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March 8, 2021

Kelli Book
Iowa Department of Natural Resources Wallace State Office Building
502 East 9th Street
Des Moines, Iowa 50319
Email: Kelli.Book@dnr.iowa.gov

RE: Supreme Beef, LLC Nutrient Management Plan

Dear Ms. Book:

The Iowa Environmental Council (IEC) offers the following comments on the Nutrient Management Plan (NMP) submitted by Supreme Beef, LLC (Supreme Beef) on February 1, 2021. These comments represent the views of the Iowa Environmental Council, an alliance of 80 organizations, at-large board members from business, farming, the sciences and education, and over 500 individual members. IEC's members hike, fish, paddle, swim, and recreate in and around lakes, rivers, and streams throughout the state.

The submitted NMP proposes over-application of manure, makes unfounded assumptions regarding manure nutrient content, does not list conservation practices, and will pose a threat to water quality in the region. Each of these deficiencies independently provides a basis for DNR to disapprove the application because it does not comply with the requirements of the Iowa Administrative Code.

We are aware that other commenters have submitted comments today raising many of the same issues that IEC is providing below, and we support those comments.

I. The NMP Proposes Over-Application of Manure in Violation of Iowa Administrative Code Section 567-65.112.

A fundamental purpose of manure management is to prevent water pollution. State law expressly imposes this obligation: "Manure from an animal feeding operation shall be disposed of in a manner which will not cause surface water or groundwater pollution."¹ Avoiding water pollution requires that nutrients applied to land be available for crop uptake.² NMPs specifically require the calculation to determine the appropriate manure application based on crop needs:

¹ IOWA CODE § 459.311(3).

² See, e.g., IAC 567-65.3(1), 65.17(1), 65.17(18), 65.112(8)(a)(2).

Calculations necessary to determine the land area required for the application of manure, process wastewater and open feedlot effluent from an open feedlot operation based on nitrogen or phosphorus use levels (as determined by phosphorus index) in order to obtain optimum crop yields....³

Applying manure in excess of the amount needed by crops will lead to manure loss – either through volatilization or through pollution of ground and surface water.

Manure application rates are determined using nitrogen and phosphorus rates, either of which may be the limiting factor. Phosphorus rates are determined using a phosphorus index (P-Index) that accounts for existing phosphorus in the soil.⁴ The P-Index is calculated for each field receiving manure.⁵ It must be calculated to account for “the most erosive soil map unit that is at least 10 percent of the total field area.”⁶ The P-Index must also consider “the dominant critical soil map unit consistent with NRCS conservation planning guidelines.”⁷ Soils with a P-Index greater than five cannot receive manure until additional conservation measures are implemented to reduce the P-Index.⁸ DNR’s position after the NMP submitted in October was that “corrected calculations will be required prior to any land application from the facility.”⁹

Using the correct dominant critical area soil type and slope information results in three proposed manure application fields exceeding a P-Index of five. DNR cannot approve these fields for manure application according to the requirements in rule. See Attachment A for the P-Index recalculations.

In the same way, using the correct sediment delivery ratio results in two other fields would result in two fields meeting or exceeding a P-Index of five. See Attachment A, part II for the P-Index recalculations. These fields also cannot be approved for manure application and would reduce the number of acres available for manure application.

P-Index calculations in NMPs cannot rely on data that is outdated. For open feedlots, the administrative code expressly incorporates section 65.17(17), which provides that “Soil phosphorus concentration data is considered valid for use in the phosphorus index if the data is four years old or less....”¹⁰ There is an exception for “original” plans, but DNR approved an NMP for Supreme Beef on October 5, 2020, authorizing 2700 cattle at the facility.¹¹ Several fields in its previous NMP application lacked a valid soil phosphorus test, but that deficiency was

³ IAC 567-65.112(8)(a)(2).

⁴ IAC 567-65.112(8)(a)(1).

⁵ IAC 567-65.17(17)(a).

⁶ IAC 567-65.17(17)(b).

⁷ *Id.* Although the rule states this is required for manure management plans, the nutrient management plan requirements fully incorporate the calculations of 65.17(17).

⁸ IAC 567-65.17(17)(f).

⁹ Letter from Jason Marcel, IDNR, to Michael Schmidt, Jan. 19, 2021.

¹⁰ IAC 567-65.112(8)(a)(1), 567-65.17(17)(d).

