

STATE OF MINNESOTA
DEPARTMENT OF AGRICULTURE

IN THE MATTER OF THE PROPOSED AMENDMENTS)
TO THE RULES OF THE DEPARTMENT OF AGRICULTURE)
GOVERNING FERTILIZER LABELS AND LABELING)
REQUIREMENTS (Agr 319-323)

STATEMENT OF NEED
AND REASONABLENESS

I. INTRODUCTION

The subject of this rulemaking is the proposed amendments to rules of the Minnesota Department of Agriculture governing fertilizer labels and labeling requirements. The amendments to these rules are proposed for adoption pursuant to Minnesota Statutes section 17.725, Subdivision 1, which authorizes the Department to establish rules for labels and labeling requirements for fertilizers registered in Minnesota.

Rulemaking on the proposed amendments to the rules was authorized by the Department on October 28, 1982. The commissioner of the Minnesota Department of Agriculture determined that the proposed amendments to these rules would be noncontroversial in nature due to consultations with representatives of the fertilizer industry, and due to the fact that the Department received no responses to its notice to solicit outside opinion in this matter. However, due to provisions of Minnesota Statutes section 17.725, subd. 1, a public hearing will be held regarding the proposed amendments to these rules.

The discussion provided in this statement is divided into the following parts:

Part II. General overview

Part III. Need for and reasonableness of the proposed amendments to the rules

Part IV. Attachments

II. GENERAL OVERVIEW

A. The Need for Fertilizer Labels and Labeling Requirements:

In order to understand the need for and reasonableness of the proposed amendments to these rules, it will be useful to understand the context in which the amendments are proposed. Currently, there is no federal law, and there are no federal regulations in the fertilizer industry. However, the Association of American Plant Food Control Officials (AAPFCO) has, since 1946, worked to develop model laws and regulations for adoption at the state level. The AAPFCO is composed of state officials responsible for regulating fertilizers and fertilizer materials in the 50 states. Industry members have always been participants in these AAPFCO meetings, although they are not voting members, and they have made significant contributions to the discussions of model laws and regulations. Thus, the industry is familiar with the labeling requirements herein and has accepted recommendations made by AAPFCO since 1946. Because of this, these proposed amendments to the rules codify practices already used within the fertilizer industry and would not result in a new economic burden on the industry. Similar guidelines are used in most of the other 49 states in their fertilizer labeling and review activities. The amendments as proposed are consistent with the model regulations developed by AAPFCO, a copy of which is included in this statement of need and reasonableness as Attachment A.

The first Minnesota law requiring the labeling and registration of all commercial fertilizers with the Department was passed in 1915. The registration and labeling of specialty fertilizers was first required in 1949. In 1968, the Department adopted rules governing

soil conditioners and trace minerals in fertilizers. Since the early 1970's, there have been many technological advances resulting in numerous new fertilizer products such as "slow release" fertilizers and fish emulsions. The Department has regulatory authority over the sale of these products, and has registered them, but has not had adequate enforcement standards because the 1968 rules do not have specific labelling requirements for the more recent fertilizer products. The administrative experience of the Department demonstrates the need to adopt additional standards for the labeling of all fertilizer products, including the new products, because of the difficulty of enforcing state law. Thus, almost all of the material in these proposed amendments to the rules is new material.

Beyond the issue of enforcement, this rule is necessary primarily to provide consumer protection through truth in labeling of the fertilizers sold or distributed in Minnesota. The purchase of fertilizer is a major farm expense in Minnesota, totalling \$625 million in 1981. Because fertilizer purchases impact so greatly on farm income and production, it is necessary that the fertilizers be properly labeled. At the same time, it is reasonable to make the amendments to the rules consistent with AAPFCO's model regulations since many of the fertilizers are distributed in all 50 states. Uniformity in labeling among the states reduces the burden for those registering fertilizers in several states from having to meet different labeling requirements for each state. Thus, the adoption of these model regulations in Minnesota would facilitate inter-state trade.

The proposed requirements for labels and the labeling of fertilizers will pertain to all fertilizers sold or distributed in Minnesota. At the present time, the proposed amendments will affect approximately 1,000 specialty and small packaged fertilizer products that are registered with the Department by approximately 130 companies, located both in Minnesota and throughout the world. These proposed amendments to the rules will also affect the labels and labeling requirements for approximately 850 blenders, manufacturers and distributors who also distribute commercial fertilizers in Minnesota.

By the promulgation of these amendments to these rules, the Department wishes to clarify the requirements for fertilizer labels and labeling which apply to all commercial fertilizers sold in Minnesota, in accordance with Minnesota Statutes section 17.711 to 17.729.

B. Format of the Proposed Amendments to the Rules:

The proposed amendments to the rules are set forth in the following manner: Authority and purpose; definitions; label information requirements; exception to label information requirements; location of label information; bulk fertilizers; slowly released plant nutrients; fish emulsions; additional plant nutrients permitted; labeling and labels; warning statements; enforcement; and repealer.

In this statement, for the sake of brevity, the content of the proposed amendments to the rules has not been repeated, but the numbers of the parts of the rule have been noted for reference.

III. NEED FOR AND REASONABLENESS OF THE PROPOSED AMENDMENTS TO THE RULES

The need for and reasonableness of each proposed amendment to the rules follows.

3 MCAR S 1.0327 A. Authority and Purpose

This part of the rule is all new material and is necessary and reasonable to clarify for readers and users the purpose of this rule governing fertilizer labels and labeling and the authority by which the commissioner proposes the amendments to the rules.

3 MCAR S 1.0327 B. Definitions

While the present rule Agr 319 contains definitions, the commissioner proposes to repeal those definitions since they are not precise enough, given the present level of scientific advancement. Thus, the definitions proposed in this part are all new material. The terms are necessary to clarify meanings for readers and users of the rules, and are reasonable terms because they are terms familiar in the fertilizer industry. Some of the definitions were incorporated from Minnesota Statutes section 17.713, while the following definitions were included and developed specifically for this rule.

The definition of "department" is necessary to identify the state agency charged with regulating the labels and labeling requirements of commercial fertilizer. The definition of "fertilizer" is necessary because it reflects the fact that all fertilizers are subject to the provisions of this rule. The definition of "plant nutrient" is necessary because it clarifies the interchangeable use of the term with "plant food" which is defined in Minnesota Statutes section 17.712, subd. 15 b.

3 MCAR S 1.0327 C. Label Information Requirements

This part of the rule is all new material and is necessary for two reasons. The first is to inform persons blending, manufacturing, and distributing fertilizers in Minnesota of the required information, format, and order to be placed on the labels affixed to fertilizer bags or other containers. The second reason is to assure that consumers will be able to determine product content before they purchase the fertilizer. It is reasonable that consumers be assured that they are getting the fertilizer they are purchasing, and it is also reasonable for the industry because the content, format, and order of the label information is consistent with AAPFCO standards, would be acceptable in a number of states, and thus would not be an undue economic hardship on the industry.

3 MCAR S 1.0327 D. Exception to Label Information Requirements

This part of the rule is all new material and is necessary to clarify exceptions to the label information requirements stated in C. The first section of this part of the rule, regarding the percentage of a plant

nutrient being zero, is a necessary exception because the commissioner cannot permit the guarantee of a plant nutrient which is not contained in the product. It is reasonable to leave a zero percentage nutrient out of the label so that consumers will not be confused by its being listed.

The second section of this part of the rule is necessary to identify the fertilizers which must have the chemical forms of nitrogen listed. If the nitrogen contained in a fertilizer is not a fish emulsion, organic or slowly released, just the total amount of nitrogen may be listed on the label, since frequently the nitrogen is all of one type in fertilizers other than these. If the nitrogens are not organic or slowly released, there is no need to document any claims for them on the product label since no elaborate claims are made. If claims are made, however, such as "slow release", they must be documented. That is the requirement of this section.

3 MCAR S 1.0327 E. Location of Label Information

This part of this rule is new material, and is necessary for two reasons. The first is that this part identifies the area on the package or container where the label information must be placed which is required under Minnesota Statutes section 17.716, subd. 1, and it is necessary for consumers to be able to spot the information easily on the package. It is a reasonable requirement since it is consistent with AAPFCO recommendations and as such facilitates labeling for inter-state trade. It will also have little economic impact on industry since their practices are already consistent with this requirement.

3 MCAR S 1.0327 F. Bulk Fertilizers

This part of the rule regarding the information to accompany bulk fertilizers upon delivery is all new material and is necessary to inform purchasers of the product they are receiving. It is also a requirement of Minnesota Statutes section 17.716, subd. 3. It is reasonable that consumers should have adequate knowledge of what they are purchasing. This requirement is in lieu of label information requirements for packaged products.

3 MCAR S 1.0327 G. Slowly Released Plant Nutrients

This part of the rule is quite extensive, containing all new material. The technology for "slowly released" plant nutrients is relatively new within the last few years. Thus it is important and necessary for the commissioner to identify which fertilizer products claiming "slow release" properties are making legitimate claims by adopting standards these products must meet before they can be guaranteed by the labeler and registered for sale or distribution in the state. The standards and labeling proposed for these products are reasonable because they are standards and labels consistent with those prepared by AAPFCO for these fertilizers.

The first three sections of this part of the rule contain general statements about what the commissioner will accept as descriptive of fertilizers making slow release claims. The fourth section of this part of the rule contains a clarification of what is acceptable as organic nitrogen and contains an example for the required label and labeling of such a product. The fifth section of this part of the rule contains a lower level threshold for the claim of "slow release", i.e., 15 percent of the guarantee for the total of any of the primary nutrients of nitrogen, available phosphoric acid or soluble potash. Amounts less than 15 percent of any of these nutrients would not have slow release properties.

The sixth section of this part of the rule contains reference to the tests of physical and chemical properties of fertilizers claiming slow release or organic properties which the Department will use before permitting the guarantee of such products to be registered for sale or distribution in Minnesota. The specific tests appear in Attachment D. The seventh and eighth sections of this part of the rule give examples of acceptable labels and labeling both for nitrogen-only slow release fertilizers and for fertilizers which contain more than one slow release plant nutrient.

3 MCAR S 1.0327 H. Fish Emulsions

This part of the rule regarding the definition and labeling of fish emulsion fertilizers is all new material. It is necessary for the commissioner to provide standards for the identification of these products because they are new fertilizer products which have gained widespread use only in the last two or three years. These products are different from fertilizers whose labeling requirements were covered in C. or exempted in D. because they are the only fertilizer products currently marketed which contain "other water soluble nitrogens" and these require a specific labeling standard different from other fertilizers.

It is reasonable to label these products so that consumers know what they are. While AAPFCO has not yet fully adopted these standards, a subcommittee of the group has completed a report, found in Attachment C, recommending the acceptance of this format and restrictions. The fish emulsion industry has agreed to label the products uniformly with this example and has done so for the last two years. Thus it is reasonable to require industry to continue doing so for consumer protection purposes.

3 MCAR S 1.0327 I. Additional Plant Nutrients Permitted

Much of the material in this part of this rule was contained in the current rule of the Department, Agr 322. The first section of this part of the rule contains amendments which are only amendments of language and form made by the Office of the Revisor of Statutes. The third section of this part of the rule is also only a clarification of language and form made by the Office of the Revisor of Statutes and appears in current rule of the Department, Agr 322 (a) (3).

The second section of this part of the rule, however, does contain all new material. It is necessary to provide standards for the manner in which additional plant nutrients of genuine value for agricultural crops should be labeled, and it is a reasonable provision because the requirements are consistent with the most usual labeling requirements for fertilizers as contained in C.

3 MCAR S 1.0327 J. Labeling and Labels

This part of this rule contains an amendment to the present rule Agr 322 (b). It is necessary to add the requirement that "labeling" materials be submitted to the commissioner at the time of request for registration in order to incorporate 1982 statutory changes as stated in Minnesota Statutes section 17.714, subd. 3 (b). This is a reasonable requirement so that the Department can verify any claims made by fertilizer companies on promotional materials which may accompany the fertilizer and can assure that the information provided on the label on the package itself is consistent with claims made in promotional brochures or other materials. This is a reasonable requirement for consumer protection in order that consumers will not be confused by conflicting information between labels and promotional statements.

3 MCAR S 1.0327 K. Warning Statements

The material in this part of this rule is all old material, amended only by clarifications of language and form made by the Office of the Revisor of Statutes.

3 MCAR S 1.0327 L. Enforcement

This part of this rule contains all new material and is necessary to inform persons labeling fertilizers for registration and subsequent sale or distribution in Minnesota of the commissioner's intent to act and procedures for the commissioner's action in instances where provisions of this rule are not met. Further, it is necessary to inform persons labeling fertilizers of their rights should they fail to meet the requirements of this rule.

This section is also reasonable since persons labeling fertilizers are entitled to know the consequences of failing to meet the provisions of the rule and are also entitled to know that the commissioner will afford opportunities for hearings before canceling registrations when provisions of this rule are not met.

Repealers

Rules Agr 319, 320, and 321 are proposed for repeal because the scientific understanding of the types of products described by these rules has advanced to the point where the provisions in these rules are totally inadequate. Legislative changes relating to soil amendments and

plant amendments were made in 1981 (Laws of Minnesota, 1981, chapter 214), and new rules are being developed and proposed to more adequately regulate the products covered in these current rules. It is unreasonable to retain old rules when new governing statutes exist.

Rule Agr 323 is proposed for repeal because the appeals process is governed by Minnesota Statutes section 17.728.

IV. ATTACHMENTS

The following attachments are referred to in this statement and are appended. The first three attachments are materials developed by the Association of American Plant Food Control Officials (AAPFCO) and the fourth attachment is from the Association of Official Analytical Chemists.

Attachment A - "Model Rules and Regulations", AAPFCO Official Publication No. 35, 1982, pp. 28-30.

