TUCKER CONSULTING

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Integrated Crop Management

Professional agronomist review Of the fall 2022 sludge application from the Tyson Storm Lake Facility

Hal Tucker
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Storm Lake Iowa

1/16/2023

To: Theresa Stiner of Iowa Department of Natural Resources

Cc: Neil VanZweden of Tyson Foods Inc.

Re: Agronomist Review - Storm Lake Tyson facility fall 2022 sludge application for the 2023 crop.

Dear Regulators and Managers,
the following is the Agronomist review of the sludge application impact on the soil fertility, crop nutrient needs. As well as the environmental impact from the Sludge and its field application toward the erosion of soils, nutrient losses due to the method, timing and rate of application. And concern for volatilization, solute movement leaching of nutrients from the field to surface and/or ground water.

Review of the Application Rate, Timing, and Method.
The application the sludge was pumped using umbilical cord to the injection applicator. This worked well in reducing erosion and road traffic compaction concerns. This fall, the dry soil conditions made soil compaction less of an issue. The use of umbilical cord further reduced the significance of soil compaction. The pumping began and ended on November 22nd. 2022. Prior to application the ground temperatures had moved below 50 degrees. 28 degrees Fahrenheit the day of application. After application, the soil temperatures did not rise above 50 degrees. Therefore, we would expect to have no measurable leaching and denitrification this fall/winter season. Assuming we continue to enjoy conditions, the sludge nitrogen is not expected to leach or have a significant denitrification during spring season.
The field sludge application rate averaged 27,490 gallons per acre. This was slightly below the planned application rate. The sludge application method was with injector knives. This placed the sludge below the surface and reduced volatilization and solute runoff concerns.
The application maps as well as personal field observations taken on 11/24/2022 show proper setback from open water, waterways, residences and well locations. No sludge application runoff was noticed during field observations taken on 11/24/2022.

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Review of the Crop needs supplied by the sludge application.

Nitrogen: Monitoring rainfall and the use of the Late Spring Nitrogen Test would be helpful with any decision to apply more than or less nitrogen then currently suggested. It is recommended to apply an additional 50# nitrogen to corn after soybeans. No nitrogen is recommended if soybeans are planted in 2023.

Phosphorus: The sludge will have satisfied the phosphorus needs of the crop for at least two seasons (maybe more). No additional commercial P2O5 is needed, and none should be recommended.

Potassium: Additional Potassium should be added to most fields. The rate of application would depend mostly on the soil test values. Only 17 pounds K2O was supplied by the sludge. Corn or soybeans will remove 55 to 85 pounds of K2O respectively. VRT fertilizer application based on soil sample K2O and crop removal would follow best management practices.

It is expected that corn and soybean yield levels in the sludge applied areas of the fields will yield higher than commercially fertilized areas of same fields.

Sincerely,

Hal M Tucker

Hal Tucker CCA, CPAg.