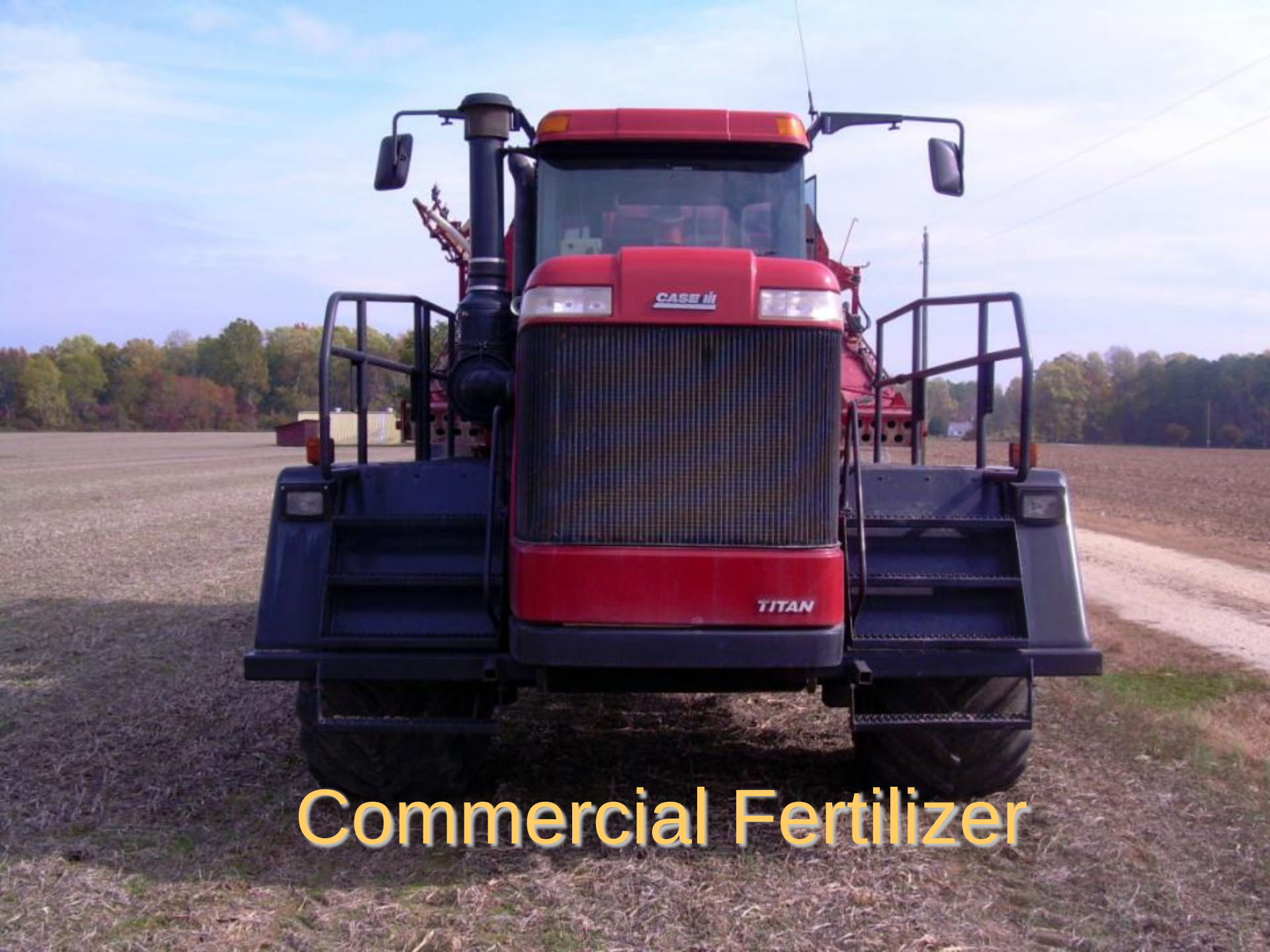


Commercial Fertilizer

Commercial Fertilizer

- Materials
- Blending
- Application

References

- The Mid-Atlantic Nutrient Management Handbook

  Chapter 8. Commercial Fertilizers

Fertilizer Materials

- Dry Materials
- Liquid Materials

- Classified into four categories:
    1. Ammoniated Dry Granular
    2. Dry Bulk Blend
    3. Clear Liquid Solutions
    4. Liquid Suspensions

Fertilizer Analysis

- Expressed as percentages

N = % nitrogen

P = % P_2O_5 Phosphate

K = % K_2O Potassium (potash)

N- P_2O_5 - K_2O -S (sulfur)