Attachment B - "Statements of Uniform Interpretation and Policy", AAPFCO Official Publication No. 35, 1982, pp. 35-36.

Attachment C - "Committee and Investigator Reports: Labeling Committee", AAPFCO Official Publication No. 32, 1979, pp. 133-137.

Attachment D - Excerpt from "Official Methods of Analysis of the Association of Official Analytical Chemists", William Horwitz, Editor, 13th edition, 1980, pp. 16-17.

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sions of this Act are hereby repealed.

Section 23. Effective Date

This Act shall take effect and be in force from and after the first day of _____

RULES AND REGULATIONS

Under the Uniform Fertilizer Bill by the _____ of the State of _____ Pursuant to due publication and notice of opportunity for a public hearing, the _____ has adopted the following regulations.

1. Plant Nutrients in Addition to Nitrogen, Phosphorus and Potassium.

Other plant nutrients when mentioned in any form or manner shall be registered and shall be guaranteed. Guarantees shall be made on the elemental basis. Sources of the elements guaranteed and proof of availability shall be provided the _____ upon request. The minimum percentages which will be accepted for registration are as follows:

Element	%
Calcium (Ca)	1.0000
Magnesium (Mg)	0.5000
Sulfur (S)	1.0000
Boron (B)	0.0200
Chlorine (Cl)	0.1000
Cobalt (Co)	0.0005
Copper (Cu)	0.0500
Iron (Fe)	0.1000
Manganese (Mn)	0.0500
Molybdenum (Mo)	0.0005
Sodium (Na)	0.1000
Zinc (Zn)	0.0500

Guarantees or claims for the above listed plant nutrients are the only ones which will be accepted. Proposed labels and directions for the use of the fertilizer shall be furnished with the application for registration upon request. Any of the above listed elements which are guaranteed shall appear in the order listed immediately following guarantees for the primary nutrients of nitrogen, phosphorus and potassium.

A warning or caution statement is required on the label for any product which contains 0.10% or more of boron in water soluble form. This statement shall carry the word "WARNING" or "CAUTION" conspicuously displayed, shall state the crop(s) for which the fertilizer is to be used, and state that the use of the fertilizer on any other than those recommended may result in serious injury to the crop(s).

Products containing 0.001% or more of molybdenum also require a warning statement on the label. This shall include the word "WARNING" or "CAUTION" and the statement that the application of fertilizers containing molybdenum may result in forage crops containing levels of molybdenum which are toxic to ruminant animals.

Examples of Warning or Caution Statements:

Boron:

1. Directions: Apply this fertilizer at a maximum rate of 350 pounds per

acre for Alfalfa or Red Clover seed production. CAUTION: Do not use on other crops. The Boron may cause injury to them.

2. CAUTION: Apply this fertilizer at a maximum rate of 700 pounds per acre for Alfalfa or Red Clover seed production. Do not use on other crops; the boron may cause serious injury to them.
3. WARNING: This fertilizer carries added borax and is intended for use only on Alfalfa. Its use on any other crops or under conditions other than those recommended may result in serious injury to the crops.

Molybdenum:

1. CAUTION: This fertilizer is to be used only on soil which responds to molybdenum. Crops high in molybdenum are toxic to grazing animals (ruminants).

2. Specialty Fertilizer Labels.

The following information, if not appearing on the face or display side in a readable and conspicuous form, shall occupy at least the upper-third of a side of the container.

- (a) Net Weight
- (b) Brand and Grade
- (c) Guaranteed Analysis:*
 - Total Nitrogen (N)**.....%
 - % Ammoniacal Nitrogen
 - % Nitrate Nitrogen
 - % Water Insoluble Nitrogen
 - % (Other recognized and determinable forms of N)
 - Available Phosphoric Acid (P₂O₅).....%
 - Soluble Potash (K₂O).....%
 - (Other nutrients, elemental basis)***.....%
- (d) Sources of nutrients, when shown on the label, shall be listed below the completed guaranteed analysis statement.
- (e) Name and address of registrant.

*If any percentage is zero (0), the nutrient shall be omitted from the statement.
 **If chemical forms of N are claimed or required, the form shall be shown and the percentages of the individual forms shall add up to the total nitrogen percentage.

***As prescribed by regulations.

3. Slowly Released Plant Nutrients.

- (a) No fertilizer label shall bear a statement that connotes or implies that certain plant nutrients contained in a fertilizer are released slowly over a period of time, unless the nutrient or nutrients are identified and guaranteed.
- (b) Types of product with slow release properties recognized are (1) water insoluble (N products only), such as natural organics, urea formaldehyde, IBDU, oxamide, etc., (2) coated slow release such as sulfur coated urea and other encapsulated soluble fertilizers, and (3) occluded slowly released, where fertilizers or fertilizer materials are mixed with waxes, resins, or other inert materials and formed into particles. The terms, "water insoluble, coated slow release, and occluded slow release" are accepted as descriptive of these products, respectively, provided the manufacturer can show a testing program substantiating the claim (test-

ing under guidance of Experiment Station personnel or a recognized reputable researcher acceptable to the _____). A laboratory procedure, acceptable to the _____ for evaluating the release characteristics of the product(s) must also be provided by the manufacturer.

- (c) To supplement (b) when the nitrogen is organic, it should be established that if a label states the amount of organic nitrogen present in a phrase, such as "nitrogen in organic form equivalent to X% N", then the water insoluble nitrogen guarantee must not be less than 60% of the nitrogen so designated. For example: If the total nitrogen guarantee for a fertilizer is 10% and the label states, "Nitrogen in organic form equivalent to 2.5% N" then the WIN guarantee must not be less than 1.5% ($2.5\% \times 0.6 = 1.5\%$).
- (d) When a slowly released nutrient is less than 15% of the guarantee for either total nitrogen (N), available phosphoric acid (P_2O_5), or soluble potash (K_2O), as appropriate, the label shall bear no reference to such designations.
- (e) Until more appropriate methods are developed, AOAC method 2.074 (13th Edition), or as it shall be designated in subsequent editions, is to be used to confirm the coated slow release and occluded slow release nutrients and others whose slow release characteristics depend on particle size. AOAC method 2.072 (13th Edition) shall be used to determine the water insoluble nitrogen of organic materials.

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STATEMENTS OF UNIFORM INTERPRETATION
AND POLICY

1. **Grade** - The grade of a fertilizer should be included with its brand name, and so used by the manufacturer on sacks and in printing literature and by the control official in his reports and publications. No numeral shall be used in the brand name or grade of a commercial fertilizer except those referring to nitrogen, available phosphoric acid and potash. (Official 1965.)
2. **Nutrient Guarantee** - All fertilizer nutrients, with the exception of phosphoric acid (P_2O_5) and potash (K_2O) if guaranteed, shall be stated in terms of the elements. (Official 1953.)
3. **Name of Fertilizer Material** - When the name of a fertilizer material is used as a part of the brand name of a mixed fertilizer, as for example, blood, bone or fish, the nitrogen or phosphoric acid shall be derived from or supplied entirely by the material named. When the name of a fertilizer material is used as a brand or as part of a brand and the nitrogen or phosphoric acid is not supplied by the material named the word "brand" shall follow the name of the materials. Example: "Fish Brand Fertilizer". (Official 1953.)
4. **Phosphoric Acid and Potash** - As the terms phosphoric acid and potash are used universally in guaranteeing and in reporting the analysis of fertilizers it is recommended that the same terms also be used in reporting and discussing the results of analyses of related materials. (Official 1953.)
5. **Net Weights** - The weights appearing on packages of fertilizers, agricultural lime, and liming materials shall always mean net weights. (Official 1953.)
6. **Mixtures of Ammonium Nitrate and Limestone or Dolomite** - These shall not be designated as "ammonium calcium nitrate", "calcium ammonium nitrate" or similar names which imply the presence of either calcium nitrate or ammonium carbonate in such mixtures. (Official 1953.)
7. **Activity of Water-insoluble Nitrogen in Mixed Fertilizers** - The alkaline and neutral permanganate methods distinguish between the better and the poorer sources of water-insoluble nitrogen, and do not show the percentage availability of the materials. The available nitrogen of any product can be measured only after carefully conducted vegetation experiments.
 - (a) The methods shall be used on mixed fertilizers containing water-insoluble nitrogen amounting to three-tenths (0.3%) of one percent or more of the weight of the material. If a total nitrogen exceeds the minimum guarantee and is accompanied by a low activity of the insoluble nitrogen, the over-run shall be taken into consideration in determining the classification of the water-insoluble nitrogen.
 - (b) The water-insoluble nitrogen in mixed fertilizers showing an activity below fifty percent (50%) by the alkaline method and also below eighty percent (80%) by the neutral method shall be classed as inferior. This necessitates the use of both methods, also the provision as to over-run in (a), before classifying as inferior. (Official 1966.)
8. **Fused and Noncrystalline Phosphate Products** - These shall be marketed with an adequate statement concerning size of particles, in terms of percentages of the total product which pass through U. S. standard sieves of stated sizes. (Official 1958.)
9. **Specialty Fertilizer Labels** - Any product coming under the fertilizer law shall not carry labels to emphasize that dilutions will make so many gallons of fertilizer. Specific claims, such as "contents of this package will make gallons of fertilizer" should be prohibited. The labels shall not carry any extravagant and misleading advertising and claims. (Official 1958.)
10. **Amount of Chlorine Permissible in Fertilizers in Which the Potash is Claimed to be Present in Form Other than Chloride** - The chlorine in mixed fertilizers in which the potash is claimed in form other than chloride shall not exceed

one-half of one percent (0.5%) more than five percent (5%) of the potash content found. (Calculate as follows: 0.05 times the percentage of potash found plus 0.5). (Official 1976.)

11. **Labels for Liming Materials Mixtures** - Artificial mixtures of two or more liming materials or of gypsum and liming materials shall include on the label a list of the ingredients used. (Official 1958.)
12. **Sieve Numbers** - Sieve numbers designate sieve openings conforming to specifications of the United States Standard Sieve Series. (Official 1958.)
13. **Reporting Analyses** - Reporting the analyses of official samples is an integral part of fertilizer control, and their usefulness to manufacturers and guarantors is largely dependent upon the time lapse between sample collection and reporting. Every effort should be expended toward reporting analyses within a reasonable period of time after sample collection. (Official 1976.)
14. **Fertilizer Legislation** - The Uniform Bill and Regulations are the result of considerable study and deliberation. Control officials and industry should keep each other advised of pending legislation and provide the necessary information to promote uniformity. (Official 1976.)
15. **Sampling** - The proper collection of sample is the foundation of a sound and equitable fertilizer program. AOAC has adopted official sampling procedures and apparatus, thus these should be used by all states. (Official 1976.)
16. **Guarantees for Fertilizer Materials** - Fertilizer materials containing only one plant food and recognized by their chemical names are required to list only a guarantee for the plant food contained therein. For example, the only guarantee required for ammonium nitrate would be "Total Nitrogen....33.5%". (Official 1976.)
17. **"Coated Slow Release" or "Occluded Slow Release" Nutrients** - When two or more nutrients in a fertilizer are coated, or occluded to obtain slow release properties, then the guarantees for those components may be shown as footnotes rather than as a component following each nutrient. For example,

Fertkote 10-15-20	
Guaranteed Analysis	
Total Nitrogen (N)*	10%
2.5% Ammoniacal nitrogen	
2.5% Nitrate nitrogen	
5.0% Urea nitrogen	
Available Phosphoric Acid (P_2O_5)*	15%
Soluble Potash (K_2O)*	20%
Sulfur (S)	14%
-----	---

*The nitrogen, phosphorus and potassium materials in this product have been coated to provide 9.0% coated slow release nitrogen (N), 13% coated slow release available phosphoric acid (P_2O_5), and 18% coated slow release soluble potash (K_2O). (Official 1981.)

18. **Sampling of On-Farm Bulk Storage** - No sample obtained from on-farm bulk storage owned and/or controlled by the farmer-consumer shall be designated as "official" unless (1) the sample is taken in the presence of the farmer-consumer and the fertilizer registrant or their respective representatives; or (2) the sample is taken in the presence of the farmer-consumer or his representative, the fertilizer registrant having been informed and accepting responsibility for the quality of product sampled; or (3) the sample is taken in the presence of the farmer-consumer or his representative and he certifies by written affidavit that the product as sampled, and identified upon the delivery statement, has not been altered or mixed with any other. (Tentative 1981.)

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COMMITTEE AND INVESTIGATOR REPORTS

LABELING COMMITTEE

D. L. Terry, Chairman

During the past year the committee was involved mainly in attempting to develop proper labeling for coated slow release products, specifically, sulfur coated urea (SCU). The committee also reviewed numerous fertilizer labels for their acceptability under the Uniform Fertilizer Bill.

The proper labeling of coated slow release products, such as, SCU, was studied by the committee for most of the year resulting in a proposed revision to Rules 2 and 3 of the Uniform Fertilizer Bill. The proposed revision as recommended by the Labeling Committee is attached as Appendix A to this report.