¹¹ The revised NMP was not submitted to DNR until October 7, 2020, creating some question as to what DNR was approving at the time it issued its approval letter.

excused because the NMP was an “original” plan. Both new fields and fields that were approved in the existing NMP are included in the application to expand. Several newly-proposed fields do not have a valid soil phosphorus test and are proposed for manure application.¹² In some cases, the previously-approved fields are expected to receive higher rates of manure application. In addition, previously-approved fields still do not have a valid soil phosphorus test as shown in Table 1 below and are proposed for manure application.

Table 1. Previously Approved Fields Lacking a Phosphorus Test.

Field Designation	Original Planned Application (gallons/field)	Planned application (gallons/field)
Airport Monona	522,587	1,170,557
East 120	787,271	1,763,420
Marting Hay	55,097	55,097
Meiers	463,235	463,235
Koether – Franklin 26/35	973,485	2,180,520
Total gallons		5,632,829

DNR cannot approve additional manure application on these fields because the calculations were inaccurate or are based on outdated phosphorus tests. Therefore, they do not comply with the P-Index requirements of code section 65.17(17).¹³ This type of deficiency provided a basis for DNR’s partial denial of Supreme Beef’s August 2020 NMP.

II. Nutrient Content Assumptions Lack Justification and Must Be Revised.

The foundation of a nutrient management plan is the nutrient output in the manure of a facility. The applicant must quantify the nutrients that will be produced and must explain how those nutrients will be applied to prevent water pollution.¹⁴ Supreme Beef provided the types of numbers required by the NMP form, but deviated from the numbers provided in rule without justification.

NMPs must provide “nutrient concentration of the manure” and “An estimate of the manure, process wastewater and open feedlot effluent volume or weight produced by the open feedlot operation.”¹⁵ The Iowa Administrative Code includes tables listing the concentrations to use in

¹² For example, the Koether – Giard 34 and Koether – Giard 35 fields have “No” for the “Correct Soils Test for P” column, but would receive 4.6 million gallons per year. *See* NMP at 3.

¹³ Two of the fields, East 120 and Koether Franklin 26/35, are also ineligible because they exceed the P-Index based on the corrected sediment delivery ratio in Attachment A.

¹⁴ IAC 567-65.112(8)(a)(2).

¹⁵ IAC 567-65.112(8)(b)(1), 112(8)(d).

the absence of measured concentrations.¹⁶ For finishing beef cattle, these show 95 pounds of nitrogen per head annually and 59 pounds of phosphorus.¹⁷ Table 5 of Chapter 65 lists the manure production per space of capacity for beef finishing at 6.5 gallons.¹⁸

The NMP listed the N concentration as 10.55 lb/1000 gallons and the phosphorus concentrations as 4.2 lb/1000 gallons.¹⁹ The concentrations came from testing by Upper Iowa Beef, a meat processing facility.²⁰ It is not clear whether the tested manure originated from the Supreme Beef facility or a different facility; the NMP only states “Manure Analysis from a similar operation.”²¹ The NMP did not explain why a processing facility would have manure content similar to the Supreme Beef operations. The NMP assumed 6.5 gallons per space per day, the same as provided in Chapter 65, so the lower concentrations do not result from dilution.

The values provided in the NMP are vastly different from the numbers in Chapter 65 and other sources analyzing manure. Accounting for the expected precipitation does not resolve for the discrepancy in concentration. The NMP does not provide a basis to show that the manure nutrient concentrations it provided are a better indicator of the nutrient concentrations that would be produced by Supreme Beef during its operation.

In combination, the assumptions about the concentration and volume of manure grossly underestimate the nutrients that will likely be produced by the facility. They also do not make mathematical sense. These underestimates and mathematical inaccuracies are shown in Attachment B, which compares the NMP assumptions with those of other sources. Using more realistic assumptions of manure nutrient content, including those in the Iowa Administrative Code tables, or even a 30 percent reduction from those tables, would significantly change the maximum allowable manure application rates calculated on pages 3-5. An NMP premised on nutrient concentrations that are 15-25 percent of actual concentrations will result in egregious over-application of manure and violates the requirements of the Iowa Administrative Code.²²

III. Mandatory Listing of Conservation Practices is Absent From the NMP.

Iowa Administrative Code requires an NMP to show “appropriate site-specific conservation practices to be implemented.”²³ The NMP indicates no erosion control measures will be taken on the fields receiving manure. The calculations for P-Index for each field have a sediment trap

¹⁶ IAC 567-65, Table 3 and Table 3a. Although these tables apply to fully confined operations, the Supreme Beef, LLC operation operates very similarly to a confinement operation by housing the cattle in open-walled barns similar to a confinement.

¹⁷ *Id.*

¹⁸ *Id.* at Table 5. Though not specified, this appears to be daily manure production rather than annual.

¹⁹ NMP at 1.