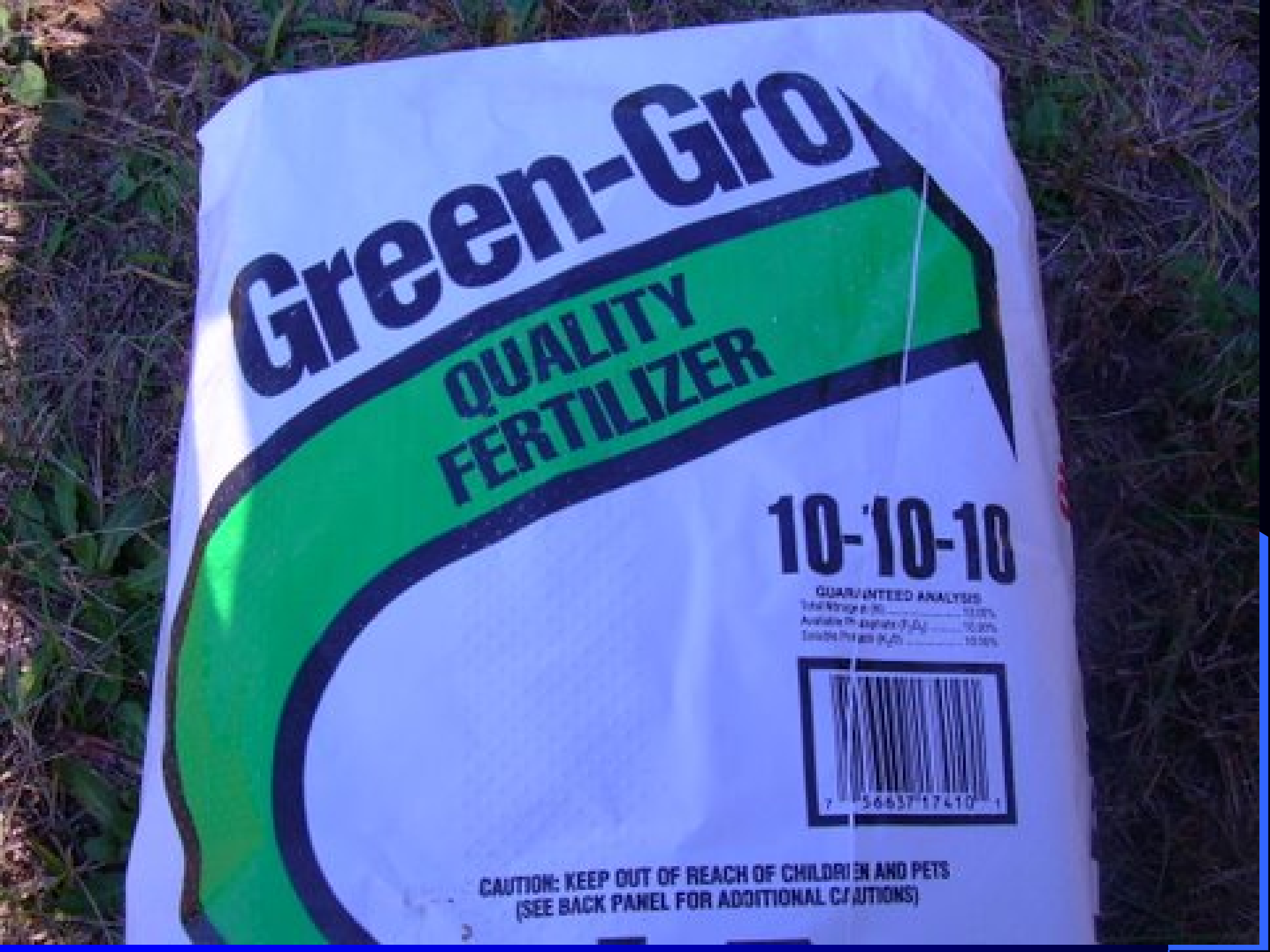
Ammoniated Dry Granular

- Ammonia reacted with phosphoric acid
- Potash and fillers added (usually coarse limestone)
- Mixture dried and granulated
- The result is a granule that contains a percentage of each nutrient
- Ammoniated fertilizer usually more expensive than dry bulk blends

Ammoniated Dry Granular

10-10-10 Ammoniated fertilizer

10% nitrogen
10% phosphate
10% potash


Green-Gro
QUALITY
FERTILIZER
10-10-10
GUARANTEED ANALYSIS
CAUTION: KEEP OUT OF REACH OF CHILDREN AND PETS
(SEE BACK PANEL FOR ADDITIONAL CAUTIONS)

Dry Bulk Blends

- Produced by blending various dry materials
- Custom blending to meet exact nutrient needs of the crop
- Common dry nitrogen materials

  ammonium sulfate 21-0-0-24s

  UREA 46-0-0

Dry Bulk Blends

- Common Dry Phosphate materials
  - diammonium phosphate (DAP) 18-46-0
  - concentrated superphosphate 0-46-0
    (triple superphosphate)
- Common Dry Potassium materials
  - muriate of potash (potash) 0-0-60
  - potassium sulfate 0-0-50-18
  - potassium-magnesium sulfate 22-22-11
    (sul-po-mag or k-mag)