The following guaranteed analyses statements are examples that would be acceptable under the proposed revision:

(1) Situation where the fertilizer is SCU:

36-0-0

GUARANTEED ANALYSIS

Total Nitrogen (N).....	36%
3% Urea Nitrogen	
33% Coated Slow Released Urea Nitrogen	
Sulfur (S).....	12%

(2) Situation where one-half of the N in a fertilizer is from SCU and one-half is from ammonium nitrate:

22-7-7

GUARANTEED ANALYSIS

Total Nitrogen (NO).....	22%
5.5% Ammoniacal Nitrogen	
5.5% Nitrate Nitrogen	
1.0% Urea Nitrogen	
10.0% Coated Slow Release Urea Nitrogen	
Available Phos. Acid (P ₂ O ₅).....	7%
Soluble Potash (K ₂ O).....	7%
Sulfur (S).....	4%

(3) Situation where all the N in a mixed fertilizer is from SCU:

22-7-7

GUARANTEED ANALYSIS

Total Nitrogen (N).....	22%
2% Urea Nitrogen	
20% Coated Slow Release Urea Nitrogen	
Available Phos. Acid (P ₂ O ₅).....	7%
Soluble Potash (K ₂ O).....	7%
Sulfur (S).....	7%

(4) Situation where all the N in a fertilizer is from encapsulated ammonium nitrate:

22-7-7

GUARANTEED ANALYSIS

Total Nitrogen (N).....	22%
11% Coated Slow Release Ammoniacal Nitrogen	
11% Coated Slow Release Nitrate Nitrogen	
Available Phos. Acid (P ₂ O ₅).....	7%
Soluble Potash (K ₂ O).....	7%

The committee or sub-groups within the committee reviewed one or more labels from about 15 different companies with the purpose of assisting the companies in developing labels acceptable under the Uniform Fertilizer Law as well as in complying with the requirements of certain specific states. We feel that these reviews are beneficial to the industry and give the committee insight into the problems of uniformity of labeling among the states.

In addition to reviewing labels the committee rendered the following opinions:

- (1) All fertilizers whether liquid or dry must be labeled and sold on the basis of weight using the avoirdupois system. Liquid measure (fluid ounces) is not acceptable.
- (2) The grade with a fourth digit, for example 10-10-10-8S, meaning sulfur or any other nutrient is not acceptable.
- (3) The Uniform Fertilizer Law does not require a "nutrient source" statement to be on the label.

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The committee held a formal meeting in El Paso and discussed label problems with specific companies and with the Industry in general. A copy of the summary of that meeting is attached as Appendix B to this report. A formal meeting is scheduled for the Williamsburg Annual AAPFCO meeting using the same format as last year.

APPENDIX A

2. Specialty Fertilizer Labels.

The following information, if not appearing on the face or display side in a readable and conspicuous form, shall occupy at least the upper-third of a side of the container.

- (a) Net weight
- (b) Brand and Grade
- (c) Guaranteed Analysis:*

Total Nitrogen (N)**.....	_____ %
_____ % Ammoniacal Nitrogen	
_____ % Nitrate Nitrogen	
_____ % Water Insoluble Nitrogen	
_____ % "Other recognized and determinable forms of "N"	
(Such as: _____ % Urea Nitrogen)	
Available Phosphoric Acid (P ₂ O ₅).....	_____ %
Soluble Potash (K ₂ O).....	_____ %
"Other nutrients" (elemental basis)***.....	_____ %
- (d) Sources of nutrients, when shown on the label, shall be listed below the guaranteed analysis.
- (e) Name and address of registrant.

3. Slowly Released Plant Nutrients.

- (a) No fertilizer label shall bear a statement that connotes or implies that certain plant nutrients contain in a fertilizer are released slowly over a period of time, unless the nutrient or nutrients are identified and guaranteed.
- (b) The types of slow released products recognized are (1) water insoluble (N products only), such as, natural organics, urea formaldehyde, IBDU, oxamide, etc., (2) coated slow release, such as, sulfur coated urea and other encapsulated soluble fertilizers, and (3) occluded slow released, where fertilizers or fertilizer materials are mixed with waxes, resins, or other inert materials and formed into particles. The terms, "water insoluble", "coated slow release", and "occluded slow release", are accepted as descriptive of these products, respectively, provided the manufacturer can show a testing program substantiating the claim (Testing under guidance of Experiment Station personnel or a recognized reputable

* If any percentage is zero (0), the nutrient shall be omitted from the statement.

** If chemical forms of N are claimed or required, the format shall be as shown and the percentages of the individual forms shall add up to the total nitrogen percentage.

*** As prescribed by regulation.

researcher acceptable to the _____.) A laboratory procedure, acceptable to the _____, for evaluating the slow release characteristics of the product(s) must also be provided by the manufacturer.

- (c) To supplement (b) when the nitrogen is organic, it should be established that if a label states the amount of organic nitrogen present in a phrase, such as, "nitrogen in organic form equivalent to XZN", then the water insoluble nitrogen guarantee must not be less than 60% of the nitrogen so designated.

For example: If the total nitrogen guarantee for a fertilizer is 10% and the label states, "Nitrogen in organic form equivalent to 2.5% N" then the WIN guarantee must not be less than 1.5% ($2.5\% \times 0.6 = 1.5\%$).

- (d) When a slowly released nutrient is less than 15% of the guarantee for either total nitrogen (N), available phosphoric acid (P_2O_5), or soluble potash (K₂O), as appropriate, the label shall bear no reference to such designations.
- (e) Until more appropriate methods are developed, AOAC method 2.064 (12th Edition), or as it shall be designated in subsequent editions, is to be used to confirm the coated slow release and occluded slow release nutrients and others whose slow release characteristics depend on particle size and AOAC method 2.062 (12th Edition) shall be used to determine the water insoluble nitrogen of organic materials.

APPENDIX B

The first part of the meeting was with industry representatives to discuss specific labeling problems and questions. The following items were agreed on by the committee:

- (1) Placement of Speciality Fertilizer Labeling when the container is attached to a display panel. The question was "Should the labeling information specified in Rule 2 of the Uniform State Fertilizer Bill be placed on both the container and the display panel or would placement on the panel be sufficient?" The consensus of the committee was that this information should be on both the container and the display panel.

It should be on the container because the display panel will probably be discarded after purchase and it should be on the display panel because it is what is mainly visible at time of purchase.

- (2) Nitrogen breakdown in Guaranteed Analysis for Fish Emulsion Fertilizer. The following was approved:

Total Nitrogen (N).....5%
 0% Nitrate nitrogen
 0% Urea nitrogen
 0.5% Ammoniacal nitrogen
 0.5% Water insoluble nitrogen
 4.0% Other water soluble nitrogen

Notes:

- (a) Zero guarantees in general are not acceptable; however, for this specific label it will be allowed so that the term "other water soluble nitrogen" will correctly mean nitrogen that is soluble but is not nitrate, ammoniacal or urea nitrogen.
- (b) Water insoluble nitrogen is guaranteed but no claims or statements such as, organic, slow acting, or slow release will be used since it is less than 15% of the total nitrogen.
- (c) Industry chemists should continue to work on identifying the specific compounds included in "other water soluble nitrogen" and propose a procedure for their identification and quantification.
- (3) The label of all liquid fertilizers should indicate net weight not volume.
- (4) The definition of a "speciality fertilizer" was reaffirmed as being based on "use" rather than on package size.
- (5) CSMA (Chemical Speciality Manufacturer's Association) requested that a representative from their organization be added to the Industry Liaison section of the committee. The request, which will be made formally by letter, was taken under advisement.

The last part of the meeting concerned the proposed revision of Rules 2 and 3 of the Uniform Bill which was circulated to the committee prior to the annual meeting. The discussion was limited by a shortage of time but the following salient points were discussed:

- (1) It should be recognized that the phrase, "slowly available plant nutrients" is not restricted to nitrogen only but may include any plant nutrient.
- (2) The collective term "slowly available plant nutrients" may need to be reworded since it is closely related, in general, to organic nitrogen and it should not be.
- (3) Each committee member agreed to provide to the chairman his written comments concerning revision of Rule 2 and 3 by November 1, 1977.

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Assistant Business Manager, Publications
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K_2SO_4 and continue stirring until all salt dissolves. Dil. to ca 1 L and mix. Cool, dil. to 1 L with H_2O , and mix. Avoid absorption of NH_3 from air during prepn particularly if stream of air is used for mixing.

For other reagents, see 2.055.

2.064

Determination

Place 0.2–2.0 g sample contg ≤ 42 mg nitrate N in 500–800 mL Kjeldahl flask (800 mL flask is preferred with samples which foam considerably, especially orgs). Add 1.7 g Raney catalyst powder, 3 drops tributyl citrate, and 150 mL H_2SO_4 - K_2SO_4 soln. If org. matter exceeds 0.6 g, add addnl 2.5 mL of this soln for each 0.1 g org. matter in excess of 0.6 g.

Swirl to mix sample with acid and place flask on cold burner. If burner has been in use, turn off completely ≥ 10 min before placing flask on burner. After flask is on burner, set heat input to 5 min boil test. When sample starts boiling, reduce heat to pass 10 min boil test. After 10 min, raise flask to vertical position and add 0.7 g HgO and 15 g K_2SO_4 . (Contents of Kel-Pak No. 5 (Curtin Matheson Scientific, Inc.) without plastic container may be used.) Replace flask in inclined position and increase heat to 4–5 min boil test. (Reduce heat input if foam fills $\geq \frac{1}{2}$ of bulb of flask. Use variable heat input until this phase is past.) Heat at 4–5 min boil test until dense white fumes of H_2SO_4 clear bulb of flask. Digestion is now complete for samples contg only ammoniacal, nitrate, and urea N. For other samples, swirl flask gently and continue digestion addnl 30 min.

Proceed as in 2.057, second par. If 800 mL Kjeldahl flasks have been used, add 300 instead of 200 mL H_2O .

Ammoniacal Nitrogen2.065 *Magnesium Oxide Method—Official Final Action*

(Not applicable in presence of urea)

Place 0.7–3.5 g, according to NH_3 content of sample, in distn flask with ca 200 mL H_2O and ≥ 2 g carbonate-free MgO. Connect flask to condenser by Kjeldahl connecting bulb, distil 100 mL liq. into measured amt std acid, 2.055(j), and titr. with std NaOH soln, 2.055(k), using Me red, 2.055(i).

2.066 ★ *Formaldehyde Titration Method* ★

Official Final Action

(Applicable to NH_4NO_3 and $(NH_4)_2SO_4$)

See 2.058, 11th ed.

Nitrate and Ammoniacal Nitrogen2.067 ★ *Ferrous Sulfate-Zinc-Soda Method* ★

Official Final Action

(Not applicable in presence of org. matter, Ca cyanamide, and urea)

See 2.059, 11th ed.

2.068 *Devarda Method (23)—Official Final Action*

(Not applicable in presence of org. matter, Ca cyanamide, and urea)

Place 0.35 or 0.5 g sample in 600–700 mL flask and add 300 mL H_2O , 3 g Devarda alloy (Cu 50, Al 45, Zn 5), and 5 mL NaOH soln (42% by wt), pouring latter down side of flask so that it does not mix at once with contents. By means of Davison (J.

Ind. Eng. Chem. 11, 465(1919)) or other suitable scrubbing bulb that will prevent passing over of any spray, connect with condenser, tip of which always extends beneath surface of std acid in receiving flask. Mix contents of distg flask by rotating. Heat slowly at first and then at rate to yield 250 mL distillate in 1 hr. Collect distillate in measured amt std acid, 2.055(j), and titr. with std NaOH soln, 2.055(k), using Me red, 2.055(i).

Nitrate Nitrogen2.069 *Robertson Method (24)—Official Final Action*

(Applicable in presence of Ca cyanamide and urea. Caution: See 51.030 and 51.065.)

(a) Det. total N as in 2.058, 2.060, or 2.064.

(b) Det. H_2O -insol. N as in 2.072, but use 2.5 g sample. Dil. filtrate to 250 mL.

(c) Place 50 mL portion filtrate in 500 mL Kjeldahl flask and add 2 g $FeSO_4 \cdot 7H_2O$ and 20 mL H_2SO_4 . (If total N is $> 5\%$, use 5 g $FeSO_4 \cdot 7H_2O$.) Digest over hot flame until all H_2O is evapd and white fumes appear, and continue digestion at least 10 min to drive off nitrate N. If severe bumping occurs, add 10–15 glass beads. Add 0.65 g Hg, or 0.7 g HgO, and digest until all org. matter is oxidized. Cool, dil., add the K_2S soln, and complete detn as in 2.057. Before distn, add pinch of mixt. of Zn dust and granular "20-mesh" Zn to each flask to prevent bumping.

Total N (a) – H_2O -insol. N (b) = H_2O -sol. N.

H_2O -sol. N – N obtained in (c) = nitrate N.

2.070 *Jones Modification of Robertson Method (24)*

Official Final Action

(Applicable when H_2O -sol. N need not be detd.

Caution: See 51.030 and 51.065.)

Weigh 0.5 g sample into Kjeldahl flask, add 50 mL H_2O , and rotate gently. Add 2 g $FeSO_4 \cdot 7H_2O$ and rotate. Add 20 mL H_2SO_4 . Digest over hot flame. When H_2O evaps and white fumes appear, add 0.65 g Hg and proceed as in 2.057.

Total N – N thus found = nitrate N.

2.071 ★ *Water-Insoluble Nitrogen in Cyanamide (25)* ★

Official Final Action

See 2.063, 11th ed.

Water-Insoluble Nitrogen

(See 2.079(a) and (b) for urea-formaldehyde or mixts contg such compds.)

2.072 *Method I—Official Final Action*

Place 1 or 1.4 g sample in 50 mL beaker, wet with alcohol, add 20 mL H_2O , and let stand 15 min, stirring occasionally. Transfer supernate to 11 cm Whatman No. 2 paper in 60° long-stem funnel 60 mm diam., and wash residue 4 or 5 times by decanting with H_2O at room temp. (20–25°). Finally transfer all residue to filter and complete washing until filtrate measures 250 mL. Det. N in residue as in 2.057.

Method II (26)—Official First Action

2.073

Apparatus

Extraction tube.—Glass, 250 × 10 mm id, 12 mm od, constricted to 3–4 mm at one end.

2.074

Determination

Weigh 3.0 g unground mixed sample and place in extrn tube contg small glass wool plug. Place addnl glass wool pad on top

★ Surplus method—see inside front cover.

of sample. Connect 250 or 500 mL separator to column with 75 mm piece of rubber tubing. Close stopcock of separator and add 250 mL deionized H₂O. Open stopcock and let quick rush of H₂O pass thru column. After initial rush of H₂O, close stopcock. Adjust flow thru stopcock to ca 2 mL/min. Squeeze rubber connection to bring level of H₂O ca 25 mm above column bed. System then operates as constant-head feeder.

