46

2025 Site Specific Discussion:

**Verbeek 284:** This farm received 152 dry tons of product applied on approximately 110 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 230 Bushels per acre was harvested on the farm. Based on this yield, approximately 74 lbs. of P2O5 and 51 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.4%, the phosphorus ranges from a minimum of 20 and a max of 40 with an average of 28 ppm; the High range according to Iowa State University. Soil potassium averages 182 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and

reported crop yields, a net of -7 lbs of P2O5 and -44 lbs of K2O are calculated on these acres. Average soil pH is 5.7 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Lknoblock 35:** This farm received 29.8 dry tons of product applied on approximately 21 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 194 Bushels per acre was harvested on the farm. Based on this yield, approximately 62 lbs. of P2O5 and 43 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 5.8%, the phosphorus ranges from a minimum of 39 and a max of 74 with an average of 61 ppm; the Very High range according to Iowa State University. Soil potassium averages 153 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 6 lbs of P2O5 and -36 lbs of K2O are calculated on these acres. Average soil pH is 5.6 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

**TerWee Sioux 8E:** This farm received 164.6 dry tons of product applied on approximately 100 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 228 Bushels per acre was harvested on the farm. Based on this yield, approximately 73 lbs. of P2O5 and 50 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 3.5%, the phosphorus ranges from a minimum of 8 and a max of 15 with an average of 11 ppm; the Low range according to Iowa State University. Soil potassium averages 125 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 6 lbs of P2O5 and -42 lbs of K2O are calculated on these acres. Average soil pH is 6.2 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Rath Rock 20:** This farm received 264.3 dry tons of product applied on approximately 149 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 243 Bushels per acre was harvested on the farm. Based on this yield, approximately 78 lbs. of P2O5 and 53 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.9%, the phosphorus ranges from a minimum of 31 and a max of 99 with an average of 63 ppm; the Very High range according to Iowa State University. Soil potassium averages 213 ppm; the High range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 7 lbs of P2O5 and -45 lbs of K2O are calculated on these acres. Average soil pH is 5.5 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.4 mhoms/dm and there are no concerns related to current measured salt levels.

**Feucht 146:** This farm received 122.4 dry tons of product applied on approximately 80 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 230 Bushels per acre was harvested on the farm. Based on this yield, approximately 74 lbs. of P2O5 and 51 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.7%, the phosphorus ranges from a minimum of 68 and a max of 89 with an average of 76 ppm; the Very High range according to Iowa State University. Soil potassium averages 158 ppm; the

Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 0 lbs of P<sub>2</sub>O<sub>5</sub> and -43 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 5.7 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.1 mhoms/dm and there are no concerns related to current measured salt levels.

**Matt Bruggeman 80:** This farm received 106 dry tons of product applied on approximately 69 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 216 Bushels per acre was harvested on the farm. Based on this yield, approximately 69 lbs. of P<sub>2</sub>O<sub>5</sub> and 48 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.4%, the phosphorus ranges from a minimum of 22 and a max of 68 with an average of 38 ppm; the Very High range according to Iowa State University. Soil potassium averages 153 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 5 lbs of P<sub>2</sub>O<sub>5</sub> and -40 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.4 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Kooima 76:** This farm received 115.4 dry tons of product applied on approximately 76 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 229 Bushels per acre was harvested on the farm. Based on this yield, approximately 73 lbs. of P<sub>2</sub>O<sub>5</sub> and 50 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.5%, the phosphorus ranges from a minimum of 28 and a max of 55 with an average of 44 ppm; the Very High range according to Iowa State University. Soil potassium averages 156 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 0 lbs of P<sub>2</sub>O<sub>5</sub> and -43 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 5.8 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Verbeek 140:** This farm received 103.1 dry tons of product applied on approximately 70 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 231 Bushels per acre was harvested on the farm. Based on this yield, approximately 74 lbs. of P<sub>2</sub>O<sub>5</sub> and 51 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 5.1%, the phosphorus ranges from a minimum of 29 and a max of 42 with an average of 34 ppm; the Very High range according to Iowa State University. Soil potassium averages 167 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -3 lbs of P<sub>2</sub>O<sub>5</sub> and -43 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 5.6 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Verbeek Rock 31:** This farm received 162.5 dry tons of product applied on approximately 122 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 227 Bushels per acre was harvested on the farm. Based on this yield, approximately 73 lbs. of P<sub>2</sub>O<sub>5</sub> and 50 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.2%, the phosphorus ranges from a minimum of 8 and a max of 38 with