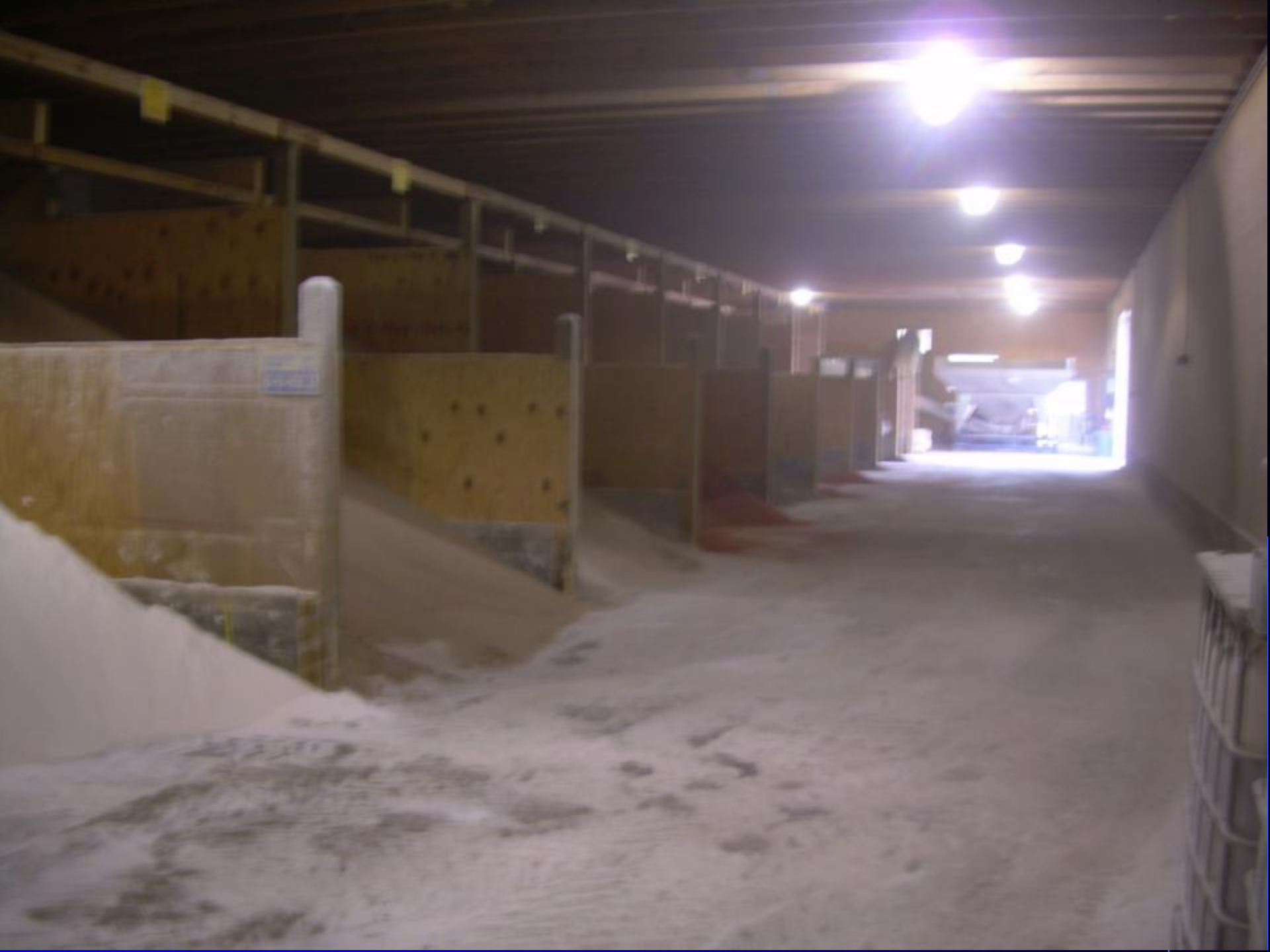
Dry Bulk Blends

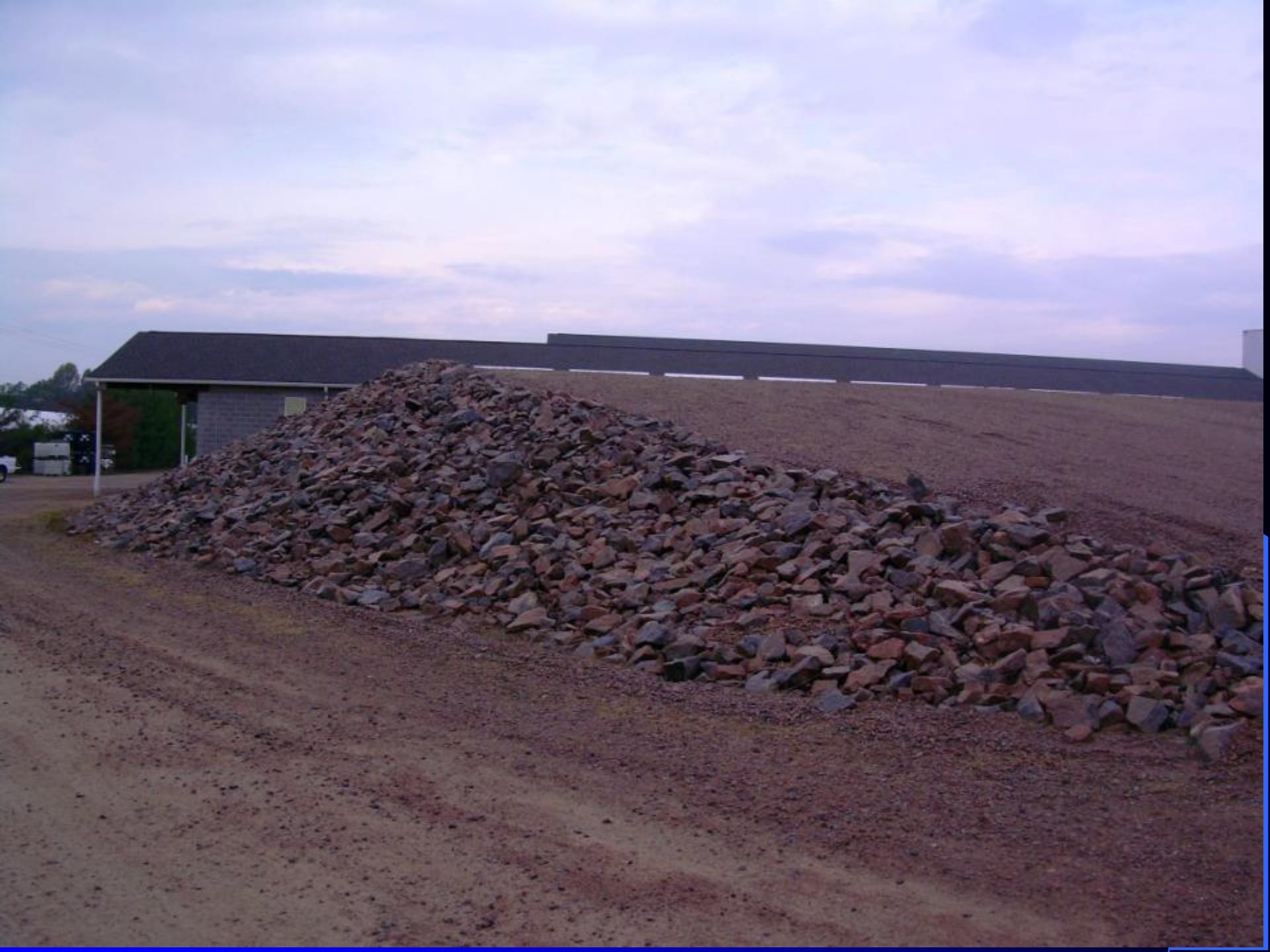
- Dry micronutrients
- Liquid micronutrients
  - Boron
  - Zinc
  - Manganese

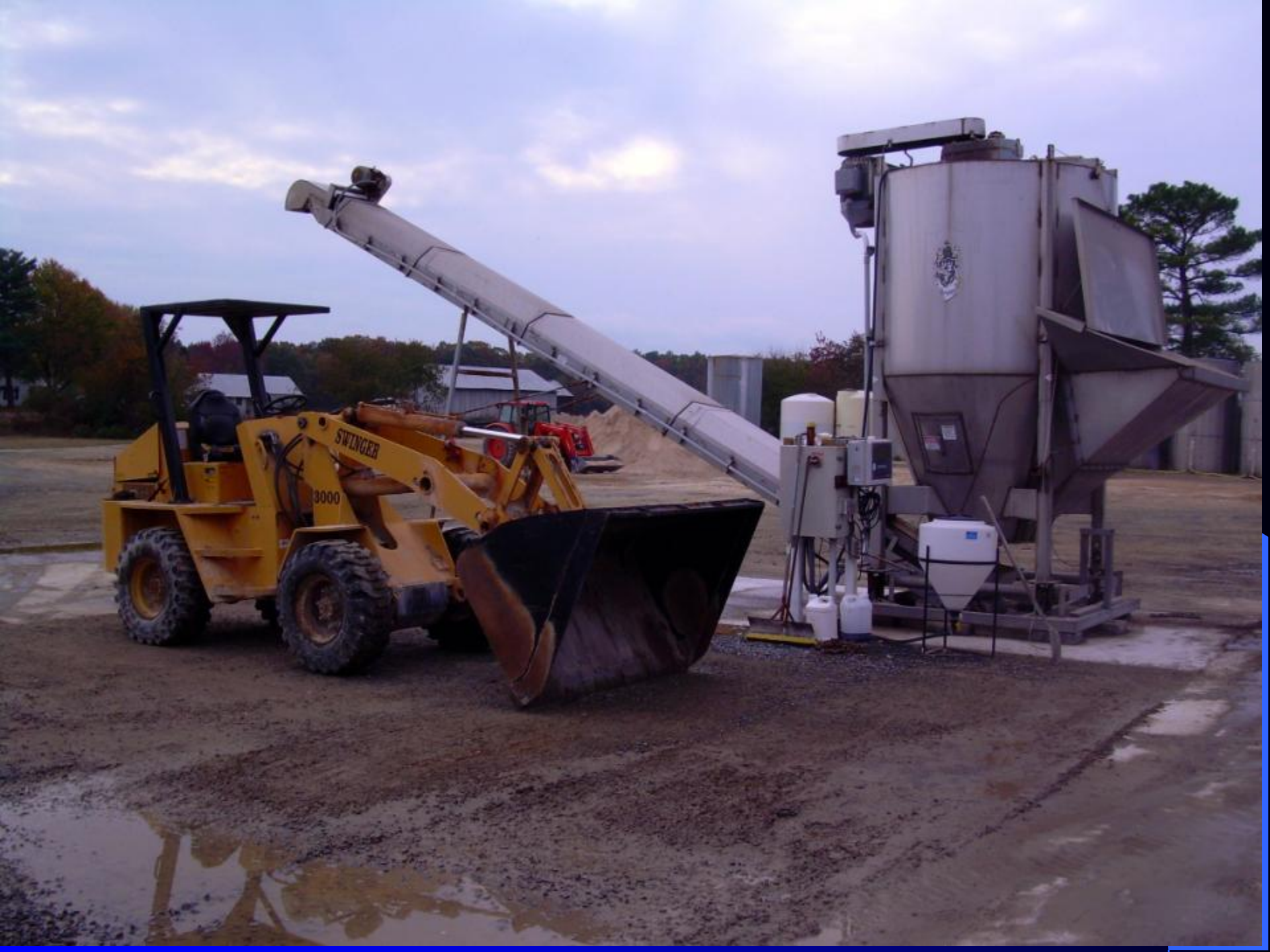
Dry Bulk Blends

- Important to match particle size and density
- Reduces segregation during transport to the field
- Larger particle and less dense materials tend to move to the top of the load
- Similar particles improve uniformity during application -