After H₂O wash is complete, disconnect column from rubber tubing. Invert column over Kjeldahl flask and force contents into flask with aid of pressure bulb. Wash traces of sample from tube into Kjeldahl flask and wash sample from walls of digestion flask with min. H₂O. Det. N in residue as in 2.059-2.060 or 2.063-2.064.

★ Nitrogen Activity ★

2.075 Removal of Water-Soluble Nitrogen
Official Final Action

- (a) Mixed fertilizers.—See 2.058, 10th ed.
(b) Raw materials.—See 2.058, 10th ed.

2.076 Water-Insoluble Organic Nitrogen
Soluble in Neutral Permanganate
Official Final Action

See 2.059, 10th ed.

2.077 Water-Insoluble Organic Nitrogen
Distilled from Alkaline Permanganate (27)
Official Final Action

See 2.060-2.061, 10th ed.

Nitrogen Activity Index (AI) of Urea-
Formaldehyde Compounds (28)
Official Final Action

(Applicable to urea-formaldehyde compds
and mixts contg such compds)

2.078 Reagent

Phosphate buffer soln.—pH 7.5. Dissolve 14.3 g KH₂PO₄ and 91.0 g K₂HPO₄ in H₂O and dil. to 1 L. Dil. 100 mL of this soln to 1 L.

2.079 Determination

- (a) Crush sample (do not grind) to pass No. 20 sieve.
(b) Det. cold H₂O-insol. N (WIN) as in 2.072, keeping temp. at 25±2°. Stir at 5 min intervals during 15 min standing.
(c) Det. hot H₂O-insol. N (HWIN) in phosphate buffer soln as follows: Place accurately weighed sample contg 0.1200 g WIN in 200 mL tall-form beaker. Add ca 0.5 g CaCO₃ to mixed fertilizers contg urea-HCHO compds. From supply of boiling buffer soln, add 100 mL from graduate to sample, stir, cover, and immerse promptly in boiling H₂O bath so that liq. in beaker is below H₂O level in bath. Maintain bath at 98-100°, checked with thermometer, and stir at 10 min intervals. After exactly 30 min, remove beaker from bath and filter promptly thru 15 cm Whatman No. 12 fluted paper. If filtration takes >4 min, discard detn. Repeat detn, stirring in 1 g Celite filter-aid just before removing beaker from bath, and filter.

Wash insol. residue completely onto paper with boiling H₂O and continue washing until total vol. used is 100 mL. Complete washing before filtrate becomes cloudy or its temp. drops to <60°. Det. total N (HWIN) in wet paper and residue as in 2.057, using 35 mL H₂SO₄ when CaCO₃ has been added.

$$\text{Activity Index (AI)} = (\% \text{WIN} - \% \text{HWIN}) \times 100 / \% \text{WIN}$$

Urea (29)—Official Final Action

2.080

Reagent

Neutral urease soln.—Use fresh com. 1% urease soln, or dissolve 1 g urease powder in 100 mL H₂O, or shake 1 g jack bean meal with 100 mL H₂O 5 min. Transfer 10 mL soln to 250 mL erlenmeyer, dil. with 50 mL H₂O, and add 4 drops Me purple (available from Fisher Scientific Co.; No. So-I-9). Titr. with 0.1N HCl to reddish purple; then back-titr. to green with 0.1N NaOH. From difference in mL, calc. vol. 0.1N HCl required to neutze remainder of soln (usually ca 2.5 mL/100 mL), add this amount of acid, and shake well.

Verify enzyme activity of urease source periodically. Discard any source which does not produce soln capable of hydrolyzing 0.1 g urea/20 mL soln.

2.081

Determination

Weigh 10±0.01 g sample and transfer to 15 cm Whatman No. 12 fluted filter paper. Leach with ca 300 mL H₂O into 500 mL vol. flask. Add 75-100 mL satd Ba(OH)₂ soln to ppt phosphates. Let settle and test for complete pptn with few drops satd Ba(OH)₂ soln. Add 20 mL 10% Na₂CO₃ soln to ppt excess Ba and any sol. Ca salts. Let settle and test for complete pptn. Dil. to vol., mix, and filter thru 15 cm Whatman No. 12 fluted paper. Transfer 50 mL aliquot (equiv. to 1 g sample) to 200 or 250 mL erlenmeyer and add 1-2 drops of Me purple. Acidify with 2N HCl and add 2-3 drops excess. Neutze soln with 0.1N NaOH to first change in color of indicator. Add 20 mL neutral urease soln, close flask with rubber stopper, and let stand 1 hr at 20-25°. Cool flask in ice-H₂O slurry and titr. at once with 0.1N HCl to full purple; then add ca 5 mL excess. Record total vol. added. Back-titr. excess HCl with 0.1N NaOH to neut. end point.

$$\% \text{ Urea} = (\text{mL } 0.1N \text{ HCl} - \text{mL } 0.1N \text{ NaOH}) \times 0.3003.$$

Biuret

Spectrophotometric Method (30)
Official First Action

(Applicable to urea only. Do not use for mixed fertilizers)

2.082

Reagents

(a) Alkaline tartrate soln.—Dissolve 40 g NaOH in 500 mL H₂O, cool, add 50 g NaKC₄H₄O₆·4H₂O, and dil. to 1 L. Let stand 1 day before use.

(b) Copper sulfate soln.—Dissolve 15 g CuSO₄·5H₂O in CO₂-free H₂O and dil. to 1 L.

(c) Biuret std soln.—1 mg/mL. Dissolve 100 mg reagent grade biuret in CO₂-free H₂O and dil. to 100 mL. Biuret may be purified as follows: Dissolve 10 g in 1 L absolute alcohol and conc. by gentle heating to ca 250 mL. Cool at 5° and filter thru gooch (60% recovery). Repeat crystn and dry final product in vac. oven at 80°.

2.083

Preparation of Standard Curve

Transfer series of aliquots, 2-50 mL, of std biuret soln to 100 mL vol. flasks. Adjust vol. to ca 50 mL with CO₂-free H₂O, add 1 drop Me red, and neutze with 0.1N H₂SO₄ to pink color. Add, with swirling, 20 mL alk. tartrate soln and then 20 mL CuSO₄ soln. Dil. to vol., shake 10 sec, and place in H₂O bath 15 min at 30±5°. Also prep. reagent blank. Det. A of each soln against blank at 555 nm (instrument with 500-570 nm filter is also satisfactory) with 2-4 cm cell. Plot std curve.

STATE OF MINNESOTA
DEPARTMENT OF AGRICULTURE

IN THE MATTER OF THE PROPOSED RULES)
OF THE DEPARTMENT OF AGRICULTURE)
GOVERNING THE STORAGE AND HANDLING)
OF DRY COMMERCIAL FERTILIZER (3 MCAR S 1.0326))

STATEMENT OF NEED
AND REASONABLENESS

I. INTRODUCTION

The subject of this rulemaking is the proposed adoption by the Minnesota Department of Agriculture of a new rule governing the storage and handling of dry commercial fertilizer. This rule is proposed for adoption pursuant to Minnesota Statutes section 17.725, subd. 1, which authorizes the Department to establish rules for the storage and handling of commercial fertilizers in Minnesota.

Rulemaking on the proposed rule was authorized by the Department on October 28, 1982. The Commissioner of the Minnesota Department of Agriculture determined that the proposed adoption of this rule would be noncontroversial in nature due to consultations with representatives of the fertilizer industry and governmental pollution control officials. Further, the Department received no responses to its notice to solicit outside opinion in this matter. However, due to the provisions of Minn. Stat. section 17.725, subd. 1, a public hearing will be held regarding the adoption of this rule.

The discussion provided in this statement is divided into the following parts:

Part II. General overview

Part III. Need for and reasonableness of the proposed rule

Part IV. Attachments

II. GENERAL OVERVIEW

A. The Need for Regulating the Storage and Handling of Dry Commercial Fertilizer:

In order to understand the need for and reasonableness of this proposed rule, it will be useful to understand the current situation regarding dry commercial fertilizers in Minnesota. Prior to 1982, the Department's jurisdiction extended primarily to fertilizer products themselves rather than to the condition of facilities in which they were produced. Facilities storing and handling dry commercial fertilizers were not under the inspection or permitting authority of any agency of the state for the purposes related to Minnesota Statutes sections 17.711 to 17.729. In 1982, amendments to Minnesota Statutes sections 17.711 to 17.729 were passed which gave the Department of Agriculture new regulatory and inspection authority over these facilities. This move by the Legislature was prompted in part by the fact that within the preceding two years there have been approximately 20 releases of commercial fertilizers from facilities, about five of which have been releases of dry commercial fertilizers. Laboratory tests subsequent to these releases, caused primarily by human error and equipment failure, have shown that surface and ground water in some cases had been adversely affected. Because of this and because of the Department's existing authority in the area of agricultural chemicals, the Legislature accorded to the Department the new responsibility to approve fertilizer storage and handling facilities in addition to its prior responsibility for assuring fertilizer product quality.

The proposed rule is necessary for the Department to carry out its statutory responsibility to approve dry commercial fertilizer storage and handling facilities. Based on administrative experience with releases of dry commercial fertilizers as well as knowledge of fertilizer materials, the Department has become increasingly aware of the types of maintenance, safeguards, and operations that will reduce the number of incidents and minimize their impact on human life, property, and the environment when they do occur. The rule is also necessary to respond to public concern about such releases of dry commercial fertilizers. It has been the Department's administrative experience that through field inspections and education of plant operators, the number of incidents will likely be decreased. The provisions in the rule are reasonable because they have been informally discussed with and agreed to by representatives of the fertilizer industry, other governmental agencies and fertilizer experts at the University of Minnesota.

Under the authority granted by Minnesota Statutes section 17.719, Subd. 4, the Department has begun to inspect dry commercial fertilizer facilities and equipment to ensure that the provisions of Minnesota Statutes sections 17.711 to 17.729 are met. By the promulgation of this rule, the Department wishes to clarify for persons operating facilities its procedures for administering the 1982 additions to the law and to ultimately reduce the potential for incidents which will cause hazards to people's lives, adjoining property or the environment.

B. Format of the Proposed Rules:

The proposed rule is set forth in the following manner:

Authority and purpose; definitions; approval of facility and equipment; variances; maintenance and operations; markings; outside storage; incidents; and enforcement.

In this statement, for the sake of brevity, the content of the rule has not been repeated, but the numbers of the parts of the rule have been noted for reference.

III. NEED FOR AND REASONABLENESS OF THE PROPOSED RULE

The need for and reasonableness of each part of the proposed rule follows.

3 MCAR S 1.0326 A. Authority and Purpose

This section is necessary and reasonable to clarify for readers and users the purpose of this rule governing the storage and handling of dry commercial fertilizers used for agricultural purposes and the authority by which the commissioner proposes the adoption of the rule.

3 MCAR S 1.0326 B. Definitions

This part of the rule sets forth the definitions of terms used in the rule which are necessary to clarify meanings for readers and users of the rule. They are reasonable terms because they are terms familiar in the fertilizer industry. Some of the definitions were incorporated from Minnesota Statutes section 17.713, while the following definitions were included and developed specifically for this rule.

The definition of "department" is necessary to identify the lead state agency in the event of an incident. The definition of "dry commercial fertilizer" is necessary because it clarifies the product subject to the provisions of this rule. The definition of "facility" is necessary because it clarifies the parameters of the storage and handling site subject to approval and inspection by the commissioner. The definition of "incident" is necessary because it clarifies the scope of occurrences that might cause the release of dry commercial fertilizers. The definition of "incident notification sign" is necessary to clarify that these signs are issued by the Department to assure uniformity of notification when an incident occurs.

The definition of "responsible party" is necessary to identify the person who is responsible either to clean up the incident himself or to authorize others to do so. The definition of "safeguards" is necessary to clarify the criterion that containment systems must meet. The definition of "storage container" is necessary to distinguish among three storage methods: bins and tanks, delivery equipment used for storage, and outside storage piles. The definition of "substantially altering" is necessary because it identifies the type of facility modifications that require the Department's approval.

3 MCAR S 1.0326 C. Approval of Facility and Equipment

This part of the rule contains two sections, the first pertains to the approval of new plants and the second pertains to the inspection of both newly approved and existing plants. The first section is authorized by Minnesota Statutes section 17.7155 and is necessary to assure that facilities built to handle and store dry commercial fertilizers are adequate. The type of information the Department will require of applicants is contained in Attachment A. This information will be verified by a Department inspector before approval is granted. While certain information will always be required by the Department, it is impossible to specify by rule all the information that may be required in particular cases because the technology in the industry is changing so rapidly that different information could well be required for each individual facility.

The second section of this part of the rule is necessary to inform persons operating facilities that the commissioner will act when inspection reveals that safeguards are insufficient to protect against hazards. The course the commissioner will follow is contained in Minnesota Statutes section 17.728, which is referenced in the rule.

Both sections of this part of the rule are reasonable because they are of benefit to industry, the public, and the environment. When dry commercial fertilizer facilities are properly constructed, maintained, and operated, persons operating them suffer less financial loss from product loss, the health of the public is better protected, and adverse effect on the environment is minimized where not eliminated altogether.

3 MCAR S 1.0326 D. Variances

This part of the rule is necessary to inform persons applying for approval of a new or substantially altered facility that a variance from certain parts of the rule may be requested provided that the variance meets both of the following criteria: adherence to the rule would cause economic hardship and the requested use does not constitute a hazard to people's lives, adjoining property or the environment. Minnesota Statutes section 15.0412, subd. 1a. permits a department to issue variances to rules provided that such criteria are provided in the rule.

