Written Comments in Opposition to the Proposed NMP for Supreme Beef LLC

Submitted 3/8/2021 by Steve Veysey, 919 Murray Drive, Ames IA

Introduction

The choices farmers make not only affect their crops, those choices affect all of us. Hence the NMP and MMP provisions of Iowa Code 459 and 459a, and IAC 567 Chapter 65 serve three purposes:

- They provide information and tools to help producers and farmers cost effectively use manure as fertilizer.
- They provide a legal shield for producers and farmers if the approved plan, which can be modified at any time, is documented, and followed in good faith.
- They provide some assurance for the public, including farmers and producers, that egregious practices and methods affecting water quality and soil sustainability won't be tolerated.

The first two purposes do not require DNR involvement. Just the third. As you evaluate these comments and the comments of others, please remain cognizant of whose interests you must protect.

Both the Iowa Code (IC) and Iowa Administrative Code (IAC) provide that DNR may accept public comments before deciding upon approval or denial of a submitted Nutrient Management Plan (NMP). It is further stated that those comments are restricted *"exclusively to determine whether the nutrient management plan is submitted according to procedures required by the department and that the nutrient management plan complies with the provisions of this chapter."*

My comments will focus primarily on whether the submitted plan complies with:

- IC 459A sections pertaining to NMP's (including other linked sections of IC 459 initially written for MMPs} which establish legal requirements and legislative intent.
- IAC 567.65 sections pertaining to NMP's (including other linked sections of IAC 567.65 initially written for MMPs) which establish departmental rules.

Legislation and rules governing MMP's and NMP's are intertwined. Appendix A shows some of the most relevant linkages.

This plan contains numerous deficiencies, errors, and omissions. Some of the information provided in the plan is demonstrably incorrect. It is DNR's responsibility to determine if submitted NMP's are correct or deficient and approve or deny within 60 days. [IAC 459A.201.b(2)] Disapproval of an NMP is without prejudice. The applicant may correct deficiencies and submit another application. It is not DNR's responsibility to rewrite deficient NMPs. That is the responsibility of the submitter.

Iowa Code 459A.208.6 requires the applicant to sign and attest to the truthfulness of the elements in the plan. During the review process, it is reasonable that DNR may request clarification of any issue. However, DNR does not have authority to modify or correct the plan. Doing so would nullify the applicant attestation required by rule.

ISSUE 1. The applicant is not reporting Total N and P correctly. All subsequent NMP page 1 and page 2 calculations are incorrect.

Summary

The applicant has used inaccurate and unsubstantiated values for manure N &P content. See ISSUE 2. The applicant has underestimated Total N (lbs/yr) by a factor of 3.8 and Total P (lbs/yr) by a factor of 5.9. The applicant has correctly used P-removal as a limiting factor. See ISSUE 15 for discussion.

Note: For the purposes of this comparison, I am not including his estimate of rainwater in the basin. There is no N &P in rainwater. It has no effect on the "as-excreted" calculation of Total N & P. While it will increase total basin volume, it will proportionally decrease basin N & P concentrations "as-stored". This will be relevant only when he prepares to apply manure to fields and the applicator must calculate the proper spreading rate to deliver 72 pounds of P per acre and the resulting 115 pounds of N per acre.

Note: This calculation assumes 100% availability of P in Year 1, and no volatilization factor for P.

	source	vol gal/day/head	vol gal/year/head	conc. N lbs/1000 gal	conc. P lbs/1000 gal	calc amt N (lbs/yr/hd)	calc amt P (lbs/yr/hd)	SB LLC cows	total volume (gal / year)	calc Total amt N (lbs/yr)	calc Total amt P (lbs/yr)
finishing 900 lbs	IAC 65 Tables	6.5	2372.5	40	25	94.9	59.3	11,600	27521000	1100840	688025
finishing	SB LLC values	6.5	2372.5	10.55	4.2	25.0	10.0	11,600	27521000	290347	115588

corn uptake N =	1.2	lbs/bu
corn uptake P =	0.32	lbs/bu
yield claim =	224	bu/ac

True P-based acres =	688025 x 1/224 x 1/0.32 =	9599
SBLLC claim acres =	115588 x 1/224 x 1/0.32 =	1613

TABLE 1 Calculation of acres required

The applicant will require approximately 9600 acres to agronomically apply the manure annually produced in the Supreme Beef open feedlot operation. For a more complete calculation of Page 2 values please refer to Appendix F.

Discussion

IAC Chapter 65 requires the application of manure in agronomic rates. This requires the correct calculation of N & P content. IC459A.208 (7) is the only place in Iowa Code *specific* to NMP's where manure nutrient content is discussed. Tables related to this appear in IAC, near the end of Chapter 65. Note that the language in IC459A.208 (7) most appropriately describes effluent from a settled lagoon operation, and less perfectly describes an "open feedlot" operated from a feed and manure perspective

as a confinement. This anomaly was addressed with changes in the wording when rules were expressed in IAC 65.112(8).

In open feedlots using settled lagoons, the clear effluent from the lagoon is lower in nutrient content than a manure slurry. It is applied via hoses and spray equipment to adjacent fields. Once emptied, the settled solids in the lagoon must be scraped out and land applied. To the contrary, beef confinement operations defined as "open feedlots" often are treating their manure in the same manner as swine confinements. That is the situation with Supreme Beef LLC. The manure is collected in pits under the confinement floors and either stored there or pumped as a slurry to a larger basin. The manure, possibly diluted slightly by the original slurry/agitation/ pumping step, will begin to partition in the basin into solids and liquids. It must be reagitated into the best possible slurry before being pumped into tanks and transported to fields for application. In that step, the goal is leave as little as possibleof the settled solids behind so that scraping of the basin is not required. In the Supreme Beef LLC situation, the polyethylene liner would be destroyed or compromised if it were necessary to blade out settled solids.

All the manure N &P nutrients coming from the Supreme Beef cattle operation will be in slurry form and must be accounted for "as excreted" in estimating required acres and spreading volumes.

With respect to manure nutrients, IAC 65.112(8) specifies the information that must be included in a nutrient management plan.

> IAC 65.112(8) a.(1) Total phosphorous (as P_2O_5) available to be applied from the open feedlot operation shall be included.

Note that it does not say phosphorus "in the effluent", or "in the settled solids". An accounting of all phosphorous that will be agitated, loaded, transported, and applied is required. This is the same as or nearly equivalent to phosphorous manure content "as-excreted". This is followed by:

> IAC 65.112(8) b. Information relating to the application of the manure, process wastewater and open feedlot effluent, including the following:
>
> *1.* Nutrient levels of the manure, process wastewater and open feedlot effluent.
>
> IAC 65.112(8)d. An estimate of the manure, process wastewater and open feedlot effluent volume or weight produced by the open feedlot operation.

In *b.(*1) "nutrient levels of the manure" is a separate thing from "nutrient levels of [the] open feedlot effluent". Similarly, in *d.* an estimate of the manure volume is a separate thing from an estimate of the effluent volume. These are important distinctions and reflect two separate parts of the necessary manure nutrient calculations.

Step One. Nutrient levels in the manure, and the manure volume associated with that measurement, are representative of "as-excreted" values and define the total amount of N &P in pounds per year per animal unit. **Generally, these are the numbers that must be used for planning purposes.** When combined with crop uptake and yield projections, they will determine the pounds of N & P per acre to be applied to a required number of field acres so that all manure nutrients are accounted for and applied agronomically, as required by Code.

NOTE: For an existing operation, it is conceivable to use end-of-season measurements (see below) of nutrient levels combined with manure-volume-in-the-pit-or-basin for the total N &P calculations, but only if the "as-stored" nutrient concentrations and manure volume are measured at the same time at the same facility.