  more dense particles throw farther



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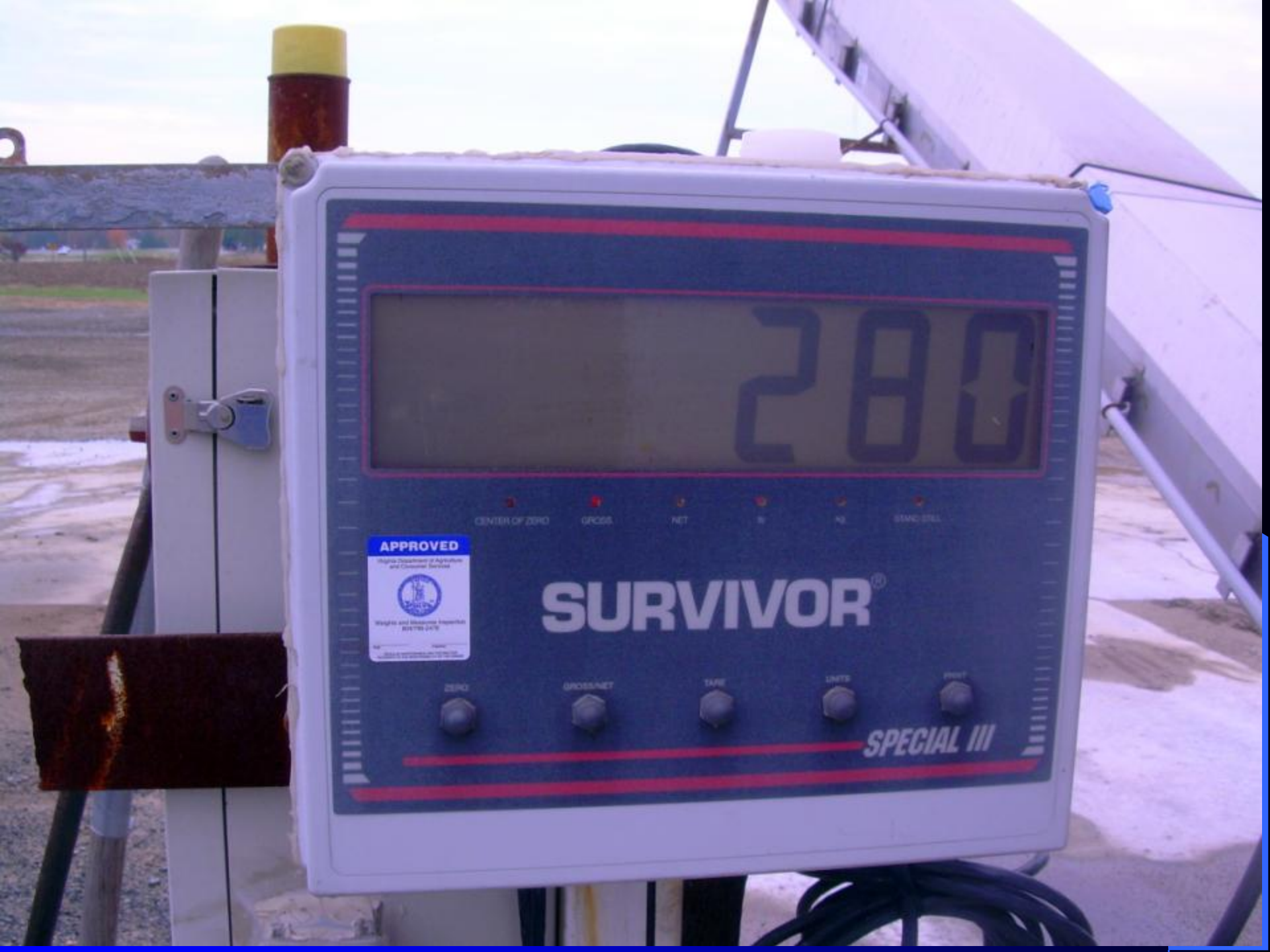
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Clear Liquids

- Cold mix process
  - superphosphoric acid is neutralized by anhydrous ammonia
  - creates a base material 10-34-0
  - commonly used as a starter
  - additional nitrogen or potash may be added for a complete fertilizer

Clear Liquids

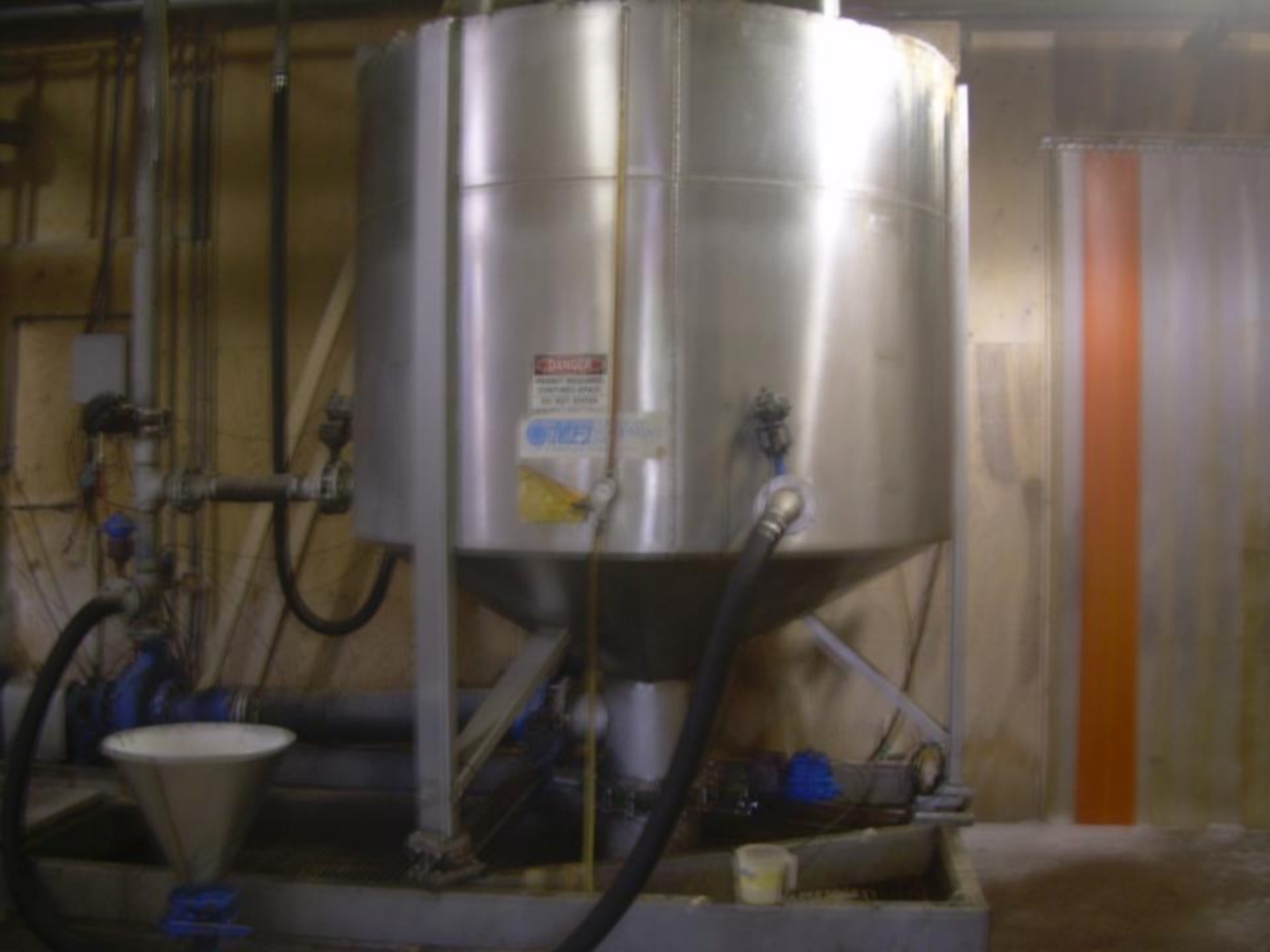
- Hot mix process
  - aqua ammonia reacted with phosphoric acid (generates considerable heat)
  - water (filler), potash, and additional nitrogen added to mix