an average of 24 ppm; the High range according to Iowa State University. Soil potassium averages 158 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -9 lbs of P<sub>2</sub>O<sub>5</sub> and -43 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 5.6 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**TerWee Sioux 10N:** This farm received 131.8 dry tons of product applied on approximately 92 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 247 Bushels per acre was harvested on the farm. Based on this yield, approximately 79 lbs. of P<sub>2</sub>O<sub>5</sub> and 54 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.5%, the phosphorus ranges from a minimum of 24 and a max of 66 with an average of 45 ppm; the Very High range according to Iowa State University. Soil potassium averages 189 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -10 lbs of P<sub>2</sub>O<sub>5</sub> and -47 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.3 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.4 mhoms/dm and there are no concerns related to current measured salt levels.

**Martin 145:** This farm received 97.5 dry tons of product applied on approximately 73 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 207 Bushels per acre was harvested on the farm. Based on this yield, approximately 66 lbs. of P<sub>2</sub>O<sub>5</sub> and 46 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.8%, the phosphorus ranges from a minimum of 16 and a max of 32 with an average of 22 ppm; the High range according to Iowa State University. Soil potassium averages 153 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -2 lbs of P<sub>2</sub>O<sub>5</sub> and -39 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.6 - Neutral and no action is needed. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**LKnoblock 190:** This farm received 179.5 dry tons of product applied on approximately 141 acres in the 1st Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 227 Bushels per acre was harvested on the farm. Based on this yield, approximately 73 lbs. of P<sub>2</sub>O<sub>5</sub> and 50 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.6%, the phosphorus ranges from a minimum of 67 and a max of 109 with an average of 85 ppm; the Very High range according to Iowa State University. Soil potassium averages 305 ppm; the Very High range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -12 lbs of P<sub>2</sub>O<sub>5</sub> and -44 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.1 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.4 mhoms/dm and there are no concerns related to current measured salt levels.

**Mark Bruggeman 80:** This farm received 36.5 dry tons of product applied on approximately 25 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Soybeans yield of 66 Bushels per acre was harvested on the farm. Based on this yield, approximately 48 lbs. of P<sub>2</sub>O<sub>5</sub> and 79 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic

matter levels are approximately 3.8%, the phosphorus ranges from a minimum of 18 and a max of 20 with an average of 19 ppm; the Optimum range according to Iowa State University. Soil potassium averages 160 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 23 lbs of P<sub>2</sub>O<sub>5</sub> and -72 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.3 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.1 mhoms/dm and there are no concerns related to current measured salt levels.

**Martin 130:** This farm received 67.3 dry tons of product applied on approximately 58 acres in the 1st Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 211 Bushels per acre was harvested on the farm. Based on this yield, approximately 68 lbs. of P<sub>2</sub>O<sub>5</sub> and 46 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.5%, the phosphorus ranges from a minimum of 15 and a max of 65 with an average of 40 ppm; the Very High range according to Iowa State University. Soil potassium averages 153 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -12 lbs of P<sub>2</sub>O<sub>5</sub> and -41 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Lknoblock 75:** This farm received 48.4 dry tons of product applied on approximately 35 acres in the 4th Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 229 Bushels per acre was harvested on the farm. Based on this yield, approximately 73 lbs. of P<sub>2</sub>O<sub>5</sub> and 50 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.5%, the phosphorus ranges from a minimum of 73 and a max of 107 with an average of 84 ppm; the Very High range according to Iowa State University. Soil potassium averages 334 ppm; the Very High range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -7 lbs of P<sub>2</sub>O<sub>5</sub> and -43 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.4 mhoms/dm and there are no concerns related to current measured salt levels.