²⁰ NMP at Part 3, PDF 138-139; Eller, Donnelle, “State reports COVID-19 outbreak at northern Iowa beef processing plant,” Des Moines Register (May 13, 2020).

²¹ NMP at 1.

²² 567 IAC 65.112(8)(a)(2) (requiring calculation of land area for manure application “to obtain optimum crop yields”).

²³ IAC 567-65.112(8)(e)(7).

factor set to 1.0, meaning that no functioning conservation measures are in place. Additionally, no conservation measures are listed on the RUSLE2 calculation records.

Failure to till on-the-contour or install and maintain appropriate conservation measures on the slopes will lead to preventable soil loss. Much of the soil is considered “highly erodible land,” with a high likelihood of erosion or runoff that could reach surface waters. Site-specific conservation practices are needed to protect water quality. We urge the operators to implement these conservation measures.

If conservation measures are in fact being implemented, then the calculations in the NMP are inaccurate and must be redone to account for the conservation practices. The public must then be allowed to review and comment on those claims. If they are not being taken, the risk of water pollution is high.

IV. DNR Should Disapprove the NMP Due to Potential Adverse Impacts.

The facility and proposed manure application fields include natural resources that are extremely sensitive to pollution. The Iowa Administrative Code authorizes DNR to use environmental risk as a basis to disapprove an application and DNR should deny this NMP on that basis.

A. Legal Standard

The Iowa Administrative Code authorizes the DNR to “evaluate any proposed open feedlot operation or proposed expansion of an open feedlot operation that requires a construction permit with respect to its potential adverse impacts on natural resources or the environment.”²⁴ The applicability of the phrase “requires a construction permit” is ambiguous: it could apply to both the original feedlot and the expansion, or just to the expansion. The law also provides that a permit is required “When the department has previously issued the open feedlot operation a construction permit and ... (1) The animal unit capacity of the open feedlot operation will be increased to more than the animal unit capacity approved by the department in the previous construction permit.”²⁵

DNR has issued a construction permit for the basin at the facility, but the permit was a wastewater permit authorizing the basin’s use in an anaerobic digester, not an open feedlot.²⁶ DNR amended the permit for the basin in 2019 without addressing this issue.²⁷ The permit was not accompanied by an NMP, as required for settled open feedlot effluent basin permits.²⁸ Despite that obvious deficiency, DNR characterizes the basin at the site as a settled open feedlot

²⁴ IAC 567-65.103(5).

²⁵ IOWA CODE § 459A.205(4)(b); IAC 567-65.105(1)(b).

²⁶ Permit No. 2018-0109S (2017, amended 2019).

²⁷ *Id.*

²⁸ IOWA CODE § 459A.205(3)(a).

effluent basin approved in 2019;²⁹ DNR apparently plans to ignore this procedural defect and the construction permit requirements. DNR has not required and does not plan to require a new construction permit application for the facility.³⁰

The NMP application would allow Supreme Beef to expand the operation's capacity above the previously authorized threshold. This triggers the construction permit requirement.³¹ It also provides DNR the ability to deny an application on the basis of environmental risk. Specifically, DNR may consider "the proximity of the open feedlot operation structures or open feedlot effluent application areas to sensitive areas, including but not limited to publicly owned land, designated areas, trout streams and karst terrain."³² DNR may also consider "whether open feedlot effluent for land application is hauled or otherwise transported more than five miles."³³

More broadly, the DNR director may deny an application if the operation would cause water pollution, would violate water quality standards, or would have "an adverse effect on natural resources or the environment will occur in a specific area due to the current concentration of animal feeding operations or the associated open feedlot effluent application areas."³⁴

IEC recognizes that the provisions giving DNR authority to disapprove an application based on environmental concerns received an objection from the Administrative Rules Review Committee. This objection does not invalidate the rule or revoke DNR's authority, but has the effect of shifting the burden of proof in any challenge to use reliance on the rule. The Administrative Rules Review Committee argued the master matrix provides a comprehensive assessment mechanism to for approval of feedlots.³⁵ However, the master matrix does not apply to open feedlots and NMPs.³⁶ Instead, only the provisions in rule provide a comprehensive evaluation mechanism for open feedlots. The evidence in these comments and those of other commenters support the conclusion that this facility poses an increased risk to water quality and natural resources based on all of the provisions cited above. DNR would be fully justified in concluding that it cannot reasonably approve the facility.