Step Two. Prior to application, the producer will know the total volume of manure in the basin and will be able to obtain an accurate nutrient concentration test. This will allow determination of the proper application rate based upon true pounds of N &P/1000 gal of manure "as-stored" so that fields receive the correct amount of pounds-per-acre fertilizer calculated and specified in the NMP. Depending upon site-specific management factors, "as-stored" may or may not be different from "as-excreted" values.

NOTE: "As-excreted" does not mean that urine and feces were collected in a bucket directly from the animal, although the Chapter 65 Table 5 value of 6.5 gal/finishing cow per day "as-stored" in "liquid, pit or basin" is very representative of "as-excreted", with minimal dilution. If the manure is flushed into a lagoon, the value is quite different because it reflects significant dilution, the settling of solids from the initial suspension, and some denitrification. See previous discussion.

IAC 65.112 does not include or refer to manure nutrient tables, nor does it specify that the producer can use values from their own operation or a "similar operation". In both regards, that language is found in IAC 65.17(5) [MMP] *"Total nitrogen and total phosphorous available from the confinement feeding operation."* Curiously, IAC 65.112 [NMP] does not link to IAC 65.17(5), but this seems to be the protocol DNR has been using for both MMP and NMP evaluations:

IAC 65.17(5) a. [Part 1] To determine the nitrogen available to be applied per year, the factors in Table 3, "Annual Pounds of Nitrogen Per Space of Capacity," multiplied by the number of spaces shall be used. To determine total phosphorus (as P2O5) available to be applied per year, the factors in Table 3a, "Annual Pounds of Phosphorus Per Space of Capacity," multiplied by the number of spaces shall be used.

This could not be clearer. Annual pounds of N &P per cow per year, multiplied by number of cows, gives the proper value of total N&P that must be considered in the NMP calculations. Manure N&P "concentrations" (lbs/1000 gal) are NOT to be used in calculating the total amount of N &P. In fact, Chapter 65 does not even include nutrient concentration tables! When combined with crop nutrient uptake values and yield projections, these numbers alone, total annual pounds of N &P, define how much manure can be spread per acre. Nothing else. Volume estimates are useful to determine if the holding structure is large enough, and as discussed earlier, actual basin volume and nutrient concentrations at the time of spreading are necessary for the proper "gallons per acre" agronomic application.

In all cases, the applicable calculation is Mass = Concentration x Volume.

IAC 65.17(5) a. [Part 2] If the tables are not used to determine the nitrogen or phosphorus available to be applied, other credible sources for standard table values or the actual nitrogen and phosphorus content of the manure may be used. The actual nitrogen and phosphorus content shall be determined by a laboratory analysis along with measured volume or weight of manure from the manure storage structure or from a manure storage structure with design and management similar to the confinement feeding operation's manure storage structure.

This also could not be clearer. If other than Table values are used, BOTH nutrient concentration (lbs per 1000 gal) AND the volume-of-manure-in-the-storage-structure-from-which-the-sample-was-taken, must be reported. It's the same as the jellybean example in my verbal comments. You may have stored your 100 jellybeans in either of two ways:

100 beans = 10 jars x 10 beans/jar.

100 beans = 2 jars x 50 beans/jar.

Reporting either of those scenarios will truthfully reflect the total number of beans you have. What you cannot report truthfully is that you have 2 jars each with 10 beans. That's only reporting 20 jellybeans, and you have 100! *Note: Which scenario is completely truthful will be important to your best friend to whom you've promised to give "one jar of jellybeans" [manure application rate].*

ISSUE 2 The source of nutrient values used by the applicant is unknown.

Summary

The applicant reports test results from a "similar operation", Upper Iowa Beef. Supreme Beef uses covered pits pumped to an exposed effluent storage basin. The values used from UIB are N= 10.55, P= 4.2 lbs/1000 gallons; far from the norms of N= 40 and P= 25 lbs/1000 gal. The UIB values used are the average of two test results determined by Midwest Laboratories for samples sent from UIB. However UIB is a harvesting facility, not a production facility. The manure may have been submitted to the testing lab by UIB, but the manure did not come from there. A review of GIS aerial photos shows no evidence of manure storage structures at UIB in any way similar to those at Supreme Beef. Based upon the information included with the application, there is no way of knowing the actual source of the manure, or the management conditions related to the manure production and storage.

FIGURE 1. *Upper Iowa Beef – 2019* **FIGURE 2**. *Supreme Beef - 2019*

In practical terms, the N and P content of the manure as it is excreted from the cow is likely to be close to the IAC Chapter 65 Table values of 95 lbs N /head/year and 59 lbs P /head/year. These numbers may fluctuate slightly based upon herd genetics and feed composition, but there have been no such claims by the applicant and no information provided to allow DNR to verify either of those possibilities. The correct assumption is always that if low *concentrations* are reported then the volume excreted per day will be *higher than average*. Because:

Mass = Concentration x Volume

In summary, either concentration or volume could vary from norms depending upon site specific circumstances, but the product of concentration x volume must at least come close to meeting the norms of N &P that cows are known to excrete. The applicant's calculations do not.

Discussion

The applicant seems to be confused about the meaning of "nutrient content in manure". There may be a misconception about the magnitude of possible variations in manure N & P content arising from a misunderstanding of statements in PM 1003.

> Use of average or "book" nutrient values can be helpful for designing a new facility and creating manure management plans but is not very helpful in determining specific manure nutrient supply or application rates due to wide variation in nutrient concentrations between production facilities. For example, a recent sampling across swine finishing facilities found a range in total N from 32 to 79 pounds N/1,000 gallons, P from 17 to 54 pounds P_2O_5/1,000 gallons, and K from 23 to 48 pounds K_2O/1,000 gallons. A similar or larger range can be found with other manure types. Nutrient analyses often vary greatly as storage facilities are emptied or manure is stockpiled, and also among multiple samples collected from loads during land application. Therefore, collecting multiple manure samples and maintaining a history of analysis results will improve use of manure nutrients.

PM1003 is discussing possible variations in "concentration" expressed as lbs/1000 gal. But how many 1000's of gallons do you have? What IAC requires is a correct estimate of the total mass of N &P produced per year. And as we know Mass = Concentration x Volume. PM1003 is correct in stating that *concentrations* can vary and you must know concentrations correctly to calculate application rates at the time of spreading. However, PM1003 goes on to state:

> If manure average nutrient values or methods to estimate manure nutrient concentrations based on excretion are of interest or needed for planning purposes, those can be found in the Midwest Plan Service bulletins listed on page 7.

Bingo! Of concern are possible variations in "as-excreted", expressed in Tables as pounds N & P per cow per year. Variations of up to 30% from Table averages are possible with special herd genetics and special dietary formulations. The applicant has made no showing in that regard. The following tables are from the referenced MWPS_18 Section 1 bulletin.

Table 3. Sample comparison from well agitated deep-pits during pumping.
Samples taken from six deep pits in Iowa. All pits were agitated for at least four hours before the first load was removed and were agitated continuously during pumping. A 75-hp pump or larger was used for agitation.

Component	Unit	Profile Sample[a]	First Load	Middle Load	Last Load
Nitrogen (N)	lbs per 1,000 gal	48.6	56.8	57.8	59.5
Ammonical Nitrogen (NH_4-N)	lbs per 1,000 gal	34.4	38.9	37.9	37.8
Phosphorus (P_2O_5)	lbs per 1,000 gal	49.8	40.3	42.2	50.3
Potassium (K_2O)	lbs per 1,000 gal	31.4	25.0	27.9	25.8

[a]A representative sample of the entire pit depth.