Variances are reasonable, particularly variances from requiring safeguards, since safeguards are not always essential to protecting human life, property or the environment in the case of dry commercial

fertilizer because such fertilizer, which is composed of particulate matter, does not move from the facility of its own accord. Thus, requiring the installation of safeguards might prove an unreasonable economic hardship for persons operating facilities. It is further reasonable that the department provide the person requesting a variance a response within a prescribed time frame.

3 MCAR S 1.0326 E. Maintenance and Operations

This part of the rule contains three sections. The first section, regarding the maintenance and operation of the facility and its safeguards and equipment, is necessary to provide a standard for persons operating the facility. The standard regarding "avoidable amounts of particulate matter" may seem vague, but it is necessarily so. There are no federal standards in this area, nor are there any state standards either in Minnesota or elsewhere. It is in the industry's interest to attempt to prevent any product from escaping, but it is not reasonable to impose a standard where it is not possible for one to actually exist. This first section also contains an exemption from this section in cases where the existing facility does not pose any hazard to people's lives, adjoining property or the environment. This is a reasonable exemption because it will not cause unfair economic hardships for facilities operating in places where the escape of particulate matter has no significant adverse effect.

The second section of this part of the rule, regarding the requirement that storage containers be maintained to prevent fertilizer cross contamination, is necessary to ensure that purchasers of the fertilizer are in fact receiving what the label and labeling say the product is. It is also necessary to prevent undesirable chemical reactions among the fertilizers themselves while they are stored. The provision is reasonable because it is fair that purchasers should receive the product they pay for and because inappropriate chemical mixes mean a loss to the industry as well as to consumers.

The third section of this part of the rule regarding the requirements that storage container areas must be kept free of clutter including grass and weeds is necessary to prevent, where possible, a fire-related incident. This is a reasonable requirement from three points of view: industry will lose less product, the public's safety will be better assured, and less damage to the environment will result.

3 MCAR S 1.0326 F. Markings

This part of the rule contains two sections. The first section regarding the label on each storage container is necessary because it is a requirement of Minnesota Statutes section 17.716, subd. 5, and it aids employees of the facilities in avoiding incorrect formulations of fertilizers. These markings are particularly important so that individuals responding in an emergency who may not be familiar with the dry commercial fertilizers will be able to accurately identify the product when notifying emergency personnel of an incident.

The second section of this part of the rule regarding the incident notification sign is necessary to identify for employees of the facility emergency personnel to contact in the event of an incident. It is reasonable to provide for a uniform method of response to incidents so that potential hazards to people's lives, adjoining property or the environment are reduced.

3 MCAR S 1.0326 G. Outside Storage

This part of the rule regarding the outside storage of dry commercial fertilizer is necessary because it provides the fertilizer industry with an important storage option. The principal dry fertilizer stored in this manner is the mineral potash, one of the three primary nutrients used for agricultural crops. The peak demand periods for this nutrient occur in the spring and fall, and each lasts a little under a month. Further, the use of this nutrient in some parts of the state is great because it is a common practice for some farmers to apply straight potash to their fields using 4, 6, or 8 ton spreaders and thus they may require up to those amounts in one load and may use more than one load in both the spring and fall. Because of this high volume and rapid turnover, it is not reasonable to require the industry to build additional storage containers for this use. Outside storage is also reasonable because the physical properties of potash are such that upon contact with water, the nutrient will create a crust which will shed water and thus reduce the potential for runoff into surface and ground waters.

3 MCAR S 1.0326 H. Incidents

This part of the rule is necessary to inform persons owning or operating a dry commercial fertilizer facility in Minnesota of their statutory responsibility under Minnesota Statutes section 17.7285 if an incident should occur and clarifies the role of the Department and other state agencies in responding to incidents.

It is reasonable to have such procedures in order to expedite the containment and clean up of the result of the incident and ultimately minimize the cost of clean up and hazards to people's lives, adjoining property, or the environment.

It is also necessary and reasonable that the Department clarify the extent of its liability with respect to incident clean up or containment for the information of all parties involved in an incident.

3 MCAR S 1.0326 I. Enforcement

This section of the rule is necessary to inform persons operating facilities subject to this rule of the commissioner's intent to act and procedures for the commissioner's action in instances where provisions of this rule are not met. Further, it is necessary to inform persons operating dry commercial fertilizer facilities of their rights should they fail to meet the requirements of the rule.

This section is reasonable since the persons are entitled to know the consequences of failing to meet the provisions of the rule and are also entitled to know that the commissioner will proceed in the same fair manner, affording opportunities for hearings before canceling approvals, when provisions of this rule are not met.

IV. ATTACHMENTS

The following attachments are related to the material in this statement and are appended.

- Attachment A - Questions to be Asked on the Application for Approval of a Dry Commercial Fertilizer Facility
- Attachment B - Sample "Incident Notification Sign" for Dry Commercial Fertilizer Facilities
- Attachment C - Memorandum of Understanding Regarding Procedures for Handling Pesticide and Plant Food Emergencies
- Attachment D - Excerpt from "Bulk Blend Quality Control Manual" prepared by The Fertilizer Institute, Washington, D.C., June 1975.

QUESTIONS TO BE ASKED ON THE APPLICATION FOR APPROVAL OF A DRY COMMERCIAL
FERTILIZER FACILITY

- 1) Firm making application: Name _____
Address _____
City _____ State _____ Zip _____ Phone No. _____
- 2) Firm who will operate facility: Name _____
Address _____
City _____ State _____ Zip _____ Phone No. _____
- 3) Firm who will construct/install/modify site:
Name _____
Address _____
City _____ State _____ Zip _____ Phone No. _____
- 4) New Existing Substantially Altering
- 5) Location of site: County _____ City _____ Township _____
(Legal Description _____
_____?)
- 6) Does this construction/installation/modification require a local permit?
 Yes No If yes, submit a copy.
- 7) Size of lot owned or leased: _____
- 8) Number and capacity of storage containers:
New _____; Existing _____;
Substantially Altering _____
- 9) Type of storage containers (wood, concrete, etc.): _____

- 10) Describe safeguards, if any: _____

- 11) Submit three (3) scale drawings of the facility, including other storage containers and buildings.

12) Is there an existing contingency plan with the local fire and law enforcement personnel? (check one)

Yes, briefly describe and indicate how often it is tested and reviewed:

No (If a contingency plan does not exist, one should be established within 90 days of the completed construction.)

MEMORANDUM OF UNDERSTANDING
REGARDING PROCEDURES FOR HANDLING PESTICIDE AND PLANT FOOD EMERGENCIES

It is recognized that pesticides, including but not limited to, insecticides, herbicides, rodenticides, fungicides, and plant food materials (fertilizers), including anhydrous ammonia, may be hazardous to the safety of the public and the environment when involved in an emergency situation. It is further recognized that appropriate, efficient procedures and plans must be implemented as rapidly as possible with the occurrence of an emergency involving these materials. It is recognized that a clear understanding of respective agency responsibilities will hasten implementation of such procedures and plans.

The purpose of this Memorandum of Understanding is to establish and clarify procedures to be followed by state agencies upon the occurrence, or threat of occurrence, of accidents, spills, fires, floods, poisonings, exposures, leaks, or other similar emergencies involving pesticides and plant food materials (fertilizers).

- 1) There is hereby established an "Agricultural Chemical Emergency Response Team". This team shall be composed of representatives of each of the following agencies:

Minnesota Department of Agriculture

Minnesota Pollution Control Agency

Minnesota Department of Natural Resources

Minnesota Department of Health

Minnesota Division of Emergency Services (Department of Public Safety)

Minnesota Department of Transportation

- 2) The Minnesota Department of Agriculture is hereby designated as the lead coordinating agency for the Agricultural Chemical Emergency Response Team. The department shall be responsible for the coordination of plans and procedures to deal with pesticide and fertilizer emergencies.
- 3) Government regulatory agencies and affected industry will be notified of the contents of the Memorandum by the lead coordinating agency.
- 4) The lead coordinating agency shall immediately contact all team members upon notification of an emergency.
- 5) Any Emergency Response Team member shall immediately notify the lead coordinating agency as to the occurrence of an emergency.
- 6) The lead coordinating agency may call upon other appropriate local, state, and federal agencies for assistance in the handling of such emergencies.
- 7) The Minnesota Department of Agriculture shall be a designated agent of the Minnesota Pollution Control Agency, pursuant to Minnesota Statute 115.061, regarding this type of emergency. This will facilitate a coordinated response to the emergency.

- 8) The Emergency Response Team shall develop guidelines and procedures for the implementation of practical and efficient measures to handle emergencies when they occur.
- 9) Responsibilities and procedures outlined herein shall be effective immediately upon the signing of this Memorandum of Understanding by all agencies, and shall remain in effect until January 1, 1983. At least thirty (30) days prior to January 1, 1983, the representatives to the Agricultural Chemical Emergency Response Team shall meet to discuss continuation, modification, or termination of this Memorandum of Understanding.
- 10) In the event of a "large scale" emergency, such as a fire involving large quantities of pesticides, a predetermined organizational structure shall go into effect in order to respond to the situation in the most efficient manner.
- 11) As soon as possible, after each "large scale" emergency, the lead coordinating agency shall conduct a debriefing session.

FOR MINNESOTA DEPARTMENT OF AGRICULTURE:

Mark W. Leticia
Commissioner

1/4/82
Dated

FOR MINNESOTA DEPARTMENT OF NATURAL RESOURCES:

Joseph M. Malmgren
Commissioner

6 Jan 82
Dated

FOR MINNESOTA DIVISION OF EMERGENCY SERVICES:

Kenneth A. Paruch
Director

1/6/82
Dated

FOR MINNESOTA POLLUTION CONTROL AGENCY:

Louis M. Bramm
Executive Director

1/6/82
Dated

FOR MINNESOTA DEPARTMENT OF HEALTH:

George R. Pettersen
Commissioner

Jan 15, 1982
Dated

FOR MINNESOTA DEPARTMENT OF TRANSPORTATION:

M. Brown
Commissioner

1/13/82
Dated

ORGANIZATIONAL STRUCTURE
FOR HANDLING "LARGE SCALE" EMERGENCIES INVOLVING PESTICIDES AND FERTILIZERS

It is recognized that preplanning and assignment of various responsibilities is very desirable when dealing with a "large scale" incident involving many people and agencies. The following officers are named and understand their duties described below prior to the incident. Along with a lead officer, a secondary officer shall also be named. In most or all cases, the secondary officer should be from a different agency (to encourage interaction and cooperation). There is an alternate individual named for each lead and secondary officer.

ADMINISTRATIVE AND PUBLIC INFORMATION OFFICER Named from MDA (a high level administrator). Secondary officer from MPCA. Will be charged with the overall handling of the incident on the state level. Responsible for the following:

- 1) Shall make initial contacts with involved individuals to set guidelines for the clean up.
- 2) Shall maintain contacts with local officials, state officials, federal officials, and the Governor's Office, giving up-to-date progress reports as needed.
- 3) Shall deal with the affected parties on major items of concern resulting from the emergency (time schedule, financial responsibility, etc.).
- 4) Shall be the only state official designated to provide information to the news media. Media contacts to other officers or state agencies represented within this Memorandum shall be referred to this individual. This individual shall receive information from the FIELD OFFICER IN CHARGE and other field staff.
- 5) Shall make the final decision regarding disposal or other areas where there may not be complete agreement among state agencies. This would involve consultation with administrators of the other involved state agencies.
- 6) Shall coordinate with the Division of Emergency Services (Public Safety) in developing requests for financial assistance from the Executive Council.

FIELD OFFICER IN CHARGE Named from MPCA. Secondary officer from MDA. Will spend most of the time immediately following the incident on the site or at the state agency command post. Responsible for the following:

- 1) Shall direct operations at the site so that decisions and directions made by members of the organizational structure are carried out.
- 2) Shall report to and regularly update the administrative officer.
- 3) Shall coordinate activities of the officers named herein.

- 4) Shall communicate with pollution control personnel, on both the local and federal level, when involved at the site.
- 5) During the Incident. The fire department and the responsible party are responsible for containment and minimizing environmental contamination at the scene of an incident. If the fire department is not trained in this area, the FIELD OFFICER IN CHARGE, if present, shall direct containment and/or other measures in cooperation with the fire department. In the case of a fire, this may involve plugging drains or sewers, diking, and reducing the amount of water used. Thus, the FIELD OFFICER IN CHARGE should have contacts for heavy equipment, pumps, tanker trucks, etc.
- 6) Following the Incident. After the fire department has left, it is up to the responsible party to maintain containment and minimize pollution. The responsible party shall also take the necessary steps to insure proper clean-up and disposal of the materials involved (includes, but not limited to, concentrated pesticides, contaminated soil, building debris, and runoff water).
- 7) Shall determine which products can be salvaged for subsequent sale or use. May be necessary to place stop sale on damaged or contaminated products such as feeds, fertilizers, pesticides, or seeds.
- 8) Shall maintain a single log of all samples collected and laboratory reports. All samples taken for laboratory analysis during and after the emergency will be channeled through the FIELD OFFICER IN CHARGE on duty.
- 9) Shall check with the Minnesota Department of Transportation, Hazardous Waste Section, concerning transportation of debris.

SAFETY OFFICER Named from MDH.

- 1) During the Incident. MDH SAFETY OFFICER will be at the scene of the incident and shall advise the fire department and/or FIELD OFFICER IN CHARGE in the following areas:
 - A) The protection of firefighters and other emergency and/or containment personnel from exposure through use of proper equipment.
 - B) The determination of need for evacuation of the surrounding area.
 - C) The monitoring of the exposure and decontamination of emergency and/or containment personnel.
 - D) The monitoring of area security.
 - E) The notification of local hospitals to prepare them for possible affected individuals.

The fire department may not be trained in the above areas. If present during the incident, the SAFETY OFFICER shall direct the above in cooperation with the fire department.