B. Environmental Sensitivity

Supreme Beef is located in the watershed of Bloody Run Creek, an Outstanding Iowa Water. Bloody Run Creek is also listed as a trout stream. It is one of only a few streams in Iowa to have

²⁹ See "Feature Detail," Iowa DNR, available at <https://programs.iowadnr.gov/animalfeedingoperations/FeatureDetail.aspx?FacilityId=71007&FeatureID=39802> (classifying the feature as a settled open feedlot effluent basin).

³⁰ DNR rejected comments regarding the basin as outside the scope of reviewable comments during the prior NMP comment process, despite an NMP being required for approval of a settled open feedlot effluent basin. See "Summary of Comments Received by the Iowa Department of Natural Resources," Iowa DNR (Oct. 7, 2020), at 19.

³¹ IOWA CODE § 459A.205(4)(b); IAC 567-65.105(1)(b).

³² *Id.* at (a)(2).

³³ *Id.* at (a)(3).

³⁴ *Id.* at (b).

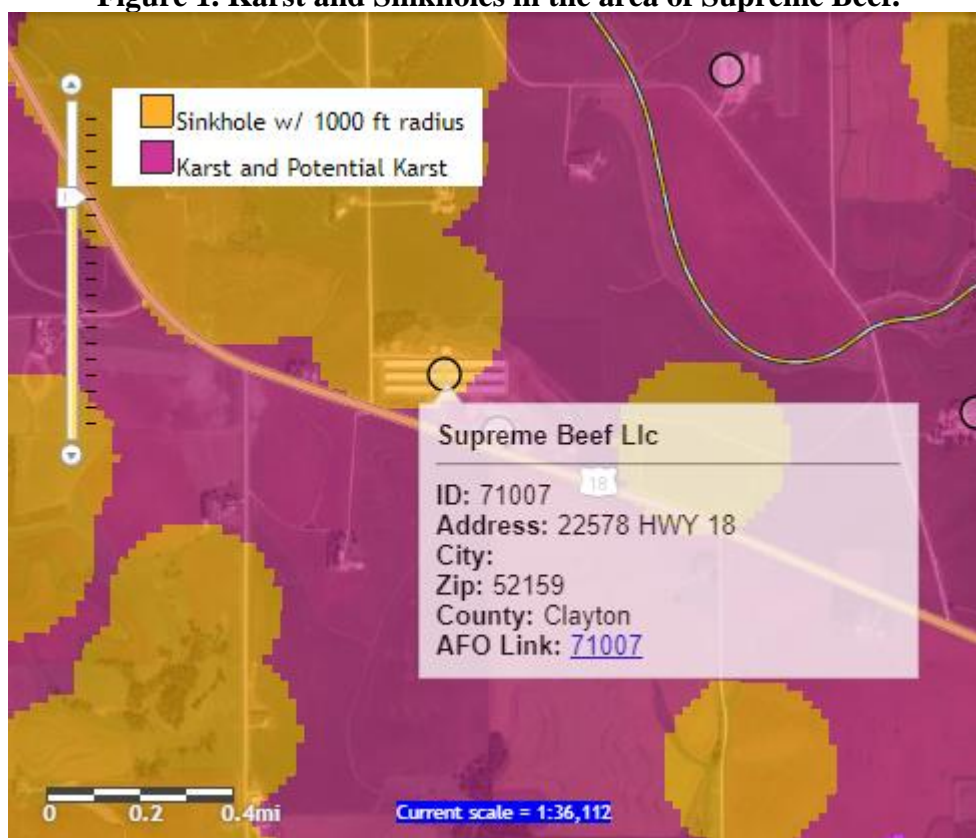
³⁵ See Objection to Ch. 65 (Aug. 8, 2006).

³⁶ IOWA CODE § 459.305 (applying master matrix to confinement feeding operations).

both designations, highlighting the rarity of high-quality waters in the state. Many of the fields proposed for manure application are in highly vulnerable watersheds of other high-quality creeks.

The area surrounding Supreme Beef is karst topography, in which limestone or dolomite sits below shallow soils and often connects surface water to shallow groundwater.³⁷ Sinkholes are common in the area, as shown on Figure 1 below. The karst and sinkhole topography increases the risk that excess nutrients will reach surface and groundwater. The landscape also includes many areas that the U.S. Department of Agriculture classifies as “highly erodible land,” making it susceptible to greater runoff.³⁸

Figure 1. Karst and Sinkholes in the area of Supreme Beef.



Discharges that might degrade Outstanding Iowa Waters are subject to additional scrutiny under Iowa’s implementation of the Clean Water Act through the state’s antidegradation policy.³⁹ Supreme Beef is not applying for a Clean Water Act discharge permit, although it is not clear

³⁷ See “Karst and Sinkholes,” Iowa DNR, available at <https://www.iowadnr.gov/environmental-protection/land-quality/animal-feeding-operations/mapping/karst-sinkholes>; “Iowa DNR – AFO Siting,” Iowa DNR, available at <https://programs.iowadnr.gov/maps/afo/>.