TABLE 2 MWPS_18 _1 "Table 3"

Table 6. Daily manure production and characteristics, as-excreted (per head per day)[a].
Values are as-produced estimations and do not reflect any treatment. Use these values only for planning purposes. The actual characteristics of manure for individual situations can vary ± 30% or more from table values due to genetics, dietary options and variations in feed nutrient concentration, animal performance, and individual farm management.

Animal	Size[a] (lbs)	Total manure[b] (lbs)	(cu ft)	(gal)	Water[c] (%)	Density[c] (lb/ft³)	TS[d] (lb/day)	VS[c] (lb/day)	BOD_5 (lb/day)	Nutrient content (lbs N)[d]	(lbs P_2O_5)[d]	(K_2O)

Beef												
Calf (confinment)	450 650	48 69	0.76 1.09	5.66 8.18	92 92	63 63	3.81 5.51	3.20 4.63	1.06 1.54	0.20 0.29	0.09 0.13	0.16 0.23
Finishing	750 1,100	37 54	0.59 0.86	4.40 6.46	92 92	63 63	2.97 4.35	2.42[d] 3.55[d]	0.60 0.89	0.27 0.40	0.08 0.12	0.17 0.25
Cow (confinment)	1,000	92	1.46	10.91	88	63	11.0	9.38	2.04	0.35	0.18	0.29

TABLE 3 MWPS_18 _1 "Table 6"

IAC Chapter 65 Tables (reprinted in the DNR MMP Appendix) include values similar to those presented in MWPS-18-1.

Manure Management Plan Form
Appendix A1: Manure Production Per Space of Capacity[1]

Beef, Confined	Space	Liquid, Pit* or Basin**
Mature cows, 1000 lb.	1 head	7.2 gal
Finishing, 900 lb.	1 head	6.5 gal
Feeder calves, 500 lb.	1 head	3.6 gal

Manure Management Plan Form
Appendix A2: Annual Pounds of Nitrogen Per Space of Cap

Beef, Confined	Space	Liquid, Pit* or Basin**
Mature cows, 1000 lb.	1 head	105
Finishing, 900 lb.	1 head	95
Feeder calves, 500 lb.	1 head	53

Manure Management Plan Form
Appendix A3: Annual Pounds of Phosphorus (as P_2O_5) per Space o

Beef, Confined	Space	Liquid, Pit* or Basin**
Mature cows, 1000 lb.	1 head	66
Finishing, 900 lb.	1 head	59
Feeder calves, 500 lb.	1 head	33

Manure Management Plan Form
Appendix A4: Nutrients in Animal Manure

Management System	N	P_2O_5	K_2O
	Lbs./1,000 gallon		
Liquid, Pit			
Beef-confined			
Mature cows, 1,000 lb.	40	25	35
Finishing, 900 lb.	40	25	35
Feeder calves, 500 lb.	40	25	35

TABLE 4 DNR "Appendix A" Table excerpts

Note that Appendix A 4 table (nutrient concentrations) is not in IAC Chapter 65. It does not need to be. It's calculated from the measured values contained in the Mass and Volume tables using the formula: Concentration = Mass / Volume.

We know that the manure sample from Upper Iowa Beef was diluted in some fashion prior to testing. The moisture content as reported by Midwest Labs as 97.5%, whereas the normal moisture content for cow manure "as-excreted" is just 92%. See Table 6 MWPS-18 Section 1 above.

ISSUE 3. The source and role of "basin rainwater" is unclear.

Summary

There is a claim that the effluent storage basin will also contain 6.9M gallons of rainwater. This may refer to water that has flowed or seeped into the basin during construction and prior to the introduction of manure. Or it may refer to rain falling on the manure storage basin. It might refer to rainwater falling on animal barn roofs and redirected into the basin. No explanation is given. It is actually not relevant to the calculation of annual Total manure N & P per year.

Discussion

In Clayton County, average evaporation exceeds average rainfall, per unit area. Clearly the basin has sloped sides, so unless it is near full, the "catch" area will be larger than the "evaporation" area. No dilution of nutrient content can be predicted due to rainwater falling in the basin unless a calculation based upon the average ratio of "catch" area to "evaporation" area is performed. There is no evidence in the application that this has been done.

AVERAGE ANNUAL AND MONTHLY RAINFALL (inches)

COUNTY	ANNUAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
CLAYTON	34.23	1.03	1.10	2.05	3.54	3.88	4.52	4.10	4.66	3.21	2.35	2.32	1.26

AVERAGE ANNUAL AND MONTHLY EVAPORATION (inches)

COUNTY	ANNUAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CLAYTON	39.0	0.8	1.2	1.6	4.0	5.9	6.2	5.9	5.1	3.5	3.1	1.2	0.8

TABLE 5 Rainfall and Evaporation in Clayton County

In practical terms, dilution by rainwater is not relevant to calculating the "as-excreted" amount of N &P that will be produced per year by 11,600 cows. Rainwater does not contain N & P. As discussed earlier, it is only relevant at the time of spreading for the applicator to know the actual volume and concentration of effluent, so that a spreading rate can be calculated that will apply the planned amount of N &P to each field.

In the Page 1 and Page 2 recalculations summarized later in this section and detailed in Appendix F, the rainwater claimed has been allowed in the "Current NMP" calculation column since this is how the applicant proceeded, and there is no way to know the level of dilution of the "similar operation" sample as tested. However, the other calculation columns based upon Table values representative of "as-excreted", correctly ignore rainwater.

ISSUE 4. Recalculating NMP Page 1 and Page 2 values based upon more correct assumptions shows that there are insufficient acres to support the plan.

Summary and Discussion

Several recalculations of P1 and P2 values have been performed. One example has been shown previously in Table 1. These are presented completely in Appendix F. You will note the use of a spreadsheet rather that DNR's interactive forms. These are simple calculations. I have calculated 5 scenarios. *Note: In the applicant example shown previous in Table 1, the rainwater was excluded, but in the equivalent calculation shown in Appendix F and discussed below the rainwater was included for the reasons just discussed and to completely replicate the applicant NMP calculations.*

1. Using the applicants' inputs, yield projections, and volumes including rainwater. See the note in the spreadsheet. This is to prove to DNR that my spreadsheet calculations are correct. **2020 acres are needed**.

2. Using DNR Table values, basically "as-excreted", and 224 bu/ac yield as claimed by the applicant. Since rainwater doesn't add any N&P, rainwater present should not be included in the mass balance calculation. It is only important to the applicator when the manure is about to be spread so he knows the concentration of what he is spreading and can properly calibrate his equipment. **9599 acres are needed**.
3. Table values, but using 180 bu/ac as a more realistic yield for these HEL fields. See Appendix K: Fields:Soils:Yields. **11945 acres are needed.**
4. Table values for N&P annual mass minus 30%, which is the error bar mentioned in MWPS-18-1 Table 6 . The applicants projected yield value of 224 bu/ac is used. **6719 acres are needed**.
5. Table values less 30%. A more realistic 180 bu/ac yield is used. **8361 acres are needed**.

In all cases P-crop uptake was used as the limiting factor, as did the applicant in his current NMP. This was done correctly. Virtually all the fields are designated HEL, and most of the fields have soil-P tests in the H and VH range. See ISSUE 15 Fields with H and VH levels of P.

ISSUE 5. Fields not having "Correct Soils Test for P" must be excluded.

On the NMP Page 3 the applicant includes 23 fields lacking Correct Soils Test for P.

> IAC 65.17(17) e.
> ***For an original manure management plan***, previous soil sampling data that does not meet the requirements of subrule 65.17(16) may be used in the phosphorus index if the data is four years old or less. In the case of fields for which soil sampling data is used that does not meet the requirements of subrule 65.17(16), the fields must be soil-sampled according to the requirements of subrule 65.17(16) no more than one year after ***the original manure management plan is approved***.