- 2) Following the Incident. After the fire department has left, it is up to the responsible party to maintain the security of the area. The SAFETY OFFICER shall work with the FIELD OFFICER IN CHARGE to see that this is done. During containment and clean-up operations the SAFETY OFFICER shall monitor the use of proper safety equipment. The SAFETY OFFICER shall also monitor the exposure and decontamination of all persons involved.

ENVIRONMENTAL OFFICER Named from the DNR. Secondary officer from MPCA. The ENVIRONMENTAL OFFICER shall assist and advise the FIELD OFFICER IN CHARGE regarding environmental concerns. Responsible for the following:

- 1) During the Incident.
 - A) The assessment of drainage and/or runoff patterns from the site to public water.
 - B) The collection of samples to determine if materials from the site have entered public waters.
- 2) Following the Incident.
 - A) The assessment of environmental damage.
 - a) Kills or contamination of fish and wildlife.
 - b) Damage to fish and wildlife habitat.
 - B) Assist in sampling to determine the kinds and amounts of materials that may have left the site.
 - C) Advise as to likely effects of proposed disposal practices on fish and wildlife or their habitat.

RESOURCE OFFICER Named from Division of Emergency Services, DPS. Secondary officer from DOT, Office of Rates and Regulations. Responsible for the following:

- 1) Upon notification by the lead agency, or incident/accident responder, the Division of Emergency Services Duty Officer or designee will back-up lead agency and notify all other agencies or team responders on the call list.
- 2) Upon completion of the call list, DES will inform the lead agency as to the status of notification and the availability of the State Emergency Operation Center for use as the incident/accident command post if needed.
- 3) Shall log all data, information, requests, and notifications that have been directed to the Division of Emergency Services.
- 4) Shall assist the lead agency in preparation of financial requests under Minnesota Statutes Chapter 9, if assistance is appropriate.
- 5) Shall prepare status reports as needed.
- 6) Shall provide a complete log of DES activities/actions to the lead agency and initial team responder.

TRANSPORTATION OFFICER Named from DOT. Secondary officer from MDA. Will spend most of the time immediately following the incident on the site or at DOT headquarters. Responsible for the following:

- 1) Shall coordinate with the lead agency, the transportation of hazardous material or contaminated debris from the incident site to its final destination (hazardous waste disposal site, land application site, etc.).

LARGE SCALE EMERGENCIES OFFICERS FOR 1982 SHALL BE AS FOLLOWS:

LEAD OFFICER

SECONDARY OFFICER

ADMINISTRATIVE AND PUBLIC INFORMATION OFFICER:

John Baumgartner
Assistant Commissioner
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Minnesota 55107
Office Phone: (612) 296-9310
Home Phone: (612) 739-3648

Russ Felt, Acting Chief
Enforcement Section
Division of Water Quality
Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
Office Phone: (612) 296-7755
Home Phone: (612) 724-7254
(24 Hr. Emergency Response:
(612) 296-7373)

ALTERNATE:

William Bulger, Director
Agronomy Services Division
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Minnesota 55107
Office Phone: (612) 296-1161
Home Phone: (612) 645-2329

Dick Kable, Head
Emergency Response Unit
Division of Water Quality
Pollution Control Agency
1935 West Plato Boulevard
Roseville, Minnesota 55113
Office Phone: (612) 296-7235
Home Phone: (612) 434-6547
(24 Hr. Emergency Response:
(612) 296-7373)

FIELD OFFICER IN CHARGE:

Dick Kable, Head
Emergency Response Unit
Division of Water Quality
Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
Office Phone: (612) 296-7235
Home Phone: (612) 434-6547
(24 Hr. Emergency Response:
(612) 296-7373)

Dave Dally
Pesticide Control Specialist
Agronomy Services Division
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Minnesota 55107
Office Phone: (612) 297-2528
Home Phone: (612) 459-6486

ALTERNATE:

Bob Dullinger
Emergency Response Unit
Division of Water Quality
Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
Office Phone: (612) 296-7367
Home Phone: (612) 699-9487
(24 Hr. Emergency Response:
(612) 296-7373)

Larry Palmer
Pesticide Control Specialist
Agronomy Services Division
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Minnesota 55107
Office Phone: (612) 297-2530
Home Phone: (612) 755-7624

LEAD OFFICER

SECONDARY OFFICER

SAFETY OFFICER:

David Gray, Chief
Minnesota Department of Health
Section of Health Risk Assessment
Division of Environmental Health
717 Delaware Street Southeast
Minneapolis, Minnesota 55440
Office Phone: (612) 296-5352
Home Phone: (612) 699-7004

Charles B. Schneider, Chief
Minnesota Department of Health
Section of Environmental Field Services
Division of Environmental Health
717 Delaware Street Southeast
Minneapolis, Minnesota 55440
Office Phone: (612) 296-5335
Home Phone: (612) 560-6543

ALTERNATE:

Larry Gust
Minnesota Department of Health
Section of Health Risk Assessment
Division of Environmental Health
717 Delaware Street Southeast
Minneapolis, Minnesota 55440
Office Phone: (612) 296-5325
Home Phone: (612) 789-2610

ENVIRONMENTAL OFFICER:

Howard F. Krosch, Supervisor
Monitoring and Control Unit
Fish and Wildlife Division
Department of Natural Resources
Third Floor, Centennial Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-2835
Home Phone: (612) 436-5405

Marvin Hora, Head
Monitoring and Toxic Substances Unit
Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
Office Phone: (612) 296-7396
Home Phone: (612) 574-9879

ALTERNATE:

David Zappetillo
Monitoring and Control Unit
Fish and Wildlife Division
Department of Natural Resources
Third Floor, Centennial Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-2835
Home Phone: (612) 770-6695

Harold Wiegner
Pollution Control Specialist
Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
Office Phone: (612) 296-7320
Home Phone: (612) 457-8571

RESOURCE OFFICER:

Duty Officer
Office Phone: (612) 778-0800

Richard E. Moulton
Hazardous Materials Safety Committee
Department of Public Safety
Division of Emergency Services
B-5 State Capitol
St. Paul, Minnesota 55155
Office Phone: (612) 296-0459

LEAD OFFICER

SECONDARY OFFICER

ALTERNATE:

Pete Marcotte
Hazardous Materials Specialist
Minnesota Department of Transportation
Room 404
Transportation Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-8958
(612) 296-7115
Home Phone: (612) 689-4768

Ray Jones
Hazardous Materials Specialist
Minnesota Department of Transportation
Room 404
Transportation Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-8958
(612) 296-7115
Home Phone: (612) 257-6588

TRANSPORTATION OFFICER:

Pete Marcotte
Hazardous Materials Specialist
Minnesota Department of Transportation
Room 404
Transportation Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-8958
(612) 296-7115
Home Phone: (612) 689-4768

Dave Dally
Pesticide Control Specialist
Agronomy Services Division
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Minnesota 55107
Office Phone: (612) 297-2528
Home Phone: (612) 459-6486

ALTERNATE:

Ray Jones
Hazardous Materials Specialist
Minnesota Department of Transportation
Room 404
Transportation Building
St. Paul, Minnesota 55155
Office Phone: (612) 296-8958
(612) 296-7115
Home Phone: (612) 257-6588

AGRICULTURAL CHEMICALS EMERGENCY RESPONSE CALL LIST

PRIMARY LIST

MINNESOTA DEPARTMENT OF AGRICULTURE

David W. Dally.....Office (612) 297-2528
None (612) 459-6486
Larry P. Palmer.....Office (612) 297-2530

MINNESOTA POLLUTION CONTROL AGENCY

Dick Kable.....Office (612) 296-7235
None (612) 434-6547
Bob Dullinger.....Office (612) 296-7367
None (612) 699-9487
Kevin Faus.....Office (612) 296-7709
None (612) 872-7847
24-Hour..... (612) 296-7373
Air Quality..... (612) 296-7371

MINNESOTA DEPARTMENT OF PUBLIC SAFETY, EMERGENCY SERVICES DIVISION

Emergency Services 24-Hour..... (612) 778-0800

MINNESOTA DEPARTMENT OF TRANSPORTATION

Pete Marcotte.....Office (612) 296-8958
None (612) 689-4768
Ray Jones.....Office (612) 296-7115
None (612) 257-6588

MINNESOTA DEPARTMENT OF TRANSPORTATION, EMERGENCY OPERATION CHIEF

Dennis Springer.....Office (612) 296-3072
None (612) 455-6771
24-Hour..... (612) 296-3334

MINNESOTA DEPARTMENT OF HEALTH

David Gray.....Office (612) 296-5352
None (612) 699-7004
Charles Schneider.....Office (612) 296-5335
None (612) 560-6543
Larry Gust.....Office (612) 296-5325
None (612) 789-2610

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Howard Krosch.....Office (612) 296-0778
None (612) 436-5406
Dave Zappetillo.....Office (612) 296-0783
None (612) 770-6695

NATIONAL RESPONSE CENTER..... 1-(800) 424-8802

AGRICULTURAL CHEMICALS EMERGENCY RESPONSE CALL LIST
SECONDARY LIST

AMERICAN RED CROSS

Disaster Personnel..... (612) 291-6787

UNITED STATES COAST GUARD..... (612) 725-7452

UNITED STATES FISH AND WILDLIFE SERVICE

Regional Office..... (612) 725-3585

Environmental Field Office..... (612) 725-7131

CHEMTREC..... 1-(800) 424-9300

UNITED STATES FOOD AND DRUG ADMINISTRATION..... (612) 725-2121

MINNESOTA POISON CONTROL CENTER..... (612) 347-3141

TELEPHONE NUMBERS FOR PESTICIDE MANUFACTURERS ARE ON FILE WITH THE MINNESOTA DEPARTMENT OF AGRICULTURE, (612) 297-2528.

MINNESOTA POLLUTION CONTROL AGENCY
REGIONAL OFFICES

REGION I - DULUTH

John Pegors, Regional Director	314 West Superior Street
Robert Beresford, Reg. Specialist	1015 Torrey Building
Tim Jusick, Reg. Specialist	Duluth, Minnesota 55802
Lyle Hobbs, Reg. Specialist	(218) 723-4660
Helen Phillips, Secretary	Tie Line: 8-101-4660

Counties: Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, St. Louis

REGION II - BRAINERD

Larry Shaw, Regional Director	304 East River Road
Don Adams, Reg. Specialist	Suite 3
Stan Kalinoski, Reg. Specialist	Brainerd, Minnesota 56401
Shirley Martin, Secretary	(218) 828-2492
	Tie Line: 8-111-2492

Counties: Benton, Cass, Chisago, Crow Wing, Isanti, Kanabec, Mille Lacs, Morrison, Pine, Sherburne, Stearns, Todd, Wadena, Wright

REGION III - DETROIT LAKES

Willis Mattison, Regional Director	116 East Front Street
Larry Olson, Reg. Specialist	Detroit Lakes, Minnesota 56501
John Matlock, Reg. Specialist	(218) 847-2164
Sharron Ross, Secretary	Tie Line: 8-175-76

Counties: Becker, Beltrami, Clay, Clearwater, Douglas, Grant, Hubbard, Kittson, Lake of the Woods, Mahnommen, Marshall, Norman, Ottertail, Pennington, Polk, Pope, Red Lake, Roseau, Stevens, Traverse, Wilkin

REGION IV - MARSHALL

Larry Johnson, Regional Director	Box 286
Hank Steffen, Reg. Specialist	1104 East College Drive
Mark Oemichen, Reg. Specialist	Marshall, Minnesota 56258
Sharry Vandewiehle, Secretary	(507) 537-7146
	Tie Line: 8-105-7146

Counties: Big Stone, Chippewa, Cottonwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, McLeod, Meeker, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Swift, Yellow Medicine

REGION V - ROCHESTER

Larry Landherr, Regional Director	1200 South Broadway
Dave Read, Reg. Specialist	Suite 140
Don Abrams, Reg. Specialist	Rochester, Minnesota 55901
Cory Landgren, Reg. Specialist	(507) 285-7343
Carol Vandavelde, Secretary	Tie Line: 8-103-7343

Counties: Brown, Blue Earth, Dodge, Faribault, Fillmore, Freeborn, Goodhue, Houston, LeSueur, Martin, Mower, Nicollet, Olmsted, Rice, Sibley, Steele, Wabasha, Waseca, Watonwan, Winona

METRO COUNTIES: Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
REGIONAL OFFICES

METRO Howard F. Krosch or David Zappetillo
Monitoring and Control Unit
Fish and Wildlife Division
Department of Natural Resources
Third Floor, Centennial Building
St. Paul, Minnesota 55155
Office: (612) 296-2835
Home (Krosch): (612) 436-5405
Home (Zappetillo): (612) 770-6695

REGION #1 Department of Natural Resources
Route #5, Box 4A
Bemidji, Minnesota 56601
North Star Network No.: 110-3959
Direct: (218) 755-3959

REGION #2 Department of Natural Resources
1201 East Highway #2
Grand Rapids, Minnesota 55744
North Star Network No.: 117-344
Direct: (218) 326-0311