³⁸ The USDA definition is incorporated into state rule at IAC 567-65.1.

³⁹ IAC 567-61.2. Iowa’s Antidegradation Implementation Policy includes discussion of its applicability to open feedlots that apply for Clean Water Act discharge permits through the National Pollutant Discharge Elimination System.

based on the inadequacies described above that the facility should be exempt from such requirements. At present, the only opportunity for scrutiny by the public and the DNR is through this NMP review. As described above, and in comments submitted by others, the NMP is deficient in numerous ways and there are significant risks to water quality if the DNR approves the NMP.

C. Transportation for Land Application

Transporting manure for use as a fertilizer is not always a cost-effective option for an agricultural operation. Manure is expensive to transport.⁴⁰ Surveys and studies often evaluate transporting manure up to a few miles from the source, and have even considered subsidizing manure transport to protect water quality.⁴¹ The Iowa Administrative Code implicitly acknowledges this concern by listing transportation distance as a factor for DNR to consider in evaluating the potential environmental impact from a facility.

In the proposed NMP, the transportation assumptions are cause for significant concern: they include distant fields, the remote landowners pay hauling costs, and the claimed nutrient content is low. Cumulatively, this makes appropriate land application far less economic.

Supreme Beef has proposed land application at fields up to 31 miles away from the facility, as shown in Table 1 below.

Table 1. Manure Application Field Distance from Supreme Beef Facility.

Distance from Facility	Number of Fields	Acres	% Total Acres
< 5 miles	21	1676	38
5-10 miles	17	1463	33
10-20 miles	7	1171	27
>30 miles	1	103	2

More than 60 percent of the field acres in the NMP exceed the distance threshold flagged in the Administrative Code as a potential cause for concern. Almost 30 percent are more than ten miles away. These distances make hauling manure much less efficient for the landowners compared to alternative sources: DNR identified other animal feeding operations within eight miles of Supreme Beef.⁴² One of these might be closer to nearly all of the fields listed by Supreme Beef and could have lower transportation costs.

⁴⁰ See “Costs Associated with Development and Implementation of Comprehensive Nutrient Management Plans,” NRCS (June 2003), at 56.

⁴¹ *Id.*; Hadrich, Joleen & Harrigan, Timothy & Wolf, Christopher. (2010), Economic Comparison of Liquid Manure Transport and Land Application, *Applied Engineering in Agriculture*, at 26, 10.13031/2013.34939; “Using EnviroAtlas Data to Identify Cost-Effective Locations for Manure Management Incentives,” U.S. EPA (2015), available at <https://www.epa.gov/sites/production/files/2015-07/documents/manuremanagement.pdf> (proposing to subsidize manure transport to reduce water quality risks).

⁴² IEC submitted a public records request to DNR in late 2020 for all management plans from animal feeding operations within eight miles of Supreme Beef.

This concern is exacerbated by the fact that the contracts for manure application require (with one exception) the recipient of manure to pay the transportation costs. If it is uneconomic to travel more than five miles, or even ten miles, those landowners will likely not be willing to pay the transportation costs and will choose not to renew the contracts, which expire in July 2021. Supreme Beef will be left with fewer acres on which to apply manure.

D. Growing Concentration of Feedlots in Northeast Iowa

The Supreme Beef proposal would make it one of the largest CAFOs in the state: at 11,600 animal units, it would be in the top 1/3 of one percent of CAFOs in Iowa based on Iowa DNR's animal feeding operation database. In 1990, there were approximately five CAFOs in Clayton County;⁴³ today, DNR's animal feeding operation database identifies 116 operations in Clayton County with a total of over 100,000 animal units.⁴⁴ In response to an IEC data request last year, DNR identified 19 other animal feeding operations with manure management plans or NMPs within eight miles of Supreme Beef. These operations also use nearby cropland for applying manure. The growing number of CAFOs and density of animals increases the risk of manure over-application or of runoff into surface and groundwater.

V. Conclusion

The NMP proposes over-application of manure, makes unfounded assumptions regarding manure nutrient content, does not list conservation practices, and will pose a threat to water quality in the region. Each of these deficiencies independently provides a basis for DNR to disapprove the application because it does not comply with the requirements of the Iowa Administrative Code. IEC urges the DNR to disapprove the NMP.