Clear Liquids

- Hot mix process
  - common liquid materials
    - aqua ammonia 20-0-0
    - phosphoric acid
    - water
    - potash 0-0-60
    - 28%-32% UAN nitrogen solution
    - micronutrients

Liquid Suspensions

- High analysis versus clear liquids is limited
- Clay is added during the hot mix process
- Clay provides a surface for the fertilizer salts to form on
- Nutrients are held in “suspension”
- Suspensions allow for less material per acre (higher analysis)
- Flexibility - Allows for more acres per load
- Agitation necessary to prevent settling of clay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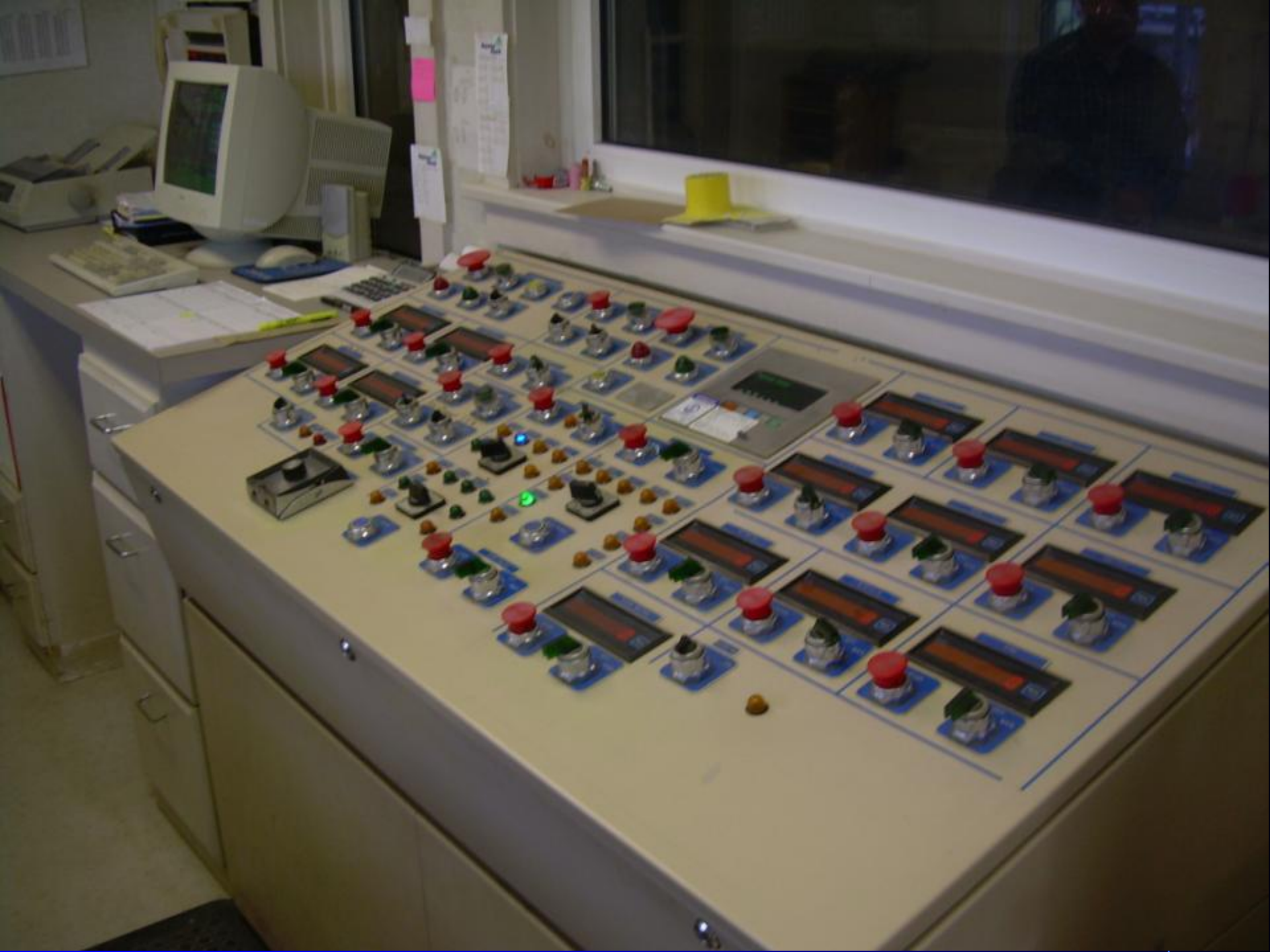