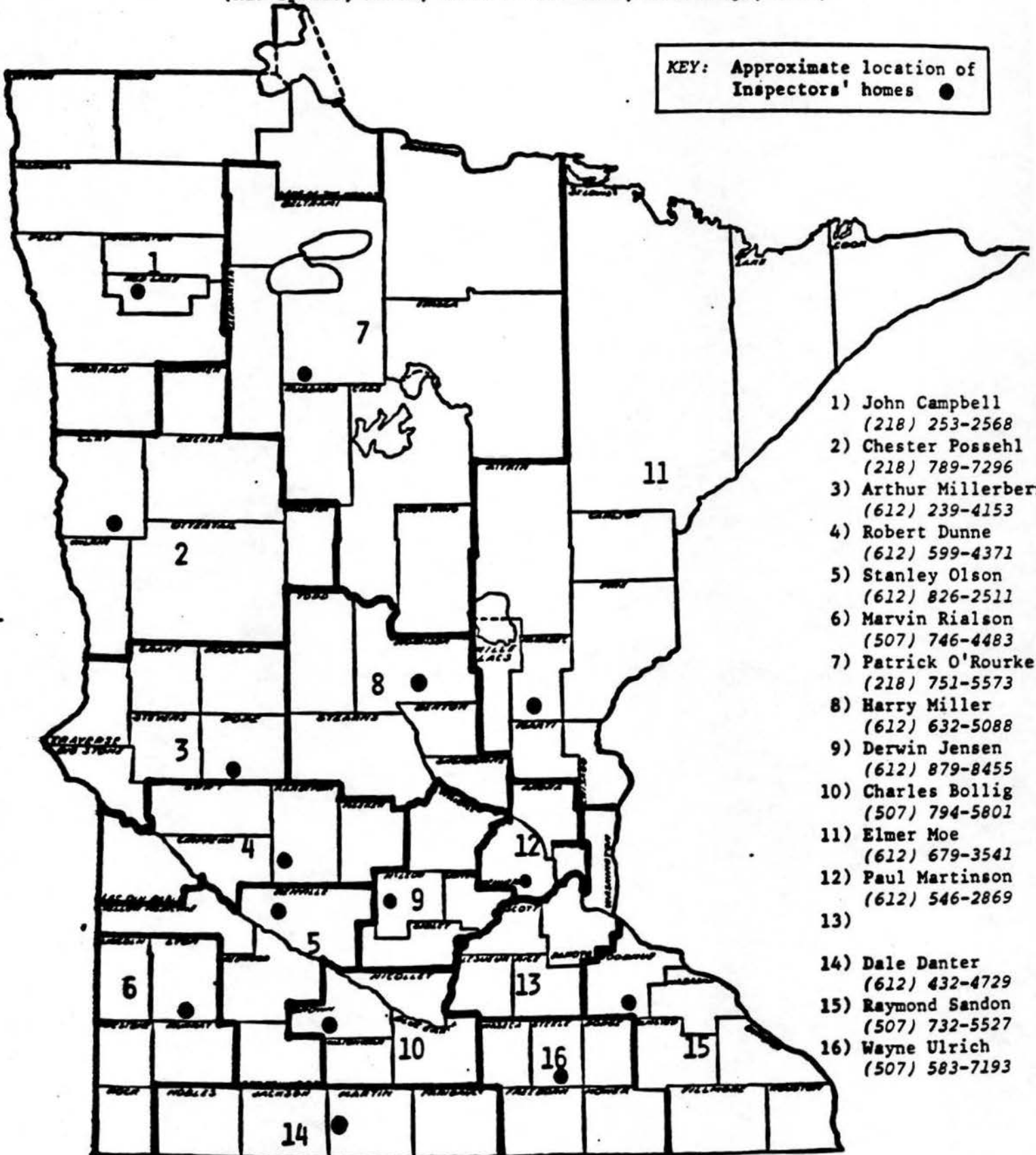
REGION #3 Department of Natural Resources
424 Fronts
Box 648
Brainerd, Minnesota 56401
North Star Network No.: 111-2624
Direct: (218) 828-2624

REGION #4 Department of Natural Resources
Highway #15 South, Box 756
New Ulm, Minnesota 56073
North Star Network No.: 172-225
Direct: (507) 354-2196

REGION #5 Department of Natural Resources
2300 Silver Creek Road
Rochester, Minnesota 55901
North Star Network No.: 103-7340
Direct: (507) 285-7340

PERSONS TO CONTACT IN A FERTILIZER OR PESTICIDE EMERGENCY
 (All Spills, Fires, Vehicle Accidents, Poisonings, Etc.)

KEY: Approximate location of Inspectors' homes ●



- 1) John Campbell
(218) 253-2568
- 2) Chester Possehl
(218) 789-7296
- 3) Arthur Millerber
(612) 239-4153
- 4) Robert Dunne
(612) 599-4371
- 5) Stanley Olson
(612) 826-2511
- 6) Marvin Rialson
(507) 746-4483
- 7) Patrick O'Rourke
(218) 751-5573
- 8) Harry Miller
(612) 632-5088
- 9) Derwin Jensen
(612) 879-8455
- 10) Charles Bollig
(507) 794-5801
- 11) Elmer Moe
(612) 679-3541
- 12) Paul Martinson
(612) 546-2869
- 13)
- 14) Dale Danter
(612) 432-4729
- 15) Raymond Sandon
(507) 732-5527
- 16) Wayne Ulrich
(507) 583-7193

IF PROPER PERSON CANNOT BE REACHED, THEN CALL:

MINNESOTA DEPARTMENT OF AGRICULTURE.....(612) 296-6121 (8:00 A.M. - 4:30 P.M.)
 David W. Dally.....(612) 297-2528 Home: (612) 459-6486
 Larry P. Balan

MINNESOTA DEPARTMENT OF AGRICULTURE
Agronomy Services Division
District Coordinators

1) John Campbell	Box 308, Red Lake Falls, MN 56750	(218) 253-2568
2) Chester Possehl	Box 277, Baker, MN 56513	(218) 789-7296
3) Arthur Millerbernd	Route #3, Starbuck, MN 56381	(612) 239-4153
4) Robert Dunne	Route #1, Box 78-B, Pennock, MN 56279	(612) 599-4371
5) Stanley Olson	Box 97, Danube, MN 56230	(612) 826-2511
6) Marvin Rialson	Route #1, Garvin, MN 56132	(507) 746-4483
7) Patrick O'Rourke	515 - 20th Street, Bemidji, MN 56601	(218) 751-5573
8) Harry Miller	Route #1, Box 254, Little Falls, MN 56345	(612) 632-5088
9) Derwin Jensen	246 Griffin Avenue, Hutchinson, MN 55350	(612) 879-8455
10) Charles Bollig	108 Woodland Drive, Sleepy Eye, MN 56085	(507) 794-5801
11) Elmer Moe	601 McLean Avenue, Mora, MN 55051	(612) 679-3541
12) Paul Martinson	6500 Phoenix Street, Minneapolis, MN 55427	(612) 546-2869
13)		
14) Dale Danter	16388 Finch Way, Rosemount, MN 55068	(612) 432-4729
15) Raymond Sandon	Route #2, Box 182, Zumbrota, MN 55992	(507) 732-5527
16) Wayne Ulrich	Route #1, Blooming Prairie, MN 55917	(507) 583-7193

* * * * *

NOTE: See a doctor for medical assistance in the event of suspected human poisoning. The Hennepin County Poison Center can give immediate advice. Call 1-(612) 347-3141 for 24-hour/day service. Be able to furnish information from the label of the product suspected.

Primary contact for Spills or Incidents:

Pete Marcotte
Office: 612-296-7115
Home: 612-689-4768

Ray Jones
Office: 612-296-7115
Home: 612-257-6588 (unlisted)

STATE OF
MINNESOTA

MINNESOTA
DEPARTMENT OF TRANSPORTATION



Transportation Bldg.
St. Paul, MN 55155

Area # 1

Al E. Abrahamson
Office: 218-723-4885
Home: 218-751-1265

Area # 3

Bill Pinnell
Office: 612-255-4170
Home: 612-253-7670

Area # 4

Walt Baker
Office: 218-847-4401
Home: 218-732-5283

Area # 5

G. Bruce Cameron
Office: 612-296-7115
Home: 612-421-3857

Area # 6

Don Svenby
Office: 507-634-7920
Home: 507-634-7920

Area # 7

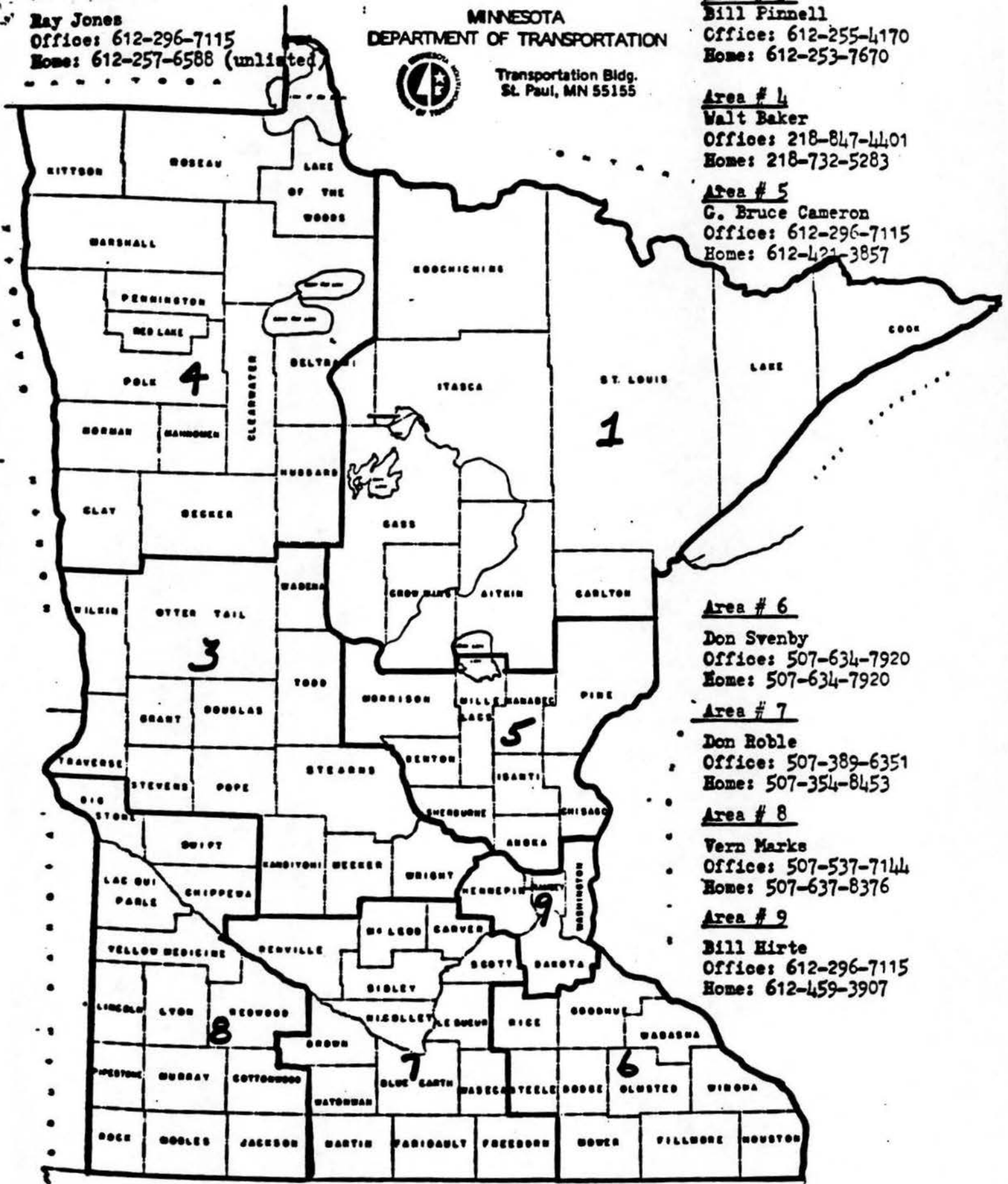
Don Roble
Office: 507-389-6351
Home: 507-354-8453

Area # 8

Vern Marks
Office: 507-537-7144
Home: 507-637-8376

Area # 9

Bill Hirte
Office: 612-296-7115
Home: 612-459-3907



BULK BLEND QUALITY CONTROL MANUAL

Produced by

THE FERTILIZER INSTITUTE'S

PRODUCT QUALITY COMMITTEE

J. R. Perrin, Chairman
(Swift Chemicals Company)

Fred Maher, Chairman
Quality Control Manual Task Force
(Landmark, Inc.)

With consulting services of

Cecil H. Russell
St. Louis, Missouri

1015 - 18th Street, N.W.
Washington, DC 20036

June, 1975

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* * * * *

This manual is a guide in quality control practices in fertilizer blending operations. The information described herein reflects the best informed judgment and experience of personnel involved in its preparation, but does not constitute a warranty and none should be implied. Neither The Fertilizer Institute, the members of its staff nor of its committees shall be liable for the use of any of the opinions or information contained in the manual.

SECTION D. PLANT DESIGN AND EQUIPMENT

A quality blended fertilizer is the goal of each fertilizer blender. To accomplish this goal, he needs a well-designed facility for ease of operation in the production of these quality products. Additionally, he needs to be aware of fertilizer industry trends, new building materials, new improved construction methods, cost of materials, etc.

1. Plant Design

The typical bulk blend plant consists of three major components:

- (a) Horizontal or vertical storage plant
- (b) Fertilizer receiving machinery system
- (c) Fertilizer blending and loadout system.

Various designs have been used in all three with success in new plants or as additions to existing structures. In any event, an engineering study should be made on:

- (a) building site considerations
- (b) cost/unit volume of storage area
- (c) material receiving system
- (d) blending system, and
- (e) loadout system.

A flow diagram of a typical blend plant is shown in Figure 14.