This is not the original approved NMP. The original approved NMP was approved on October 5, 2020. This is a subsequent plan. The IAC 65.17(17) *e*. language is clear. Only the original approved plan may include fields that do not have Correct Soils Test for P. Conditional approval of such fields listed in the original approved plan is allowed so long as non-compliant P-tests have been completed within the last four years, with the caveat that the Correct Soils Test for P must be completed within 12 months of the original plan approval date. *There is no such 12-month grace period allowed for fields listed in subsequent NMPs.* All subsequent NMP's must contain Correct Soils Test for P for all the fields listed on NMP Page 3.

The fact that some of the fields may not be scheduled to receive manure in one or more of the 5 years specified on NMP Page 3 is not relevant. IAC rules provide that once an NMP is approved, the timing, location, and amounts of manure applied to each field can be changed by the applicant without any required review or notification if proper plan updates are kept on-site. It is also not relevant that 5 of these 23 fields were conditionally approved in the original approved plan. Supreme Beef LLC has chosen to forego the original approved plan and submit a subsequent plan.

The applicant has attested that the following fields listed on NMP Page 3 do not have Current Soils Test for P. On this basis alone these fields must be disallowed.

Field	Correct P test	Planned manure
Costigan E lane	n	540,902
Costigan House Bottom	n	0
Costigan School House Bottom	n	675,814
Derk Home	n	0
East 120	n	1,763,430
Freddys Hay	n	0
Goedken East	n	0
Goedken West	n	0
Home Farm 1	n	0
Home Farm 2	n	0
Home Farm 3	n	0
Home Farm 4	n	0
Home Farm Hay	n	0
Junes	n	0
Koether Giard 34	n	1,760,600
Koether Giard 35	n	2,935,352
Marting Hay	n	88,830
Meiers	n	1,037,613
Monroe A	n	107,174
Monroe B	n	383,814
Monroe C	n	0
North Harness	n	0
Koether Franklin 26/35	n	2,180,520

TABLE 6 Fields lacking correct soils P-test

ISSUE 6. RUSLE2 calculations for four fields (PLU's) use incorrect Dominant Critical Area Soil

Summary

The RUSLE2 Profile Erosion Calculation Record, required for each field listed in the NMP, serves several purposes. One purpose is to provide an estimate of the rill and interrill erosion portion of Total Soil Erosion, a factor in the erosive PI term of the P-Index calculation, as detailed in NRCS ITN 25. When the incorrect DCA is used, the rill and interrill soil loss calculation will be incorrect. This occurred on four occasions.

Discussion

Proper selection of soil type (soil map unit – SMU) is a critical input to the RUSLE2 calculation. IAC 567-65.17(17) *b.* states:

> When sheet and rill erosion is calculated for the phosphorus index, the soil type used for the calculation shall be the most erosive soil map unit that is at least 10 percent of the total field area. Effective September 15, 2010, in all original and complete manure management plans submitted to the department for approval, the dominant

critical soil map unit consistent with NRCS conservation planning guidelines shall be used to calculate sheet and rill erosion for the phosphorus index. (See NRCS Technical Note No. 29).

The Dominant Critical Area (DCA) SMU shall be based upon the protocol defined in NRCS ITN 29 and shall be used for the rill and interrill portion of the PI calculation. PLU SMU's and area percentages are obtained from the NRCS Web Soil Survey program. The applicant has included this information for all the Page 3 fields. The ITN 29 protocol for selecting the DCA soil can be summarized as:

- Identify the highest slope class (F>E>D>C>B) where the sum of SMU areas is greater than 10%
- From the highest slope class of SMU's totaling more than 10%, choose the one with the highest K-factor (NRCS eFOTG -> Cayton County Conservation Planning SMU table)

The four fields where the DCA was incorrectly selected are:

Field	acres	Soil Type claimed	Correct DCA SMU
Costigan E lane	31.7	163D2	703D2
Home Farm Hay	7.0	162D2	163D
Junes	35.7	163D2	703E2
Koether Giard 35	172.0	163'E2	703E2

TABLE 7 DCA soil types for RUSLE2 recalculation

In all four cases, the correct DCA soil is more erosive, either because it is a higher slope class or it has a higher K-factor within that slope class. The RUSLE2 calculation yields greater rill and interrill erosion in all four cases and the total P-Index is **higher** in all four cases.

ISSUE 7. All RUSLE2 management plans are the same and deficient.

Summary and Discussion

On NMP Page 2 the applicant claims that a substantial amount of commercial N fertilizer will be added annually to every field. *Yet none of the RUSLE2 management plans include a step for the application of commercial fertilizer.* This will affect the calculation of rill and interrill erosion. It has been noted by others during the verbal comments that the RUSTLE2 management plans do not reflect the diversity of tillage equipment and practices used by farmers in NE Iowa. The management plans are over-simplified and applied over-broadly and do not reflect the diversity of site-specific practices and equipment used in crop production on these fields. Additional tillage and/or application steps will affect the P-Index calculation.

ISSUE 8. All P-Index calculations ignore ephemeral and classical gully erosion.

Summary and Discussion

In every case, the Total Erosion factor used in the calculation of the erosive term of the P-Index is exactly the same as the interrill erosion calculated by RUSLE2. ITN 25 is clear. Rill and interrill erosion must be

added to estimated ephemeral gully erosion and classical gully erosion to determine the total soil erosion value to be used in the erosive PI term. From ITN 25 page 3:

Erosion Component (Potential P delivered to surface water with sediment}:
Gross erosion x (STF or SDR) x Buffer factor x Enrichment factor x STP Erosion factor

> Gross erosion is estimated using the NRCS Field Office Technical Guide (FOTG) to calculate soil loss. The Revised Universal Soil Loss Equation Version 2 (RUSLE2) or current erosion prediction tool used by NRCS will be used to determine rill and interrill erosion. Ephemeral gullies, and classical gully erosion are determined by the Gully Erosion procedures outlined in section I-C-3 of the FOTG. **Gross erosion is the sum of soil loss from rill and interrill erosion, ephemeral gullies and classical gully reported in tons/acre/year**. Gully erosion is prorated over the entire field or conservation management unit.

There is no evidence that the Gully Erosion procedures outlined in section I-C-3 of the FOTG have been followed so that Gross erosion required in the P-Index calculation is correctly estimated. The soil loss due to ephemeral and classical gully erosion is not zero as claimed by the applicant. Even a cursory review of GIS aerial data over time for these fields shows evidence of ephemeral gully erosion. The Total P-Index value will be higher in every case where ephemeral and classical gully erosion are found to be greater than zero.

ISSUE 9. The P-Index Sediment Delivery Ratio (SDR) is incorrectly low in numerous cases.

Summary

The SDR value used as a factor in the Erosive P-I term of the Total P-Index equation derives directly from the estimated distance from field center to the nearest perennial or intermittent channeled stream. See ITN 25, page 3:

> Sediment delivery ratio (SDR) is derived from **Figure 1** and **Figure 2**. The data adapt the use of SDR from watersheds to individual fields by transforming area to linear distance from the center of the field to the nearest perennial, or intermittent channeled stream downslope,

The applicant has overestimated field-center-distance-to-stream by **100% or more** on 8 occasions.

Designation	Dist_NMP_back_calc_ft	Dist_GIS_meas_ft	Dist_diff_percent
Schutte South	400	200	100
June's	1500	750	100
Carlson - Farmersburg 5	2000	1000	100
East 120	2600	1100	136
Leroy's	2600	1000	160
Kathy's Hay	2000	600	233
Kathy's	2000	600	233
Koether - Franklin 26/35	3000	800	275

TABLE 8 Field to stream distances

Discussion

Because of the logarithmic relationship, distance measurements need only be approximate. These measurements are typically obtained using GIS-based map "measuring" tools. It is important to use a GIS-based map that in fact shows intermittent streams. The correct stream layer to use is derived from the national NHD Stream Centerline coverage. This layer is available at the Iowa Geographic Map Server (Iowa – Stream Centerlines) but does not appear to be available at DNR's AFO Siting Atlas. Look carefully at the blue lines in both images below. The IGMS map shows a much more extensive network of smaller surface waters.