**Rens Larchwood 26:** This farm received 86.9 dry tons of product applied on approximately 68 acres in the 1st Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 243 Bushels per acre was harvested on the farm. Based on this yield, approximately 78 lbs. of P<sub>2</sub>O<sub>5</sub> and 53 lbs. of K<sub>2</sub>O were removed. Soil test results show that the organic matter levels are approximately 4.9%, the phosphorus ranges from a minimum of 15 and a max of 47 with an average of 31 ppm; the Very High range according to Iowa State University. Soil potassium averages 178 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -16 lbs of P<sub>2</sub>O<sub>5</sub> and -47 lbs of K<sub>2</sub>O are calculated on these acres. Average soil pH is 6.1 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

**Lknoblock 35:** This farm received 18.3 dry tons of product applied on approximately 14 acres in the 1st Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported

Corn yield of 149 Bushels per acre was harvested on the farm. Based on this yield, approximately 48 lbs. of P2O5 and 33 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 5.8%, the phosphorus ranges from a minimum of 39 and a max of 74 with an average of 61 ppm; the Very High range according to Iowa State University. Soil potassium averages 153 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 15 lbs of P2O5 and -26 lbs of K2O are calculated on these acres. Average soil pH is 5.6 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

**Verbeek 150:** This farm received 221.8 dry tons of product applied on approximately 150 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 222 Bushels per acre was harvested on the farm. Based on this yield, approximately 71 lbs. of P2O5 and 49 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.4%, the phosphorus ranges from a minimum of 7 and a max of 122 with an average of 61 ppm; the Very High range according to Iowa State University. Soil potassium averages 184 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 0 lbs of P2O5 and -41 lbs of K2O are calculated on these acres. Average soil pH is 5.6 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

**TerWee Sioux 18:** This farm received 173.8 dry tons of product applied on approximately 105 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 238 Bushels per acre was harvested on the farm. Based on this yield, approximately 76 lbs. of P2O5 and 52 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 2.9%, the phosphorus ranges from a minimum of 21 and a max of 39 with an average of 28 ppm; the High range according to Iowa State University. Soil potassium averages 159 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of 3 lbs of P2O5 and -44 lbs of K2O are calculated on these acres. Average soil pH is 5.8 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Rens Larchwood 15:** This farm received 156.4 dry tons of product applied on approximately 112 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 225 Bushels per acre was harvested on the farm. Based on this yield, approximately 72 lbs. of P2O5 and 50 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.7%, the phosphorus ranges from a minimum of 22 and a max of 40 with an average of 30 ppm; the High range according to Iowa State University. Soil potassium averages 166 ppm; the Optimum range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -5 lbs of P2O5 and -43 lbs of K2O are calculated on these acres. Average soil pH is 5.9 - Very Acidic and should be treated with agricultural lime to raise the pH to 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Rens Larchwood 14:** This farm received 309.5 dry tons of product applied on approximately 219 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 246 Bushels per acre was harvested on the farm. Based on this yield, approximately 79 lbs. of P2O5 and 54 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.7%, the phosphorus ranges from a minimum of 19 and a max of 40 with an average of 29 ppm; the High range according to Iowa State University. Soil potassium averages 149 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -11 lbs of P2O5 and -47 lbs of K2O are calculated on these acres. Average soil pH is 6.2 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

**Rens Larchwood 22N:** This farm received 213.8 dry tons of product applied on approximately 149 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Corn yield of 243 Bushels per acre was harvested on the farm. Based on this yield, approximately 78 lbs. of P2O5 and 53 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.7%, the phosphorus ranges from a minimum of 21 and a max of 43 with an average of 28 ppm; the High range according to Iowa State University. Soil potassium averages 158 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -9 lbs of P2O5 and -46 lbs of K2O are calculated on these acres. Average soil pH is 6.1 - Slightly Acidic and should be monitored to maintain soil pH near 6.5. Reported salt (EC) levels are 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

Soil phosphorus and applied nitrogen are the primary nutrients of concern to water quality and public health. The reported rates of Nitrogen do not pose a risk to water quality. The applied phosphorus rates in conjunction with the reported nutrient removal rates do not pose a significant risk to environmental quality or public health. Best management practices in nutrient management and land application should always be followed.

Regards,



Jim Nesseth  
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Andrew Nesseth  
Environmental Consultant