Sincerely,

/s/ Michael R. Schmidt

Michael R. Schmidt
Staff Attorney
Iowa Environmental Council

/s/ Alicia Vasto

Alicia Vasto
Water Policy and Advocacy Specialist
Iowa Environmental Council

⁴³ Jamie Konopacky, "EWG Study and Mapping Show Large CAFOs in Iowa Up Fivefold Since 1990," Environmental Working Group, available at <https://www.ewg.org/interactive-maps/2020-iowa-cafos/>.

⁴⁴ "Reports," Iowa DNR, available at <https://programs.iowadnr.gov/animalfeedingoperations/PrintableReport.aspx?ReportType=BasicAFOData>.

Attachment A

I. Selection of the dominant critical area (DCA) used in the RUSLE2 calculation is based on NRCS Iowa Agronomy Technical Note 29. In four of 45 cases in the NMP, the incorrect DCA was chosen. In three of those cases, the effect raised the P-Index above the threshold to restrict manure application. The three fields and their correct DCA are:

- Costigan East Lane – 703D2
- June’s – 703E2
- Koether-Giard 35 – 703E2

P-Index calculations with Gross Erosion values based on correct DCA soil type and associated slope length, slope grade, and soil crop yield are demonstrated below. Soil type is the DCA soil map unit for the field based upon the NRCS Web Soil Survey results included in the NMP. All management protocols, tillage practices, and conservation measures are exactly as specified in the NMP as submitted by Supreme Beef, LLC.

NRCS Field Office Technical Guide, Clayton County, IA

NRCS Non-Irrigated Yield Data

October 2019

AREASYMBOL	MUSYM	MUNAME	NRCS CSR2	Corn yld (bu/ac)
IA043	703D2	Dubuque silt loam, 9 to 14 percent slopes, moderately eroded	13	101
IA043	703E2	Dubuque silt loam, 14 to 18 percent slopes, moderately eroded	8	93

Available at https://efotg.sc.egov.usda.gov/references/public/IA/clayton_ylds.pdf

Conservation Planning—Clayton County, Iowa

Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor
703D2—Dubuque silt loam, 9 to 14 percent slopes, moderately eroded					
Dubuque	75	12.0	98	Medium	2
703E2—Dubuque silt loam, 14 to 18 percent slopes, moderately eroded					
Dubuque	75	16.0	98	Medium	2

Available at https://efotg.sc.egov.usda.gov/references/public/IA/Conservation_Planning--Clayton_County_Iowa.pdf

Updated P-Index calculations with correct DCA selected for RUSLE2. P-Index is greater than 5.

USDA NRCS Natural Resources Conservation Service		Iowa Phosphorus Index																
v. 1/22/2007		Credits: Iowa State University USDA National Soil Tilth Laboratory USDA Natural Resource Conservation Service																
Field Number	Erosion							+	Runoff				+	Tile / Subsurface Recharge			=	Overall
	Gross Erosion	Sediment Trap Factor	SDR	Buffer Factor	Enrichment Factor	STP Factor	Erosion PI	RCN Factor	STP Factor	P App Factor	Runoff PI	Flow Factor	STP Factor	Tile/Sub Factor	P Index			
Costi. E. Lane- ORG	7.30	1.00	0.57	1.00	1.10	0.86	3.94	1.32	0.24	0.05	0.39	1.00	0.07	0.07	4.40			
Cost. E. Lane- CORR	11.00	1.00	0.57	1.00	1.10	0.86	5.93	1.32	0.24	0.05	0.39	1.00	0.07	0.07	6.39			
Junes - ORG	7.30	1.00	0.45	1.00	1.10	0.76	2.76	1.32	0.13	0.05	0.24	1.00	0.07	0.07	3.07			
Junes - CORR	17.00	1.00	0.45	1.00	1.10	0.76	6.42	1.32	0.13	0.05	0.24	1.00	0.07	0.07	6.73			
Koehler-G-35 - ORG	11.10	1.00	0.40	1.00	1.10	0.81	3.95	1.32	0.19	0.05	0.32	1.00	0.07	0.07	4.35			
Koehler-G-35 -- CORR	17.00	1.00	0.40	1.00	1.10	0.81	6.06	1.32	0.19	0.05	0.32	1.00	0.07	0.07	6.45			

II. Another two fields were incorrectly measured for distance from the field center to nearest stream. The correct distances are 1,100 feet and 800 feet for East 120 and Koether – Franklin 26/35, respectively.

Updating the sediment delivery ratios (SDR) with the correct values results in the disqualification of these fields for manure application. All management protocols, tillage practices, and conservation measures are exactly as specified in the NMP as submitted by Supreme Beef, LLC.