> Note: The reason that ITN 25 requires measuring to intermittent streams as well as perennial streams, is because soil with attached phosphorous moves during rain events. During rain events intermittent streams have flowing water to transport the soil and phosphorous to perennial streams with aquatic life.

Overestimation of field-to-stream distance measurements results in significant changes in the SDR factor. Overestimation of distance results in underestimation of the SDR value, which results in an underestimation of the Erosive P-I and Total P-I value.

FIGURE 3.

Basewood Ave and 25th St
In Clayton County.

DNR AFO Siting Atlas

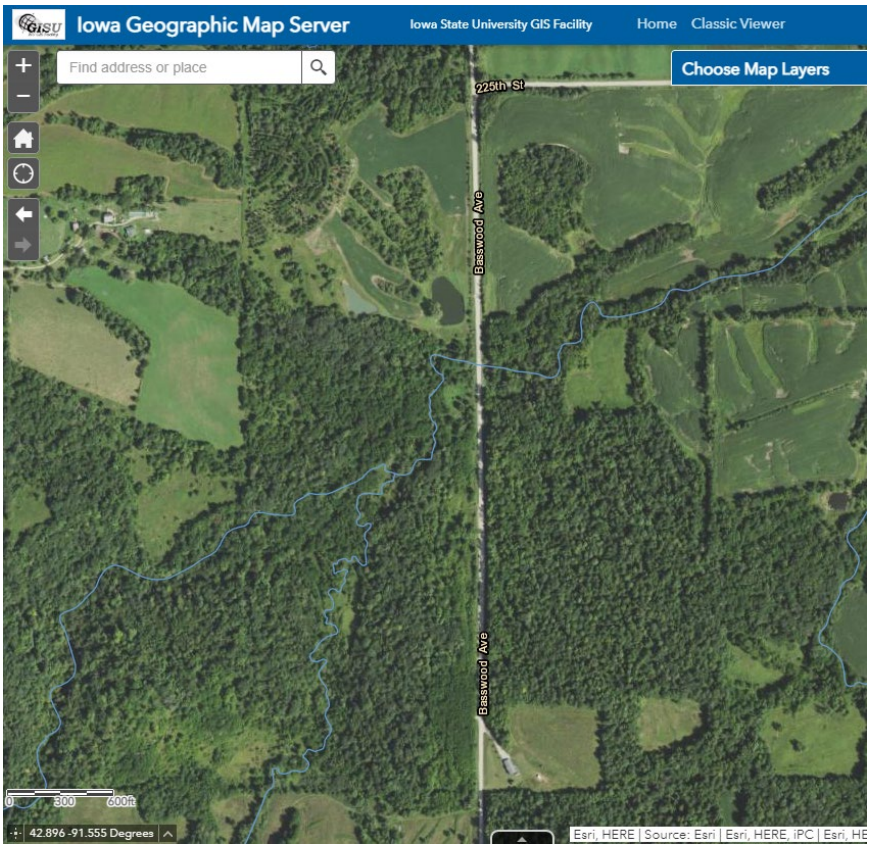

FIGURE 4.

The same area.
Note the more extensive stream network.

Using the IGM Server.

ISSUE 10. Five fields have P-Index values of 5.0 or greater and must be excluded at this time.

Summary

When known errors in DCA selection (RUSLE2) and greater than 100% distance errors (P-Index SDR factor) are combined, five fields are revealed to have Total P-Index values at or above 5.0. See Appendix C for complete RUSLE2 calculations and Appendix E for complete P-Index calculations. Appendices B and D show screen shots of the two calculation programs obtained from the NRCS website. ISU Extension Services provided standard training in the use of these programs.

correct soil type	Designation	PI_Gross_Erosion_tay *	Dist_GIS_meas_ft	PI_SDR_Recalculated	PI_Buffer_factor	PI_Enrich_factor	PI_STP_soil_erosion	P_value_grid_or_point	PI_Erosion_PI	PI_RCN_factor	PI_STP_runoff	PI_P_app_factor	PI_Runoff_PI	PI_Tile_Sub_PI	PI_Total_PI
703 D2	Costigan East lane	11.00	490	0.57	1.00	1.10	0.86	38	5.93	1.32	0.24	0.05	0.39	0.07	6.4
163 E2	East 120	11.10	1100	0.48	1.00	1.10	0.83	32	4.91	1.32	0.21	0.05	0.35	0.07	5.3
703 E2	June's	17.00	750	0.53	1.00	1.10	0.76	15	6.42	1.32	0.13	0.05	0.24	0.07	6.7
163 E2	Koether - Franklin 26/35	10.40	800	0.52	1.00	1.10	0.78	20	4.66	1.24	0.15	0.05	0.25	0.07	5.0
703 E2	Koether - Giard 35	17.00	3500	0.40	1.00	1.10	0.81	27	6.06	1.32	0.19	0.05	0.32	0.07	6.5

TABLE 9. Fields with P-Index equal or above 5.0

ISSUE 11. Four additional fields that MAY have P-Index 5.0 or greater.

Summary

As has been discussed, there appear to be serious omissions and over-simplifications in the RUSLE2 management plans listed for each field. Additional tillage or field application steps will affect the calculated rill and interrill erosion value. As has been discussed, when calculating the Total erosion factor the applicant has not included ephemeral and classical gully erosion. It is probable that if all calculations were done correctly, additional fields would be predicted to have P-Index values equal or greater than 5.0. The most likely fields in this category include:

Designation	Manure_Acres_NMP	PI_Total_PI	Correct_soil_P_test	Distance_to_SB_miles	Own_Rent_Easement	
Home Farm 1	16.4	4.58	n	2.5	O	
Carlson - Farmersburg 3	77.0	4.57	y	7.8	E	
Home Farm 4	79.5	4.42	n	2.3	O	
Home North	67.8	4.04	y	11.3	R	

TABLE 10. Fields that may have P-Index > 5.0

ISSUE 12. Manure easement agreements and hauling distances may limit available acres.

Summary

IAC Chapter 65 requires the applicant to show that he has sufficient acres at his disposal to apply the manure produced at his open feedlot to crop fields at agronomic rates. Manure is scheduled to be hauled to distant fields, many of which are not owned or rented. They are in easement. Many of these fields are more than five miles away from the production site. All the easement agreements expire on July 5**,** 2021. Farmers will refuse to renew, or simply refuse to pay hauling and application fees, if the value of the manure as fertilizer is less than associated costs.

Discussion

In ***IAC 65.103(5)a. and b***., a number of issues of concern are listed, that when considered in totality could result in denial of an open feedlot related construction permit or Nutrient Management Plan based upon the Directors Discretion rule. One of these issues is *"whether open feedlot effluent for land application is hauled or otherwise transported more than five miles.*" Clearly hauling distance is of concern for several reasons. Many of the fields listed on Page 3 of the NMP are more than five miles from the production site.

One-way Distance to S.B.	Number of fields	Acres	% Acres
< 5 miles	21	1676	38
5-10 miles	17	1463	33
10-20 miles	7	1171	27
>20 miles	1*	103	2

** 31 miles*

TABLE 11. Road distance from SB to fields

Measurements from the Supreme Beef production site to the GIS coordinates of the Page 3 listed fields were used in Google Maps to calculate the most direct driving route distance to each field. A map of field locations is included as Appendix I. Note in the table above that 62% of the field acres are more than 5 miles away from SB, and 29% of field acres are more than 10 miles from SB. One field is more than 30 miles from SB!