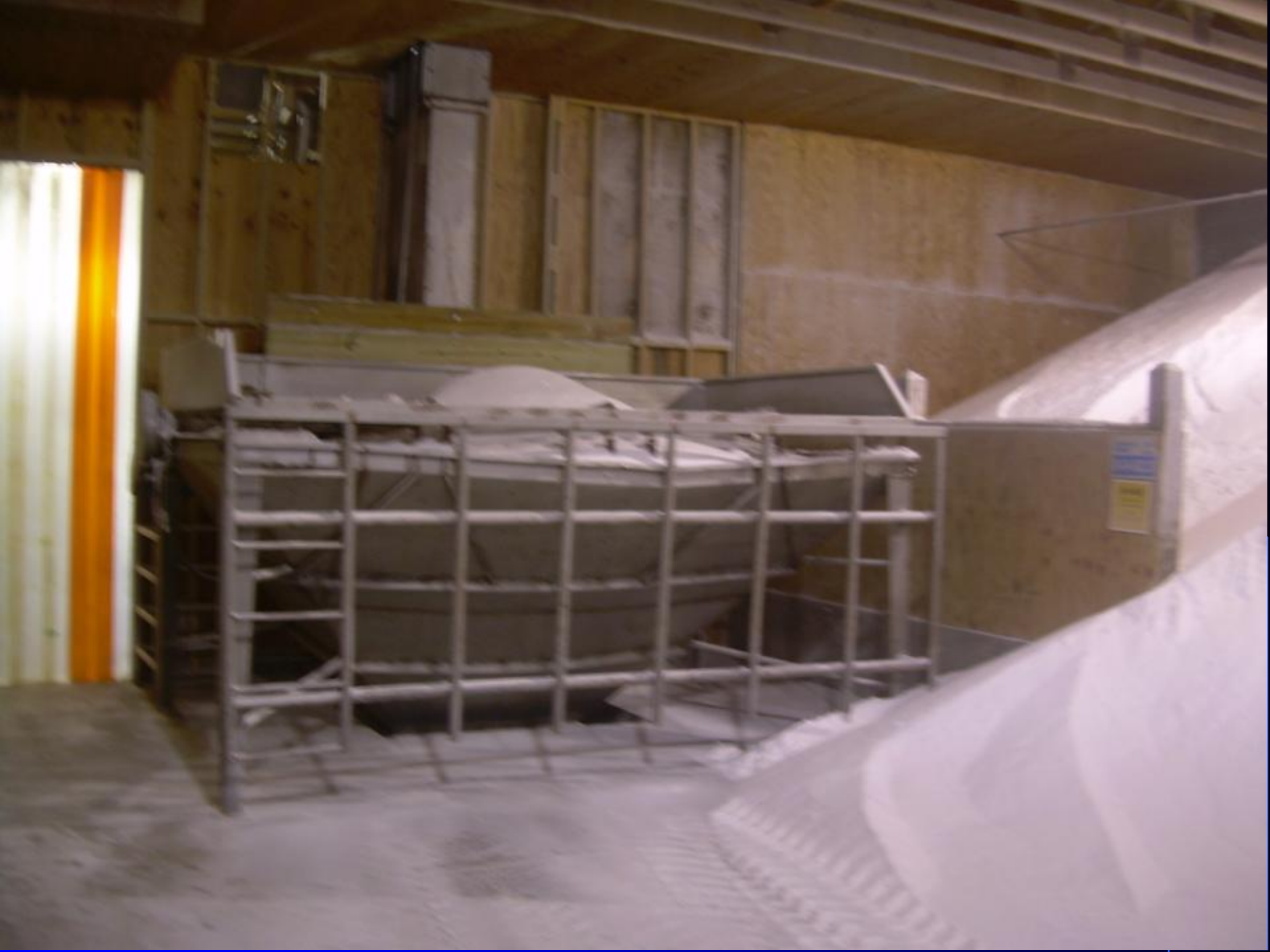

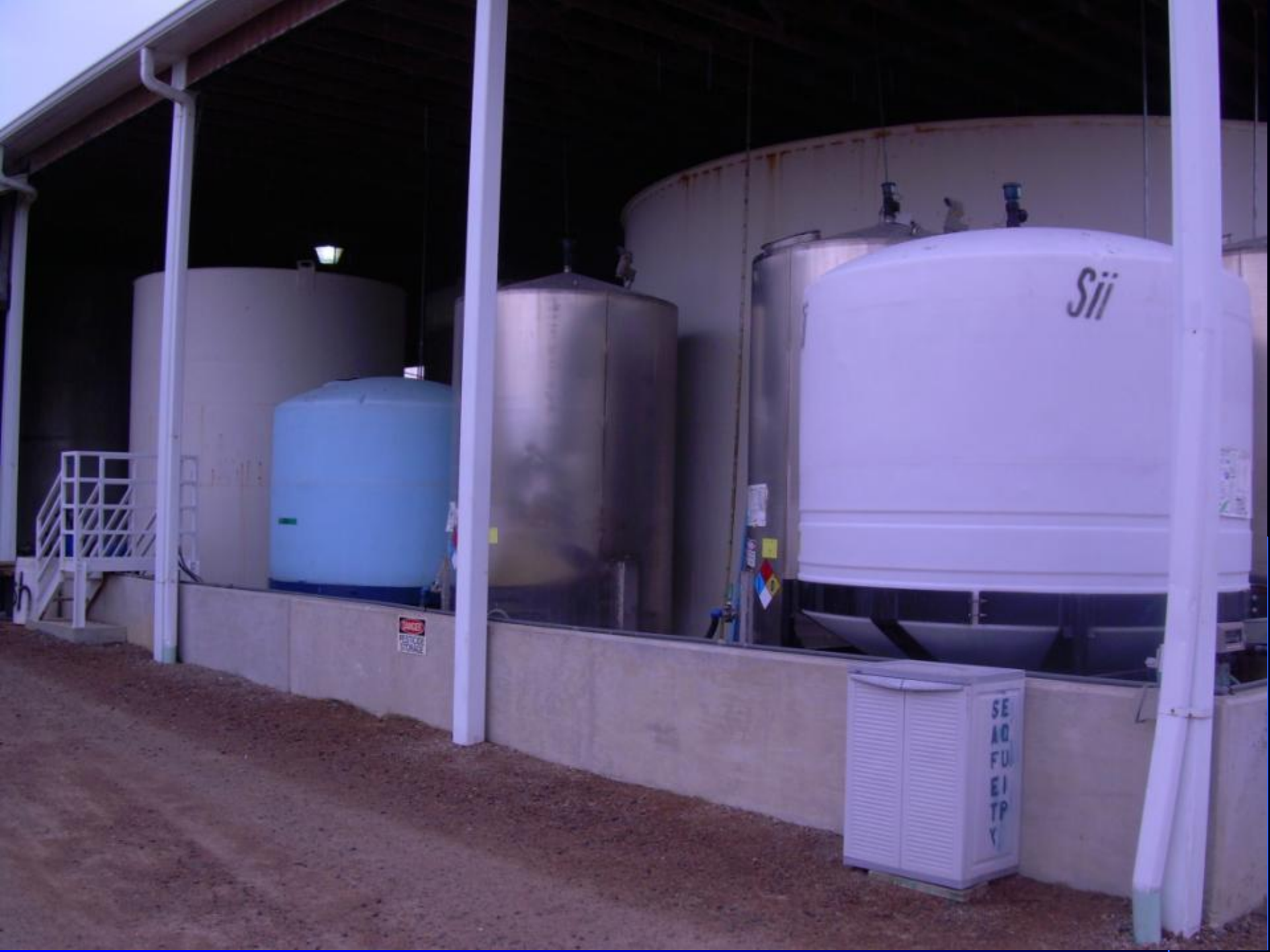
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Commercial Fertilizer Blending

- Plant Food vs. Material
- Plant food is the actual plant available nutrients in the material
- Material is simply that – the material
- Two formulas needed for basic calculations

1.) plant food (lbs.) = pounds of material x
percent (%) nutrient in fertilizer

Commercial Fertilizer Blending

Material	Plant food
100 lbs. UREA (46-0-0)	46 lbs. N
	100 x 46% (.46)
100 lbs. DAP (18-46-0)	18 lbs. N
	46 lbs. P_2O_5
	100 x 18% (.18)
	100 x 46% (.46)

Commercial Fertilizer Blending

Material	Plant food
50 lbs. Potash (0-0-60)	30 lbs. K_2O
	50 x 60% (.60)
2000 lbs. UAN 30% (30-0-0)	600 lbs. N
	2000 x 30% (.30)

Commercial Fertilizer Blending

2.) fertilizer material (lbs.) =
plant food ÷ percent (%) nutrient in fertilizer

	Material	Plant food
UREA (46-0-0)		
80 plant food lbs. N	173.9 lbs.	(80-0-0)
80 ÷ 46% (.46)		
DAP (18-46-0)	130.4 lbs.	(23-60-0)
60 plant food lbs. P		
60 ÷ 46% (.46)		

also get N from DAP 130 x 18% = 23.4 lbs. N

Commercial Fertilizer Blending

400 lbs of ammonium sulfate per acre
Ammonium sulfate 21-0-0-24s

How much nitrogen per acre? (plant food)

How much sulfur per acre? (plant food)

Commercial Fertilizer Blending

Nitrogen 84 lbs plant food per acre

400 x 21% = 84 lbs

Sulfur 96 lbs plant food per acre

400 x 24% = 96 lbs

Commercial Fertilizer Blending

250 lbs of Urea to acre (46-0-0)
200 lbs of Potash to acre (0-0-60)

How much nitrogen per acre? (plant food)

How much potash per acre? (plant food)

Commercial Fertilizer Blending

Nitrogen 115 lbs plant food per acre

250 x 46% = 115 lbs N

Potash 120 lbs plant food per acre

200 x 60% = 120 lbs K_2O

Commercial Fertilizer Blending

Need 100 lbs plant food per acre of nitrogen

Using: Urea 46-0-0

Ammonium Sulfate 21-0-0-24

How much material per acre of urea?