Iowa Phosphorus Index
Credits: Iowa State University
USDA National Soil Tilth Laboratory
USDA Natural Resource Conservation Service

Field Number	Erosion							+	Runoff				+	Tile / Subsurface Recharge			=	Overall
	Gross Erosion	Sediment Trap Factor	SDR	Buffer Factor	Enrichment Factor	STP Factor	Erosion PI	RCN Factor	STP Factor	P App Factor	Runoff PI	Flow Factor	STP Factor	Tile/Sub Factor	P Index			
East 120 -- ORG	11.10	1.00	0.40	1.00	1.10	0.83	4.11	1.32	0.21	0.05	0.35	1.00	0.07	0.07	4.5			
East 120 -- CORR	11.10	1.00	0.48	1.00	1.10	0.83	4.91	1.32	0.21	0.05	0.35	1.00	0.07	0.07	5.3			
Koether - F 26/35 -- ORG	10.40	1.00	0.47	1.00	1.10	0.78	4.22	1.24	0.15	0.05	0.25	1.00	0.07	0.07	4.5			
Koether - F 26/35 -- CORR	10.40	1.00	0.52	1.00	1.10	0.78	4.66	1.24	0.15	0.05	0.25	1.00	0.07	0.07	5.0			

Attachment B

The values reported in Table 1 of the Supreme Beef, LLC NMP are not consistent with Iowa Administrative Code Chap. 65 manure nutrient concentrations for beef cattle. Additionally, the reported volume does not balance mathematically with the reported nutrient concentrations. Equations demonstrating these inaccuracies are below.

I. The Supreme Beef reported nitrogen concentration is one fourth of IAC guidance. No justification is provided for this discrepancy.

Iowa Administrative Code Chap. 65 estimated manure production and nitrogen concentration:

$$\frac{6.5 \text{ gal}}{\text{day}} \text{ per head} \times 365 \text{ days} = \frac{2,372.5 \text{ gal}}{\text{year}} \text{ per head}$$
$$\frac{95 \text{ lbs N}}{\text{year}} \text{ per head} \div \frac{2,372.5 \text{ gal}}{\text{year}} \text{ per head} = \frac{40 \text{ lbs N}}{1000 \text{ gal}}$$

Supreme Beef reported nitrogen concentration (Table 1):

$$\frac{10.55 \text{ lbs N}}{1000 \text{ gal}}$$

The Supreme Beef reported phosphorus concentration is one sixth of IAC guidance. No justification is provided for this discrepancy.

Iowa Administrative Code Chap. 65 estimated manure production and phosphorus concentration:

$$\frac{6.5 \text{ gal}}{\text{day}} \text{ per head} \times 365 \text{ days} = \frac{2,372.5 \text{ gal}}{\text{year}} \text{ per head}$$
$$\frac{59 \text{ lbs P}_2\text{O}_5}{\text{year}} \text{ per head} \div \frac{2,372.5 \text{ gal}}{\text{year}} \text{ per head} = \frac{24.9 \text{ lbs P}_2\text{O}_5}{1000 \text{ gal}}$$

Supreme Beef reported phosphorus concentration (Table 1):

$$\frac{4.2 \text{ lbs P}_2\text{O}_5}{1000 \text{ gal}}$$

II. The annual manure production and rainwater reported by Supreme Beef results in a nitrogen concentration three times greater than the value reported by Supreme Beef in Table 1 (10.55 lbs N/1000 gal).

Supreme Beef total annual nitrogen production:

$$\frac{95 \text{ lbs N}}{\text{year}} \text{ per head} \times 11,600 \text{ cows} = \frac{1,102,000 \text{ lbs N}}{\text{year}}$$

Supreme Beef annual manure production and rainwater (Table 1):

$$\frac{34,475,273 \text{ gal}}{\text{year}}$$

Nitrogen concentration calculation:

$$1,102,000 \text{ lbs N} \div 34,475,273 \text{ gal} = \frac{32 \text{ lbs N}}{1000 \text{ gal}}$$

The same calculation for phosphorus results in a phosphorus concentration five times greater than the value reported by Supreme Beef in Table 1 (4.2 lbs P₂O₅/1000 gal).