Many of these fields are in manure easement agreements expiring on July 5, 2021, which poses additional concerns about whether these acres will actually be available when it is time to spread manure.

Designation	Manure_Acres_NMP	P_test_soil_rating	Distance_to_SB_miles	Own_Rent_Easement
Carlson - Farmersburg 5	59.0	VH	7.9	E
Derks Home	195.2	VH	7.9	E
Carlson - Farmersburg 2	57.5	H	7.8	E
Carlson - Farmersburg 3	77.0	VH	7.8	E
North Harness	95.4	VH	7.8	E
Carlson - Farmersburg 1	218.0	VH	7.8	E
June's	38.3	L	7.7	E
Koether - Franklin 26/35	135.0	Opt	6.3	E
Airport Monona	68.6	H	3.8	E
Koether - Giard 34	100.0	L	3.8	E
Koether - Giard 35	172.0	H	3.6	E
Goedken East	30.1	VH	2.6	E
Goedken West	41.7	VH	2.6	E
Schutte South	58.4	VH	2.0	E
Kevin's Farm	252.3	VH	1.0	E

Table 12. Distance from SB to easement fields

Several factors come into play when farmers must decide whether to pay hauling and application costs for manure. ISU offers a rudimentary estimating tool, however a more granular estimation protocol is under development at ISU Extension that includes additional factors of relevance.

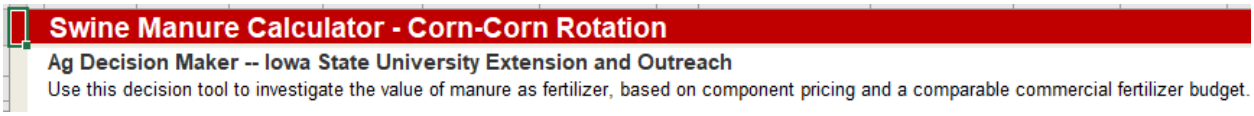

FIGURE 5.

Note that more than 875 acres located more than five miles from SB are in easement agreements! Recall that all easement agreements expire on July 5, 2021, at least three months before any manure is scheduled to be applied. When comparing to the cost of commercial fertilizer, the P in the manure *will be of no value* to many of the farmers using even the simplified manure calculator. *The soil P rating is already High or Very High for 702 of the 875 easement acres further than five miles from SB* . Those fields require no additional P fertilizer. Farmers do not waste money. Considering these factors, how many of these easement fields will actually receive manure from Supreme Beef?

ISSUE 13. Fields under expiring easement agreements should be excluded.

Summary and Discussion

To enforce requirements presented in IAC Chapter 65, for manure application fields not owned or rented by the producer, he must include valid and complete “manure easement agreements” with each landowner where manure will be spread. NMP Page 3 includes easement fields totaling 1598 acres. This represents 37% of the total acres listed on Page 3 as scheduled to receive manure in Year1-5, or with the potential to receive manure. As discussed, more than 875 of those acres are located more than five miles

from SB. All easement agreements expire on July 5, 2021, with the potential for automatic 1-year renewal. However, after the initial year of the agreement (July 5, 2021) either party may terminate the agreement. NMP Page 2 clearly states that manure application may occur in the spring or fall. All of the RUSLE2 management plans state that manure will be spread in the fall (October). Therefore, all the manure scheduled to be spread in 2021 will be AFTER every easement agreement expires, with no assurance or legal requirement that those agreements will be renewed.

> This agreement shall be for a term of 1 years beginning on _July 6th, 2020. Upon expiration of the 1 year term this agreement automatically renews on a year to year basis unless either party gives written notification to terminate.

In reviewing this NMP application, DNR must evaluate this as "no enforceable easement agreements are in place to receive manure". Therefore, the inclusion on NMP Page 3 of all fields with easement agreements expiring before the first scheduled application of manure must be denied.

Manure Application Agreements

Person	Notes	total easement acres	start date	end date	Fields	acres	In NMP?	Distance to S.B.	Receiving manure Y1-5
Wirkler, Brian		165	July 6 2020	July 5 2021	Goedken West	41.7	y	2.6	n
			July 6 2020	July 5 2021	Goedken East	30.1	y	2.6	n
			July 6 2020	July 5 2021	North Harness	95.4	y	7.8	n
Koether, Scott	1	693	July 6 2020	July 5 2021	Koether-Franklin 26/35	135.0	y	6.4	y
			July 6 2020	July 5 2021	Koether-Giard 34/35	272.0	y	3.8	y
			July 6 2020	*July 5 2021*	*Koether-Farmersburg 3*		*n*		
			July 6 2020	*July 5 2021*	*Koether-Giard 19*		*n*		
Schroe... , Aaron	2	310	July 6 2020	July 5 2021	Kevin's farm	252.0	y	1	y
			July 6 2020	July 5 2021	Schutte South	58.4	y	2	y
Radloff, Dirk		429	July 6 2020	July 5 2021	Derk Home	195.2	y	7.9	n
Schoulte, Josh	1	470	*July 6 2020*	*July 5 2021*	*Denning North*		*n*		
			July 6 2020	*July 5 2021*	*Denning South*		*n*		
			July 6 2020	July 5 2021	Junes	38.3	y	7.7	n
			July 6 2020	*July 5 2021*	*Alfa Gold North*		*n*		
			July 6 2020	*July 5 2021*	*Alfa Gold - South*		*n*		
			July 6 2020	*July 5 2021*	*Getz*		*n*		
Burrach, Gary		72	July 6 2020	July 5 2021	Airport Monona	68.6	y	3.8	y
Carlson, Tyler	1	667	July 6 2020	July 5 2021	Carlson-Farmersburg 1	218.0	y	7.8	y
			July 6 2020	July 5 2021	Carlson-Farmersburg 2	57.5	y	7.8	y
			July 6 2020	July 5 2021	Carlson-Farmersburg 3	77.0	y	7.8	y
			July 6 2020	*July 5 2021*	*Carlson-Farmersburg 4*		*n*		
			July 6 2020	July 5 2021	Carlson-Farmersburg 5	59.0	y	7.9	y
			July 6 2020	*July 5 2021*	*Carlson-Boardman*		*n*		
	Total=	2806				Total=	1598		

Note 1	Agreement includes acres not in the NMP
Note 2	Agreement has changes not initialled by both parties

TABLE 13. Manure easement agreement details

Note that the easement agreements include 1208 acres that are NOT included on NMP Page 3. What is the legal status of those acres to receive manure?

ISSUE 14 HEL fields require special conservation measures and tillage practices.

Summary

DNR provides NMP and MMP template forms with endnote instructions as well as Appendices – tables containing the standard values necessary to complete the NMP and MMP Page 1 and Page 2 calculations. However, DNR also provides this express disclaimer:

> **Disclaimer:** Producers should consult Chapter 65 of the Iowa Administrative Code for more information and the actual wording of rules governing animal feeding operations. Consult Chapter 459 of the Iowa Code for actual wording of the laws governing animal feeding operations in Iowa.

The NMP must comply with requirements of IAC Chapter 65, and the requirements of IC 459a, even if the NMP form provided by DNR is not completely clear regarding those requirements. Specifically:

> **65.112(8)** A nutrient management plan shall include all of the following:
> e. (7) Appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States.
>
> (9) Protocols to land-apply manure, process wastewater or open feedlot effluent in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, process wastewater or open feedlot effluent.

Also:

> IAC 567.65.3(5) *f. Manure application on steeply sloping cropland.* Manure application on tilled cropland with greater than 10 percent slopes should be limited to areas where adequate soil erosion control practices exist. Injection or soil incorporation of manure is recommended where consistent with the established soil erosion control practices.

