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Environmental Land Management
1602 11th Drive NE
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RE: Agronomist Review for Cargill – Fort Dodge, IA Permit #94-SDP-23-14P

The following is an agronomic review of by-products applied from the Cargill – Fort Dodge, IA facility to land in two Iowa counties; Webster and Calhoun under permit # 94-SDP-23-14P. By-product was applied in the 2025 calendar year. A brief description of the regulated by-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:

Cargill – Fort Dodge is permitted to apply up to 2 dry tons per acre per year of industrial sludge on permitted land application sites. Scrap Feed is permitted to apply up to 5 dry tons per acre per year on permitted land application sites. Based on the most recent average of scrap feed tests, an application of rate of approximately 5 dry tons per acre will supply about 100 pounds of available nitrogen (N). It also contains about 75 pounds of P2O5. The industrial sludge is typically applied at a rate of 1 dry tons per acre. The most recent test averages of the industrial sludge indicate that at a rate of 1 dry tons per acre approximately 51 pounds of available nitrogen and 70 pounds of P2O5 will be supplied, respectively. The organic nitrogen in the products will be slowly converted to plant available nitrate as soil microbes convert it – thus, its ultimate availability will depend on numerous environmental conditions including, soil temperature, moisture, drainage and pH. The application rate of 5 dry tons of scrap feed would apply approximately 10 total pounds of Sodium per acre and an application rate of 1 dry tons of industrial sludge would apply approximately 9 pounds of Sodium, neither of which is likely to cause any sodicity issues. It should be noted that the products do not contain significant levels of arsenic, lead or mercury, as tested.

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 ±21 ppm for phosphorus using the Mehlich test and ±180 ppm for Potassium (dried). The opinion in this review will be based on characteristics and rates of the applied by-product, current soil tests and land application site conditions.

Site	Permitted Acres	Acres Applied	Rate	Dry Tons	By Product	Application Period
Durschmidt 230	230	65	1.0	62.4	Industrial Sludge	4th Quarter
Durschmidt 73	73	73	1.0	71.3	Industrial Sludge	2nd Quarter
Durschmidt 75	75	75	1.0	76.1	Industrial Sludge	2nd Quarter
Durschmidt Cain West	139	139	1.0	143.2	Industrial Sludge	4th Quarter
Durschmidt Hammer 19	310	220	1.2	266	Industrial Sludge	4th Quarter
Durschmidt Hammer 30	44	44	1.1	50.1	Industrial Sludge	4th Quarter
Durschmidt Hood	127	125	1.0	119.1	Industrial Sludge	4th Quarter
Durschmidt Jordison	117	112	1.0	107	Industrial Sludge	4th Quarter
Durschmidt Kapustka	105	105	1.0	107	Industrial Sludge	2nd Quarter
Durschmidt Knopf	99	70	1.0	72.2	Industrial Sludge	2nd Quarter
Durschmidt Lantz	463	463	0.9	437.4	Industrial Sludge	1st Quarter
Stumpf Grady	119	45	4.3	193.3	Scrap Feed	1st Quarter
Stumpf Home	616	260	4.3	1111.9	Scrap Feed	2nd Quarter
Stumpf Home	616	255	4.3	1100	Scrap Feed	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:

Farmer	Site	pH	MEH-3 P	Salts	Net P2O5	Net K2O
Jason Durschmidt	Durschmidt 230	6.8	21	0.4	-15	-33

Jason Durschmidt	Durschmidt 73	5.7	34	0.2	-11	-30
Jason Durschmidt	Durschmidt 75	5.7	20	0.3	-15	-34
Jason Durschmidt	Durschmidt Cain West	6.1	32	0.2	-8	-30
Jason Durschmidt	Durschmidt Hammer 19	5.9	32	0.3	1	-28
Jason Durschmidt	Durschmidt Hammer 30	6.0	25	0.2	5	-23
Jason Durschmidt	Durschmidt Hood	5.7	37	0.2	-16	-33
Jason Durschmidt	Durschmidt Jordison	5.8	45	0.2	-18	-34
Jason Durschmidt	Durschmidt Kapustka	5.6	21	0.2	-14	-34
Jason Durschmidt	Durschmidt Knopf	5.9	20	0.2	-7	-29
Jason Durschmidt	Durschmidt Lantz	6.4	13	0.3	-14	-32
Kurt Stumpf	Stumpf Grady	6.0	13	0.1	18	-37
Kurt Stumpf	**Stumpf Home**	6.0	42	0.2	25	-25
Kurt Stumpf	**Stumpf Home**	6.0	42	0.2	-5	-3

Land Application Sites for 2025 Crop Year:

Durschmidt 230: This farm received 62.4 dry tons of product applied on approximately 65 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 235 Bushels per acre was harvested on the farm. Based on this yield, approximately 75 lbs. of P2O5 and 52 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.5%, the phosphorus ranges from a minimum of 13 and a max of 28 with an average of 21 ppm; the High range according to Iowa State University. Soil potassium averages 188 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -15 lbs of P2O5 and -33 lbs of K2O are calculated on these acres. Average soil pH is 6.8 - Neutral and no action is needed. Reported salt (EC) levels are 0.4 mhoms/dm and there are no concerns related to current measured salt levels.

Durschmidt 73: This farm received 71.3 dry tons of product applied on approximately 73 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 226 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 4.8%, the phosphorus ranges from a minimum of 12 and a max of 57 with an average of 34 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 cummulative application rate and reported crop yields, a net of -11 lbs of P2O5 and -30 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.