Supreme Beef total annual phosphorus production:

$$\frac{59 \text{ lbs P}_2\text{O}_5}{\text{year}} \text{ per head} \times 11,600 \text{ cows} = \frac{684,400 \text{ lbs P}_2\text{O}_5}{\text{year}}$$

Supreme Beef annual manure production and rainwater (Table 1):

$$\frac{34,475,273 \text{ gal}}{\text{year}}$$

Phosphorus concentration calculation:

$$684,400 \text{ lbs P}_2\text{O}_5 \div 34,475,273 \text{ gal} = \frac{19.9 \text{ lbs P}_2\text{O}_5}{1000 \text{ gal}}$$

III. Back-calculating total annual nitrogen production using Supreme Beef reported nitrogen concentration results in an annual nitrogen production per cow three times less than what is used in Iowa Administrative Code (95 lbs N/year/head). There is no justification provided for why the Supreme Beef cows produce less nitrogen annually than typical beef cattle.

Whole facility:

$$\frac{34,475,273 \text{ gal}}{\text{year}} \times \frac{10.55 \text{ lbs N}}{1000 \text{ gal}} = \frac{363,714 \text{ lbs N}}{\text{year}}$$

Per Supreme Beef cow:

$$\frac{363,714 \text{ lbs N}}{\text{year}} \div 11,600 \text{ cows} = \frac{31.4 \text{ lbs N}}{\text{year}} \text{ per head}$$

The same calculation using Supreme Beef reported phosphorus concentration results in an annual phosphorus production per head five times less than what is used in Iowa Administrative Code (59 lbs P₂O₅/year/head). There is no justification provided for why the Supreme Beef cows produce less phosphorus annually than typical beef cattle.

Whole facility:

$$\frac{34,475,273 \text{ gal}}{\text{year}} \times \frac{4.2 \text{ lbs P}_2\text{O}_5}{1000 \text{ gal}} = \frac{144,796.1 \text{ lbs P}_2\text{O}_5}{\text{year}}$$

Per Supreme Beef cow:

$$\frac{144,796.1 \text{ lbs } P_2O_5}{\text{year}} \div 11,600 \text{ cows} = \frac{12.5 \text{ lbs } P_2O_5}{\text{year}} \text{ per head}$$

IV. Other sources of estimated manure production and nutrient concentrations do not comport with the values reported by Supreme Beef.

Example 1:

UMass Extension manure production and nutrient content values Table 1 – Beef cattle: cow and calf (<https://ag.umass.edu/crops-dairy-livestock-equine/fact-sheets/manure-inventory>):

$$\begin{aligned} \frac{60 \text{ lbs manure}}{\text{day}} \text{ per head} \times 365 \text{ days} &= \frac{21,900 \text{ lbs manure}}{\text{year}} \text{ per head} \\ \frac{11 \text{ lbs N}}{2000 \text{ lbs manure}} \times \frac{21,900 \text{ lbs manure}}{\text{year}} &= \frac{120 \text{ lbs N}}{\text{year}} \text{ per head} \end{aligned}$$

This calculation of annual nitrogen production per cow is four times greater than the value calculated using Supreme Beef nitrogen concentration (31.4 lbs N/year/cow). This is conservative using the cow and calf value instead of steer (75 lbs manure/day at 14 lbs N/ton).

Using the more generous steer value for the annual phosphorus production per head, the result is five times greater than the value calculated using the Supreme Beef phosphorus concentration (12.5 lbs P₂O₅/year/head).

$$\begin{aligned} \frac{75 \text{ lbs manure}}{\text{day}} \text{ per head} \times 365 \text{ days} &= \frac{27,375 \text{ lbs manure}}{\text{year}} \text{ per head} \\ \frac{5 \text{ lbs } P_2O_5}{2000 \text{ lbs manure}} \times \frac{27,375 \text{ lbs manure}}{\text{year}} &= \frac{68.4 \text{ lbs } P_2O_5}{\text{year}} \text{ per head} \end{aligned}$$

Example 2:

MidWest Plan Service Manure Characteristics manure production and nutrient content values Table 6 – Beef – Finishing – 1,100 lbs (https://www.canr.msu.edu/uploads/files/ManureCharacteristicsMWPS-18_1.pdf):

$$\begin{aligned} \frac{0.4 \text{ lbs N}}{\text{day}} \text{ per head} \div \frac{6.46 \text{ gal}}{\text{day}} \text{ per head} &= \frac{61.9 \text{ lbs N}}{1000 \text{ gal}} \\ \frac{0.12 \text{ lbs } P_2O_5}{\text{day}} \text{ per head} \div \frac{6.46 \text{ gal}}{\text{day}} \text{ per head} &= \frac{18.6 \text{ lbs } P_2O_5}{1000 \text{ gal}} \end{aligned}$$

This results in a nitrogen concentration six times higher than what is reported by Supreme Beef (10.55 lbs N/1000 gal) and phosphorus concentration four times higher than the reported value (4.2 lbs P₂O₅/1000 gal).