Proper and complete documentation describing site-specific conservation practices and measures has not been included with the submission.

Discussion

In this regard, it is unclear exactly what DNR has been requesting since 2010 from NMP applicants beyond RUSLE2 and P-Index calculation records. That does not excuse the applicant from providing the information necessary to comply with IAC Chapter 65 requirements *and Federal requirements*. Considering that 98 % of the acres listed on NMP Page 3 are in HEL designated fields, the most appropriate documentation (actually *required* prior to 2010) proving compliance with **65.112(8) e.(7)** and **(9)** would be copies of approved Conservation Plans for each field consistent with the requirements of the 1985 Food Security Act. This is still the language used in **65.103(5)**. If such plans do not exist for some of the proposed manure application fields, then DNR should not exacerbate the problem by allowing manure disposal on those fields. Instead, DNR should bring this to the attention of NRCS so that proper assistance can be provided to develop and implement site-specific, approved Conservation Plans. If proper tillage practices and conservation measures are not in place it will in fact be manure disposal, not "appropriate agricultural utilization" which Iowa Code requires.

Is it DNR's position that in this instance inclusion of RUSLE2 and P-Index reports alone are sufficient to meet Code requirements related to conservation measures and practices? Virtually all the manure application fields are designated HEL. DNR may want to consult with conservationists and NRCS officials tasked with enforcing HEL provisions in the 1985 Food Security Act before hardening in that position.

If in fact DNR believes that RUSLE2 and P-Index reports for each field proposed on NMP Page 3 are the appropriate records by which compliance with **65.112(8) e.(7)** and **(9)** is to be evaluated, then DNR must reject this NMP on its face. No conservation tillage practices are proposed, nor are any functioning conservation measures identified in RUSLE2 or claimed via STF values in the P-Index calculation. None. Zero. Not one on any field.

See Appendix L for more information regarding Food Security Act requirements and recommendations related to agricultural commodities and HEL fields.

ISSUE 15 Fields with H and VH levels of P can only receive phosphorous at agronomic rates.

Summary

Approximately 92% of the field acres in the plan have phosporous soil test results in the High or Very High range. PM 1688 guidance on this is clear. Fields in the High and Very High categories will show little if any benefit from the application of more P and may contribute to water quality impairments. In the absence of contrary rule requirements, Chapter 65 recommendations should be followed.

> **IAC 567.65.3(5)**
> Recommended practices. Except as **required** by rule in this chapter, the following practices are recommended.
>
> b. Phosphorous application rates. To minimize phosphorous movement to surface waters, manure should be applied at rates equivalent to crop uptake when soil tests indicate adequate phosphorous levels. Phosphorous application more than crop removal can be used to obtain optimum crop production when soil tests indicate very low or low phosphorous levels.

Discussion

It is important to note that there are two "rating scales" related to soil-phosphorous. The first includes five categories of soil P-test ranges including low, optimum, or excessive phosphorous in the soil, from the perspective of *crop production*. Table 14 shows the ISU PM1688 designation of phosphorous soil test ranges for corn production. Actual summarized data for the Supreme Beef proposed fields is included in the last three columns of that table. Data obtained from the test reports presented in the NMP was used. Note that the vast majority of field acres are already well above the optimum and do not require any additional phosphorous. Manure should be applied at no more than phosphorous crop-uptake levels.

> **65.17(19) [NMP & MMP] Phosphorous-based manure rate**
> *Requirements for application of a phosphorus-based manure rate to a field.*
> *c.* The phosphorus applied over the duration of the crop schedule shall be less than or equal to the phosphorus removed with harvest during that crop schedule

This is consistent with the IAC 567.65.3(5) recommendations presented above.

The second rating scale relates to P-Index values, which is a measure of *the risk* of phosphorous (primarily soil-attached) moving from the field to surface waters. This scale contains four numerical ranges identifying L, M, H, and VH risk categories. *Note: The P-test value is related to factors in two of the three terms of the P-Index equation.* 65.17(17)f.(3) shown below indicates that when the P-Index risk is in the >2-5 range, manure may be applied at twice the agronomic P-removal rate. Clearly there are two situations. If the soil P-test value is in the Very Low, Low, or Optimum range, then application at twice the removal rate can be used to build up or sustain soil-P levels. However, if the soil P-test value is in the High or Very High range, then manure should only be applied at the P-removal rate, consistent with 65.3(5) guidance and 65.17(19). This exact scenario is captured in the language of 65.17(17)*f.(*3)3.

65.17(17)*f.(*3) [P-Index Medium] (>2-5).
1. Manure may be applied at a nitrogen-based rate in accordance with 65.17(18) if current or planned soil conservation and phosphorus management practices predict the rating of the field to be not greater than 5 for the next determination of the phosphorus index as required by 65.17(17)*"h"*(3).
2. Manure shall not be applied in excess of two times the phosphorus removed with crop harvest over the period of the crop rotation.
3. If, pursuant to 65.17(19), manure is applied at phosphorus-based rates within soil sampling periods on fields in the Medium risk category, each soil sample may represent up to 20 acres for the next required soil sampling.

From: *ISU Extension PM1688 Crop Nutrient Guidelines* **							
Soil P-test categories*		min (ppm)	max (ppm)		Supreme Beef # of fields	Supreme Beef # of acres	% of acres
Very Low	VL	0	8		1	7	0
Low	L	9	15		3	147	3
Optimum	Opt	16	20		2	196	4
High	H	21	30		3	298	7
Very High	VH	31	>31		36	3710	85

**Refers to Corn; std Bray P-1 test; values slightly higher for hay fields*

*** Fields in the High and Very High categories will show little if any benefit from the application of more P and may contribute to water quality impairments*

TABLE 14 Soil-P crop nutrient guidelines

Several P-related issues stand out when data for the SB proposed fields is examined.

Fields with P-Tests in H or VH Range	
10 fields in manure easement	1209 acres
14 fields less than 1000 ft from a stream	996 acres
18 fields more than 5 miles from SB	2473 acres
28 of 31 fields have T/Ac/Yr > T-value	3573 acres

TABLE 15 Fields with H and VH P-tests

Of the fields that have soil P-test values in the High and Vey High ranges, 10 of those fields comprising 1209 acres are in easement agreements about to expire. The phosphorous content of the manure will be of no benefit to the farmer. In fact, the additional phosphorous will build up in the soil, increasing the potential to contribute to water quality problems.

Fourteen of the fields with H or VH soil P-test levels, comprising 996 acres, are less than 1000 feet from the nearest surface water. Again, this is a reason to be cautious regarding the application of additional phosphorous to these fields.

Eighteen of the fields are more than five miles from the production site and coupled with the zero-commercial value of the phosphorous in the manure, will affect the economics not only for farmers with manure easements, but also for fields owned or rented by the producer. The East 120 field, rented by the producer, has a soil-P-test in the VH range, and is **30 miles** from the production site! The producer stands to lose money with every load he delivers and applies to this rented field from his production site. Is that *really* going to happen?

It should also be noted that 28 of the sub-group of 31 fields (3573 acres) with soil P-tests in the H or VH range, have RUSLE2 calculated rill and interrill erosion (tons/acre/year) that are HIGHER than the NRCS soil conservation target known as the "T-value".

