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Environmental Land Management
1602 11th Drive NE
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RE: Agronomist Review for PB Leiner – Davenport, IA Permit# 23-SDP-19-14

The following is an agronomic review of waste products applied from the PB Leiner, Davenport, IA facility to land in one Iowa county; under permit #23-SDP-19-14. 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:

PB Leiner is permitted to apply up to 15 wet tons (5.6 dry tons) per acre per year on the permitted land application site(s). The typical target for application rates is approximately 4 dry tons. Based on the three most recent reviews of the material from April 2023, an application of rate of approximately 5.6 dry tons per acre will supply about 26 pounds of available nitrogen (N). It also contains about 4 pounds of P₂O₅. 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. The typical application rate of 5.6 dry tons will result in approximately 31 pounds of applied sodium. This should not result in any negative impacts soil sodicity. 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.

| Site | Permitted Acres | Acres Applied | Rate | Dry Tons Applied | By Product | Application Period |
|---------------|-----------------|---------------|------|------------------|-------------|--------------------|
| Schurr 1 | 231 | 105 | 5.0 | 525.3 | Filter Cake | 4th Quarter |
| Schurr 3 | 75 | 20 | 5.0 | 101 | Filter Cake | 4th Quarter |
| Schurr 3 | 75 | 52 | 5.0 | 261.3 | Filter Cake | 2nd Quarter |
| Schurr Garlyn | 155 | 20 | 5.1 | 101.4 | Filter Cake | 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 |
|-------------|---------------|-----|---------|-------|----------|---------|
| Gary Schurr | Schurr 1 | 7.7 | 26 | 0.3 | -65 | -43 |
| Gary Schurr | Schurr 3 | 6.2 | 28 | 0.1 | -77 | -51 |
| Gary Schurr | Schurr 3 | 6.2 | 28 | 0.1 | -77 | -51 |
| Gary Schurr | Schurr Garlyn | 6.5 | 22 | 0.2 | -77 | -51 |

Land Application Sites for 2025 Crop Year:

Schurr 1: This farm received 525.3 dry tons of product applied on approximately 105 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 220 Bushels per acre was harvested on the farm. Based on this yield, approximately 70 lbs. of P2O5 and 48 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 5.6%, the phosphorus ranges from a minimum of 17 and a max of 52 with an average of 26 ppm; the High range according to Iowa State University. Soil potassium averages 126 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -65 lbs of P2O5 and -43 lbs of K2O are calculated on these acres. Average soil pH is 7.7 - Alkaline and no action is needed. Reported salt (EC) levels are 0.3 mhoms/dm and there are no concerns related to current measured salt levels.

Schurr 3: This farm received 100.5 dry tons of product applied on approximately 20 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 255 Bushels per acre was harvested on the farm. Based on this yield, approximately 82 lbs. of P2O5 and 56 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 3.8%, the phosphorus ranges from a minimum of 12 and a max of 45 with an average of 28 ppm; the High range according to Iowa State University. Soil potassium averages 207 ppm; the High range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -77 lbs of P2O5 and -51 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 0.1 mhoms/dm and there are no concerns related to current measured salt levels.

Schurr 3: This farm received 261.3 dry tons of product applied on approximately 52 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 255 Bushels per acre was harvested on the farm. Based on this yield, approximately 82 lbs. of P2O5 and 56 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 3.8%, the phosphorus ranges from a minimum of 12 and a max of 45 with an average of 28 ppm; the High range according to Iowa State University. Soil potassium averages 207 ppm; the High range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -77 lbs of P2O5 and -51 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 0.1 mhoms/dm and there are no concerns related to current measured salt levels.

Schurr Garlyn: This farm received 101.4 dry tons of product applied on approximately 20 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 255 Bushels per acre was harvested on the farm. Based on this yield, approximately 82 lbs. of P2O5 and 56 lbs. of K2O were removed. Soil test results show that the organic matter levels are approximately 3.9%, the phosphorus ranges from a minimum of 10 and a max of 34 with an average of 22 ppm; the High range according to Iowa State University. Soil potassium averages 138 ppm; the Low range according to Iowa State University. Based on the cumulative application rate and reported crop yields, a net of -77 lbs of P2O5 and -51 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 0.2 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 soil phosphorus levels do not pose a significant risk to environmental quality or public health. 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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Andrew Nesselth
Environmental Consultant