How much material per acre of ammonium sulfate?

Commercial Fertilizer Blending

Material:

Urea 217.4 lbs/acre

(100 / 46% = 217.39)

Ammonium Sulfate – 476.2 lbs/ac

(100/21%=476.2)

Commercial Fertilizer Blending

Need 120 lbs plant food per acre of phosphate

Using DAP 18-46-0

How much material per acre of DAP?

Commercial Fertilizer Blending

Material DAP 260.8 lbs per acre

120 / 46% = 260.8

DAP 18-46-0 (also get nitrogen)

How much nitrogen per acre? (plant food)

Commercial Fertilizer Blending

Material DAP 260.8 lbs per acre

120 / 46% = 260.8

DAP 18-46-0 (also get nitrogen)

How much nitrogen per acre? (plant food)

Material DAP 260.8 lbs per acre

260.8 x 18% = 46.9 lbs/ac N

Commercial Fertilizer Blending

Nitrogen on corn - need 80 lbs plant food per acre

Using 30% nitrogen

Weight of 30% is 10.84 lbs per gallon

How many gallons per acre of 30%?

Commercial Fertilizer Blending

24.6 gallons per acre of 30% nitrogen

80 / 30% = 266.6 lbs
266.6 / 10.84 = 24.6 gallons

Commercial Fertilizer Blending

- 8 acre pasture field
- Nutrient recommendation 90-70-170

  DAP (18-46-0)

  UREA (46-0-0)

  Potash (0-0-60)

  How many total pounds does the spreader truck need and what is the rate per acre?

  (hint: begin with phosphorus)

Commercial Fertilizer Blending

DAP (18-46-0) (90-70-170)

70 (P) ÷ 46% = 152 lbs./ac DAP

152 x 18% = 27.3 lbs. N

27.3-70-0

Need balance of nitrogen 90-27.3 = 62.7

UREA (46-0-0)

62.7 (N) ÷ 46% = 136 lbs./ac UREA

90-70-0

Potash (0-0-60)

170 (K) ÷ 60% = 283 lbs./ac Potash

Commercial Fertilizer Blending

152 lbs. DAP + 136 lbs. UREA + 283 lbs. Potash

571 lbs./ac = rate per acre

571 lbs./ac x 8 acres = 4568 total lbs. Mixed and put on truck for application

Commercial Fertilizer Blending

- Formula to find out analysis of material being applied:
- Analysis of material =

  (pounds of plant food ÷ rate per acre) x 100

  90 (N) ÷ 571 = .157 .157 x 100 = 15.7%

  70 (P_2O_5) ÷ 571 = .123 .123 x 100 = 12.3%

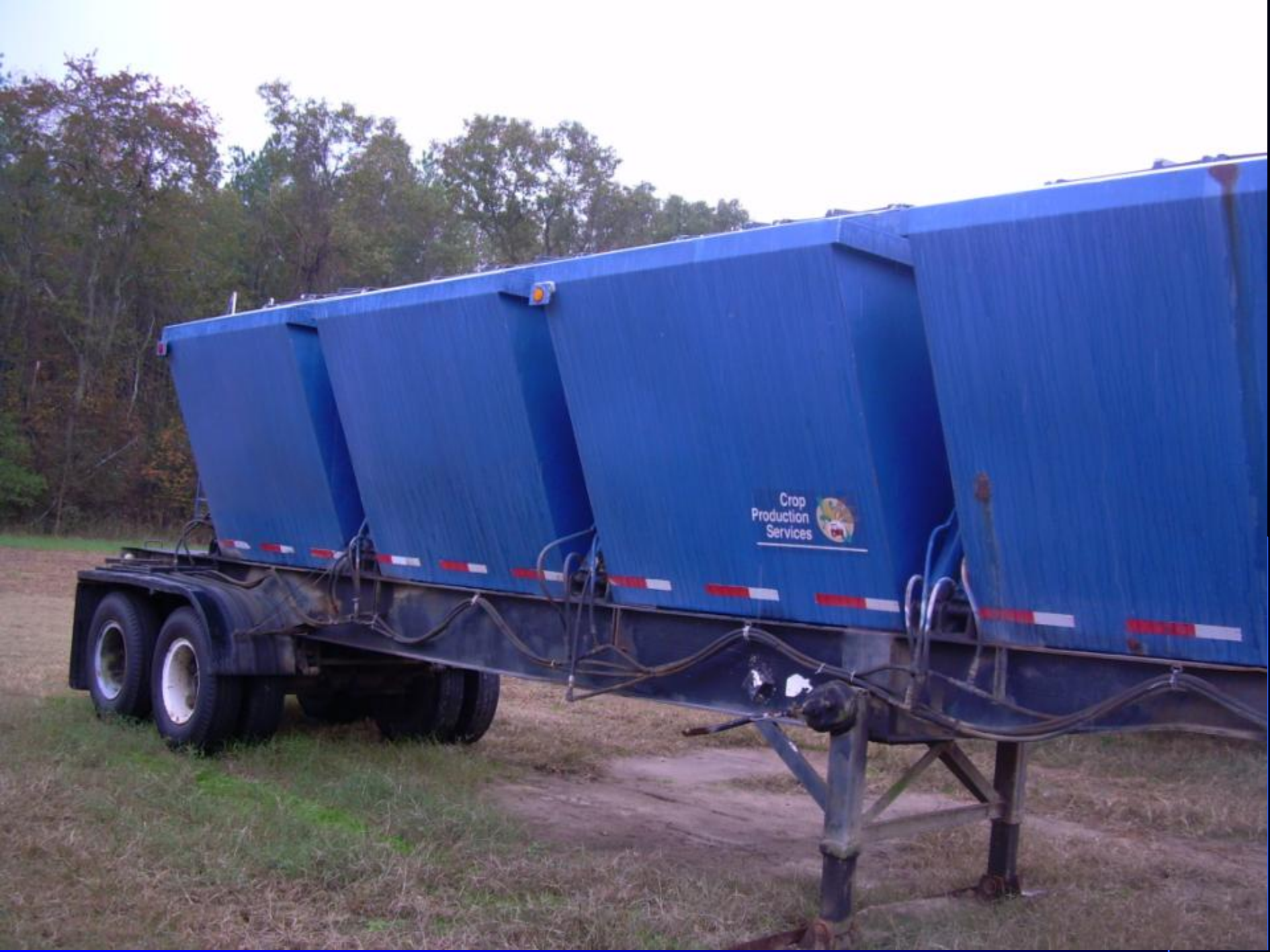
  170 (K_2O) ÷ 571 = .297 .297 x 100 = 29.7%

Commercial Fertilizer Blending

- Applicator will be applying 571 lbs./ac of a 15.7-12.3-29.7
- Plant food 90-70-170