ISSUE 16 "Directors discretion" to modify or deny this NMP; Federal CAFO requirements

Part 1. Directors Discretion

In furtherance of protecting environmentally important and sensitive areas, including high quality waters such as trout streams, IAC Chapter 65 rules were adopted, notwithstanding other IAC rules, allowing the DNR Director to use his or her discretion in approving or denying AFO-related construction permits and manure/nutrient management plans. These rules are expressed in IAC 65. 5(3) [confinements and MMPs], and in IAC 65.103(5) [open feedlots and NMPs]. The ARRC objected to both 65.5(3) [confinement operations] and 65.103(5) [open feedlot operations]. It is important to note however, that in its objection it only refers to confinements and manure management plans; the objection rationale never refers to open feedlots and nutrient management plans. Their objections are based solely upon claiming that the master matrix provides the proper review process. **However, open feedlots are exempt from the master matrix review process!** The ARRC arguments never put forward a reason for denying the Directors right of review of NMP's under 65.103(5). The complete text of the ARRC objection is in Appendix J, along with the complete text of 65.103(5). Please read the ARRC committee's concluding paragraph:

> The Committee believes this statutory language demonstrates a clear legislative intent that the matrix is the exclusive mechanism for the evaluation and approval of an application for the construction or expansion of a confinement feeding operation structure and for the implementation of manure management practices.

This objection does not pertain to open feedlots or NMPs. However, whether or not the Director chooses to take action in this case does not negate the validity of the concerns expressed in IAC 65.103(5) with respect to this facility's potential adverse impacts on natural resources or the environment.

- The likelihood open feedlot effluent will be applied to frozen or snow-covered cropland.

- 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.**
- Topography, slope, vegetation, potential means or routes of conveyance of open feedlot effluent spilled or **land applied.**
- Application areas involve cropland with predominant **slopes greater than 9 percent without a conservation plan** approved by the local soil and water conservation district or its equivalent.
- Whether open feedlot effluent for land application is **hauled or otherwise transported more than five miles.**
- Open feedlot effluent from the operation will cause pollution of a water of the state.
- Open feedlot effluent from the operation will cause a violation of state water quality standards.
- 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.

Part 2. Federal CAFO requirements

This facility meets both the State and Federal definitions of a "large concentrated animal feeding operation" (CAFO) and therefore has the presumptive requirement of obtaining a NPDES operational permit as outlined in *40 CFR § 122.23.* The applicant has made the declaration that there will be no discharges from the facility or the land application areas to waters of the nation and has therefore chosen not to obtain NPDES coverage for his activities. This does not negate certain responsibilities and potential liabilities.

> 40 CFR § 122.23(d)(1) **.** A CAFO must not discharge unless the discharge is authorized by an NPDES permit.
>
> **(e)** ***Land application discharges from a CAFO are subject to NPDES requirements.***
>
> **(1)** For unpermitted Large CAFOs, a precipitation-related discharge of manure, litter, or process wastewater from land areas under the control of a CAFO shall be considered an agricultural stormwater discharge **only** where the manure, litter, or process wastewater has been land applied in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, as specified in § 122.42(e)(1)(vi) through (ix).

The Federal requirement is very explicit. If a CAFO chooses not to obtain coverage under an NPDES permit, ANY precipitation-related discharge from land application areas IS considered a discharge unless site-specific nutrient management practices are in place that ensure appropriate agricultural utilization of the nutrients. The producer intends to land apply manure to predominately HEL-designated fields. Conservation and nutrient management practices must comply with the requirements of the 1985 Food Security Act. These are discussed in Appendix L. There has been no showing that site-specific nutrient management practices are in place. Absent a proper and approved Conservation Plan, and considering the applicants RUSLE2 declarations that all manure will be applied to all HEL designated fields **without ANY specified conservation tillage or functioning conservation measures**, it must be presumed that discharges to waters of the United States will occur.

On this basis alone, DNR should not approve this NMP.

ISSUE 17 Field Disqualification summary

Summary

Field Disqualification Summary

Designation	Manure Acres NMP	Correct_soil_P_test	Distance_to_SB_miles	predominant slope > 9%	Own_Rent_Easement	No "correct soils P-test"	Expired Easement Agreement	P-Index is >= 5.0	P-Index is or may be >= 5.0	Slopes > 9% w/o Conservation Plan	Manure hauling distance >= 5 miles
Airport Monona	68.6	y	3.8	n	E						
Carlson - Farmersburg 1	218.0	y	7.8	n	E						
Carlson - Farmersburg 2	57.5	y	7.8	n	E						
Carlson - Farmersburg 3	77.0	y	7.8	n	E						
Carlson - Farmersburg 5	59.0	y	7.9	n	E						
Costigan - School House Bottom	39.6	n	8.4	n	O						
Costigan East lane	31.7	n	7.9	n	O						
Costigan House Bottom	53.0	n	7.8	n	O						
Derks Home	195.2	n	7.9	y	E						
East 120	103.3	n	30.8	y	R						
Fred Berns Norrh	214.0	y	11.0	n	R						
Fred Berns South	170.5	y	11.0	n	R						
Freddy's Hay	87.5	n	3.4	y	O						
Goedken East	30.1	n	2.6	y	E						
Goedken West	41.7	n	2.6	y	E						
Heuers	157.6	y	10.3	y	R						
Home Farm 1	16.4	n	2.5	y	O						
Home Farm 2	84.7	n	2.5	n	O						
Home Farm 3	17.2	n	2.5	n	O						
Home Farm 4	79.5	n	2.3	n	O						
Home Farm Hay	9.0	n	2.3	n	O						
Home Grain Farm	379.5	y	12.1	y	R						
Home North	67.8	y	11.3	y	R						
Home x Scneiders	120.5	y	11.3	y	R						
June's	38.3	n	7.7	y	E						
Kathy's	71.7	y	2.1	y	O						
Kathy's Hay	30.0	y	2.1	y	O						
Kevin's Farm	252.3	y	1.0	n	E						
Koether - Franklin 26/35	135.0	n	6.3	y	E						
Koether - Giard 34	100.0	n	3.8	y	E						
Koether - Giard 35	172.0	n	3.6	y	E						

Leroy's	121.7	y	4.0	n	O						
Marting Hay	7.0	n	2.6	y	O						
Meiers	60.8	n	10.5	n	O						
Monroe A	6.3	n	2.7	n	R						
Monroe B	22.5	n	8.2	n	R						
Monroe C	174.0	n	8.5	n	R						
North Harness	95.4	n	7.8	n	E						
Palas Hay East	7.5	y	3.0	y	O						
Palas Hay West	10.5	y	8.7	n	O						
Radloff North	124.1	y	8.7	n	O						
Radloff South	109.0	y	5.3	y	O						
Schutte South	58.4	y	2.0	n	E						
Smith	207.6	y	1.5	y	R						
Walt and Elmer's	172.1	y	0.5	y	O						
Acres remaining based upon each disqualification status	4355.1					2754.9	2756.6	3874.8	3634.1	2105.3	1641.3
Acres remaining based upon red disqualification =	**1964.1**						Acres remaining based upon red and yellow disqualification =				**121.7**

TABLE 16. Field disqualification matrix

Discussion

Many of the fields listed on NMP Page 3 should be disqualified based upon three non-discretionary criteria:

- Fields with no "correct soils P-test". **Twenty-three fields totaling 1600 acres.**
- Easement agreements expiring before manure will be spread. **Fifteen fields totaling 1598 acres.**
- Fields with P-Index equal or greater than 5.0. **Five fields totaling 480 acres.**

Disqualification based upon non-discretionary criteria includes **30 fields totaling 2391 acres**.

Many of the fields may be disqualified based upon three discretionary criteria:

- Additional fields with P-Index probably greater than 5.0 . **Four fields totaling 241 acres**.
- Fields with predominant SMU slope greater than 9% without approved Conservation Plans. **Twenty-one fields totaling 2250 acres.**
- Fields located five mile or more from the manure storage site. **Twenty-four fields totaling 2714 acres.**

Disqualification based upon discretionary criteria includes **37 fields totaling 3737 acres.**

Disqualification based upon non-discretionary and discretionary criteria includes 44 of the 45 fields totaling 4,233 acres that either *must not* or *should not* be approved. This leaves just 122 acres in the plan.