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Environmental Land Management
1602 11th Drive NE
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RE: Agronomist Review for Smithfield Fresh Meats-Denison, IA Permit # 24-SDP-11-19

The following is an agronomic review of by-product applied from the Smithfield Fresh Meats in Denison, IA under permit #24-SDP-11-19. Waste was applied in the 2025 crop year. 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 Fresh Meats-Denison application rates are required to follow appropriate agronomic requirements. The facility is permitted to apply approximately 3.06 dry tons per acre of industrial sludge. An application of rate of approximately 3.06 dry tons per acre will supply about 192 pounds of available nitrogen and about 106 lbs. of P2O5 and 7 lbs. of K2O, 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 ±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 waste product, current soil tests and land application site conditions.

Land Application Sites for 2025 Crop Year:

The average application rate of the Industrial Sludge by-product was approximately 1.8 dry tons per acre. The equates to approximately 53.5 pounds of available Nitrogen, 29.6 pounds of P2O5, 1.8 pounds of K2O applied per acre. The phosphorus and potassium represent a very low risk of nutrient loading and potential harm to water and soil quality. There was no land applications from this facility for this cropping year.

Site	Permitted Acres	Acres Applied	RATE	Dry Tons Applied	Byproduct	Application Period
Schroeder Richland 32	535	160	2.5	396.9	Industrial Sludge	4th Quarter

The fields used for land application are 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. No applications were done in the 2024 crop year.

Farmer	Site	pH	MEH-3P	Salts	NetP205	NetK20
James Lindgren	Schroeder Richland 32	6.5	46	0.3	9	-53

2025 Site Specific Discussion:

Schroeder Richland 32: This farm received 396.9 dry tons of product applied on approximately 160 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 265 Bushels per acre was harvested on the farm. Based on this yield, approximately 85 lbs. of P2O5 and 58 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 2.7%, the phosphorus ranges from a minimum of 36 and a max of 54 with an average of 46 ppm; the Very High range according to Iowa State University. Soil potassium averages 220 ppm; the High range according to Iowa State University. Based on the cummulative application rate and reported crop yields, a net of 9 lbs of P2O5 and -53 lbs of K2O are calculated on these acres. Average soil pH is 6.5 - Neutral 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.

Soil phosphorus and applied nitrogen are the primary nutrients of concern to water quality and public health. No applications took place in 2024, thus there is no concerns regarding water quality or public health. Best management practices in nutrient management and land application should always be followed.

Regards,

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