Fertilizer Application

- Terragators (liquid and dry)
- Rogators
- Nurse trucks and trailers (liquid)
- Tender trucks and trailers (dry)
- Dry trucks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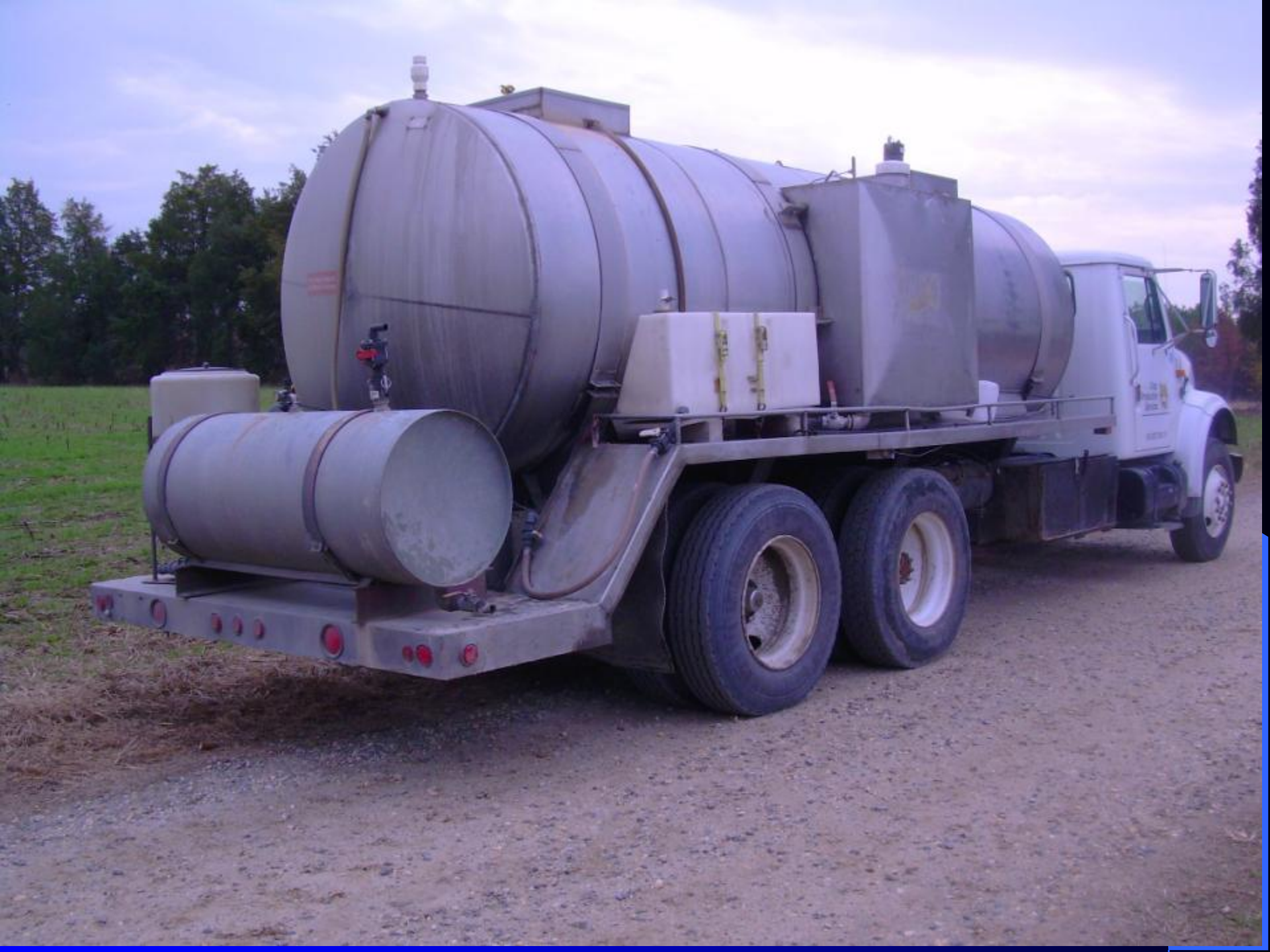

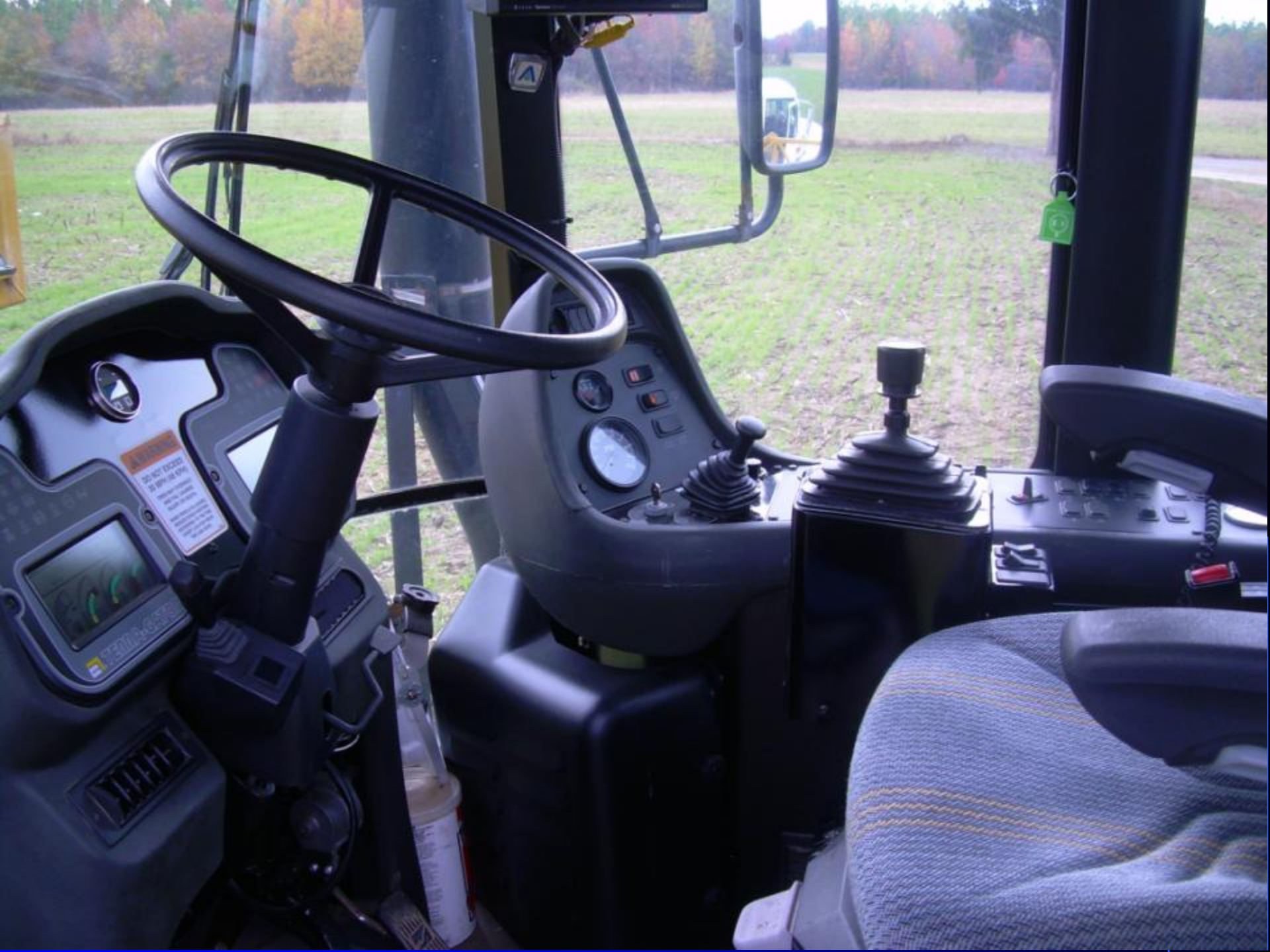

VADCR

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