Durschmidt 75: This farm received 76.1 dry tons of product applied on approximately 75 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 247 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 4.2%, the phosphorus ranges from a minimum of 17 and a max of 22 with an average of 20 ppm; the Optimum range according to Iowa State University. Soil potassium averages 164 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -15 lbs of P2O5 and -34 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 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

Durschmidt Cain West: This farm received 143.2 dry tons of product applied on approximately 139 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 4.7%, the phosphorus ranges from a minimum of 16 and a max of 74 with an average of 32 ppm; the Very High range according to Iowa State University. Soil potassium averages 163 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -8 lbs of P2O5 and -30 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.

Durschmidt Hammer 19: This farm received 266 dry tons of product applied on approximately 220 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 236 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 4.3%, the phosphorus ranges from a minimum of 17 and a max of 76 with an average of 32 ppm; the Very High range according to Iowa State University. Soil potassium averages 171 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of 1 lbs of P2O5 and -28 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 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

Durschmidt Hammer 30: This farm received 50.1 dry tons of product applied on approximately 44 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 210 Bushels per acre was harvested on the farm. Based on this yield, approximately 67 lbs. of P2O5 and 46 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 21 and a max of 34 with an average of 25 ppm; the High range according to Iowa State University. Soil potassium averages 157 ppm; the Low range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of 5 lbs of P2O5 and -23 lbs of K2O 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.

Durschmidt Hood: This farm received 119.1 dry tons of product applied on approximately 125 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 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 3.4%, the phosphorus ranges from a minimum of 21 and a max of 44 with an average of 37 ppm; the Very High range according to Iowa State University. Soil potassium averages 196 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -16 lbs of P2O5 and -33 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.

Durschmidt Jordison: This farm received 107 dry tons of product applied on approximately 112 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 3.5%, the phosphorus ranges from a minimum of 33 and a max of 53 with an average of 45 ppm; the Very High range according to Iowa State University. Soil potassium averages 203 ppm; the High range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -18 lbs of P2O5 and -34 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.

Durschmidt Kapustka: This farm received 107 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 245 Bushels per acre was harvested on the farm. Based on this yield, approximately 78 lbs. of P2O5 and 54 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 4.6%, the phosphorus ranges from a minimum of 16 and a max of 24 with an average of 21 ppm; the High range according to Iowa State University. Soil potassium averages 152 ppm; the Low range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -14 lbs of P2O5 and -34 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 0.2 mhoms/dm and there are no concerns related to current measured salt levels.

Durschmidt Knopf: This farm received 72.2 dry tons of product applied on approximately 70 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 226 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 4.1%, the phosphorus ranges from a minimum of 11 and a max of 23 with an average of 20 ppm; the Optimum range according to Iowa State University. Soil potassium averages 197 ppm; the Optimum range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -7 lbs of P2O5 and -29 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.

Durschmidt Lantz: This farm received 437.4 dry tons of product applied on approximately 463 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 231 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 4.8%, the phosphorus ranges from a minimum of 9 and a max of 21 with an average of 13 ppm; the Low range according to Iowa State University. Soil potassium averages 148 ppm; the Low range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -14 lbs of P2O5 and -32 lbs of K2O 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 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

Stumpf Grady: This farm received 193.3 dry tons of product applied on approximately 45 acres in the 1st Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Soybeans yield of 70 Bushels per acre was harvested on the farm. Based on this yield, approximately 50 lbs. of P2O5 and 84 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 2.4%, the phosphorus ranges from a minimum of 9 and a max of 19 with an average of 13 ppm; the Low range according to Iowa State University. Soil potassium averages 87 ppm; the Very Low range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of 18 lbs of P2O5 and -37 lbs of K2O 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 0.1 mhoms/dm and there are no concerns related to current measured salt levels.

Stumpf Home: This farm received 1111.9 dry tons of product applied on approximately 260 acres in the 2nd Quarter of the 2024-2025 crop year. A single by-product source was applied to the acres. A reported Soybeans yield of 60 Bushels per acre was harvested on the farm. Based on this yield, approximately 43 lbs. of P2O5 and 72 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 16 and a max of 65 with an average of 42 ppm; the Very High range according to Iowa State University. Soil potassium averages 215 ppm; the High range according to Iowa State University. Based on the cummulative

application rate and reported crop yields, a net of 25 lbs of P2O5 and -25 lbs of K2O 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.

Stumpf Home: This farm received 1100 dry tons of product applied on approximately 255 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 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 4.9%, the phosphorus ranges from a minimum of 16 and a max of 65 with an average of 42 ppm; the Very High range according to Iowa State University. Soil potassium averages 215 ppm; the High range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of -5 lbs of P2O5 and -3 lbs of K2O 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.

Phosphorus is another nutrient of concern to water quality and public health. The applied phosphorus from the by-products, in conjunction with the reported soil phosphorus levels and crop removal rates, do not pose a significant risk to environmental quality or public health. Continued monitoring of soil test levels is recommended. Applied rates of Sodium should be monitored to ensure that sodicity of soils is not increased. If necessary, added calcium (gypsum) can be used to ensure a proper ratio of calcium, magnesium and sodium is preserved to protect soil health, structure and water infiltration. The reported rates are not likely to negatively impact soil SAR. Best management practices in nutrient management and land application should always be followed.

Regards,

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