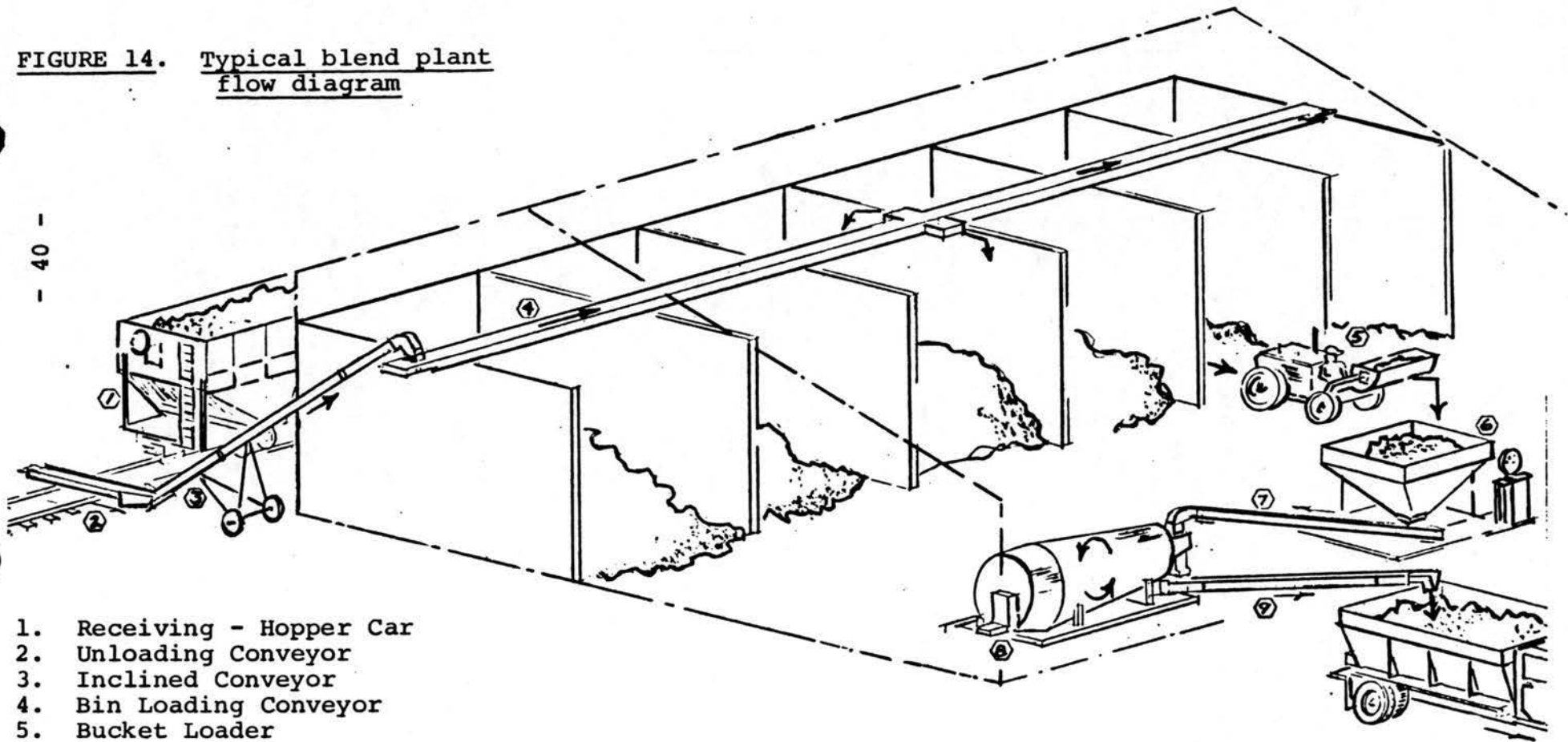
2. Materials of Construction

A well-designed facility makes use of the most recent industry developments, proven new building materials and construction techniques. Wood, concrete, steel and reinforced plastic have all been used with success. Among these, wood is still one of the most satisfactory and widely used materials. However, when storing ammonium nitrate in wooden bins, a protective coating is required. National Fire Protection Association Bulletin 490 gives details on such coatings.

a. Storage Bins

Upright wooden or metal silos used for this purpose should be equipped with good anti-segregation devices described later in the manual.

FIGURE 14. Typical blend plant
flow diagram



1. Receiving - Hopper Car
2. Unloading Conveyor
3. Inclined Conveyor
4. Bin Loading Conveyor
5. Bucket Loader
6. Hopper w/Scale
7. Conveyor - To Mixer
8. Mixer
9. Loading-Out Conveyor

(Courtesy of Landmark, Inc.)

b. Bin Walls

The walls of horizontal bins must be made out of heavy timber and/or braced sufficiently to prevent either collapse or bulging when full.

c. Bin Gates

Wood reinforced with steel is the best construction material for bin gates. An example is shown in Figure 15. The top view shows the bin empty and the gate open. The middle picture shows the gate closed. The bottom photo shows a filled bin with the gate closed -- note material flows out well enough for pickup by a payloader.

d. Floors

Without exception, concrete is the best material for bin floors. Concrete should be at least five inches thick, reinforced with steel wire mesh, preferably unrelaid with a four-inch sand fill and a poly-vapor barrier.

Some coatings for concrete are effective in minimizing the corrosive attack by materials such as ammonium nitrate and potash. Such curing agents and coatings are listed below:

- (1) Magnesium fluosilicate or zinc fluosilicate
- (2) Sodium silicate (commonly called water glass)
- (3) Drying oils (linseed oil, tung oil, soybean oil)
- (4) Cumar (synthetic resin)
- (5) Varnishes and paints
- (6) Bituminous and/or coal tar paints

See Appendix 4 for application methods.

3. Plant Equipment

A well-designed plant utilizes the most recent industry developments. To a large degree, plant design will affect the selection of plant equipment. Thus, design and performance should be requested and supplied by the manufacturer before purchase.

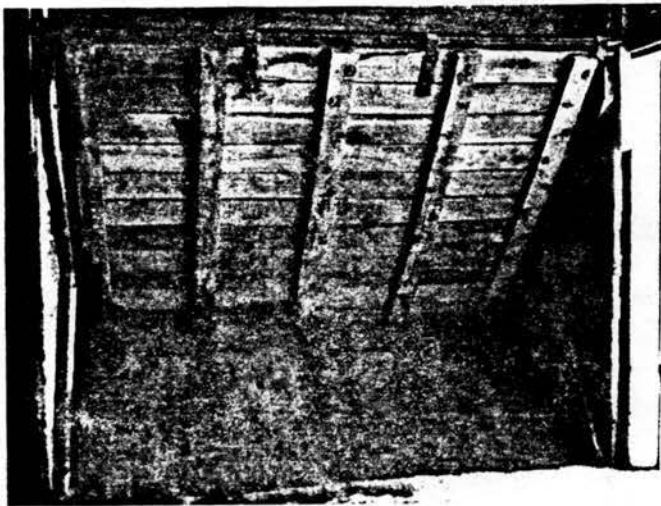
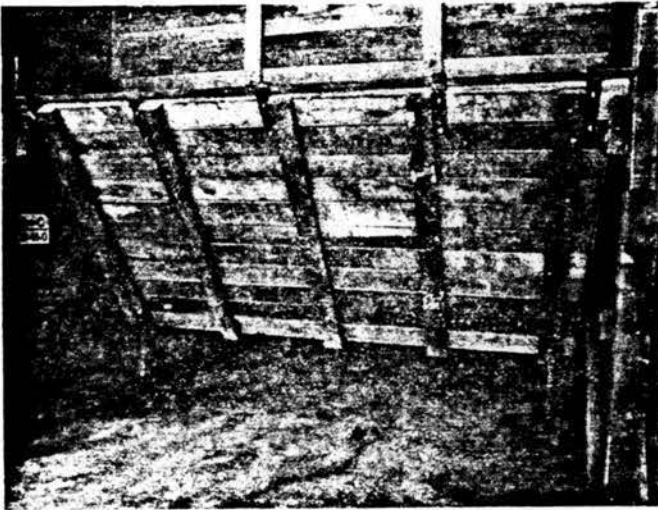
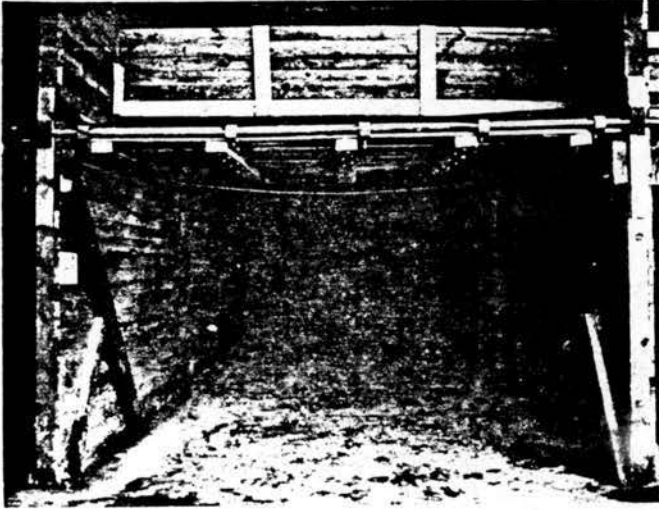


FIGURE 15.

Wooden bin gates
reinforced with steel

(Courtesy of TVA)

a. Receiving Equipment, Augers or Belts

Conveyor belts are preferred for unloading or transferring granular fertilizers. They do not grind or degrade the granules to fines, as augers may, which can result in segregation and plant dust problems.

Short augers which are kept clean are acceptable. Coating the inside of augers with neoprene or Kynar will help prevent caking on the housing and on the flights.

b. Hopper Design

There are several hopper designs that are satisfactory when equipped with anti-segregation devices to minimize or prevent coning. Examples are shown in Figures 16 and 17. This qualification applies to bagging, bulk loading and holding hoppers.

c. Scales (and volumetric delivery devices)

Bagging scales or scale weighing hoppers must pass state inspection for accuracy. It is desirable for each blender to have standard weights, certified by state inspectors, to check all scale equipment daily.

If the scale weighing hopper is delivering insufficient or excessive amounts of material, adjust the charge to the blender accordingly. The scale weighing hopper can be checked by weighing 500-pound increments of material on a standardized platform scale (to the full capacity of the scale weighing hopper) and then transferring this to the weighing hopper for recalibration.

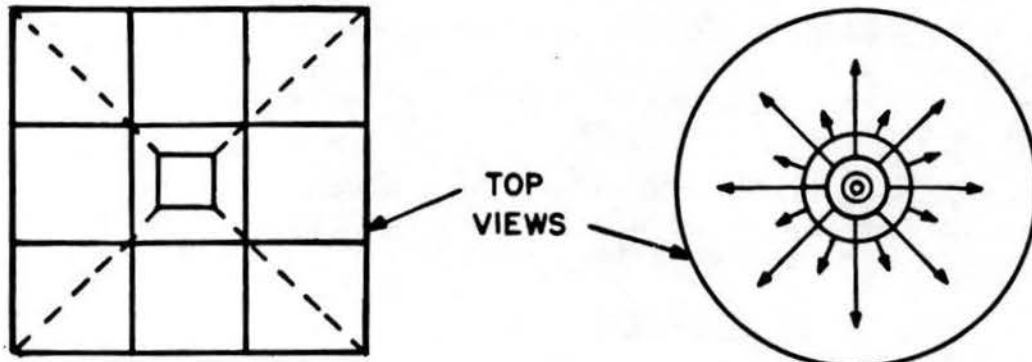
Volumetric feeder mechanisms must also be kept in good working order -- they can be standardized by catching and weighing the amount of given material discharged in a given amount of time.

Chemical analysis of blends is another check on the ratio of materials being delivered by scale hoppers or volumetric feeders.

d. Mixing Equipment

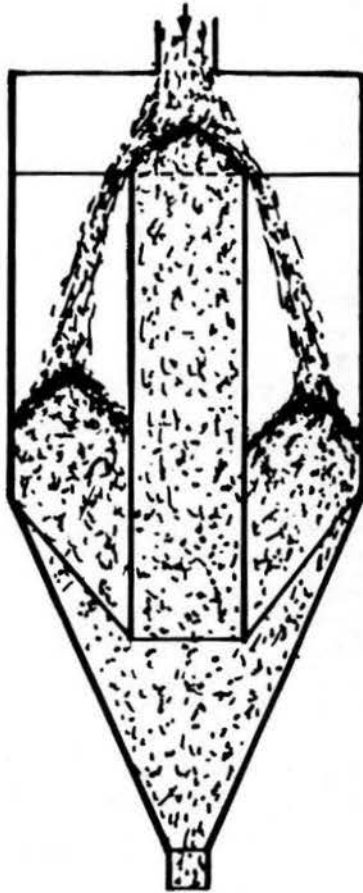
There are many excellent mixers. They include ribbon mixers, rotary, and rotary flighted mixers which look like concrete mixers but which are designed for blending fertilizers. Unmodified concrete mixers do not blend well and should not be used as "blenders." Upright baffle mixers have exhibited some problems. Powdered micronutrients or liquid pesticides cannot be added in baffle mixers (1), (5), (6).

FIGURE 16. Methods suggested for reducing segregation⁽¹⁾



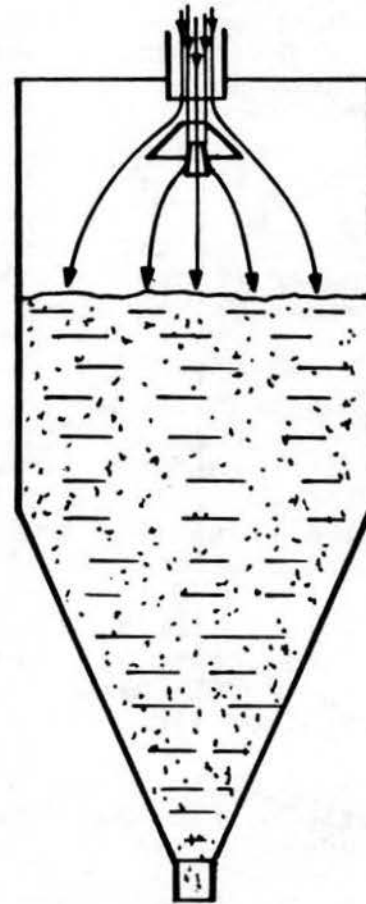
BLEND IN

BLEND IN



A

**INTERNAL "EGG CRATE" BAFFLES
PREVENT FORMATION OF
LARGE CONE**



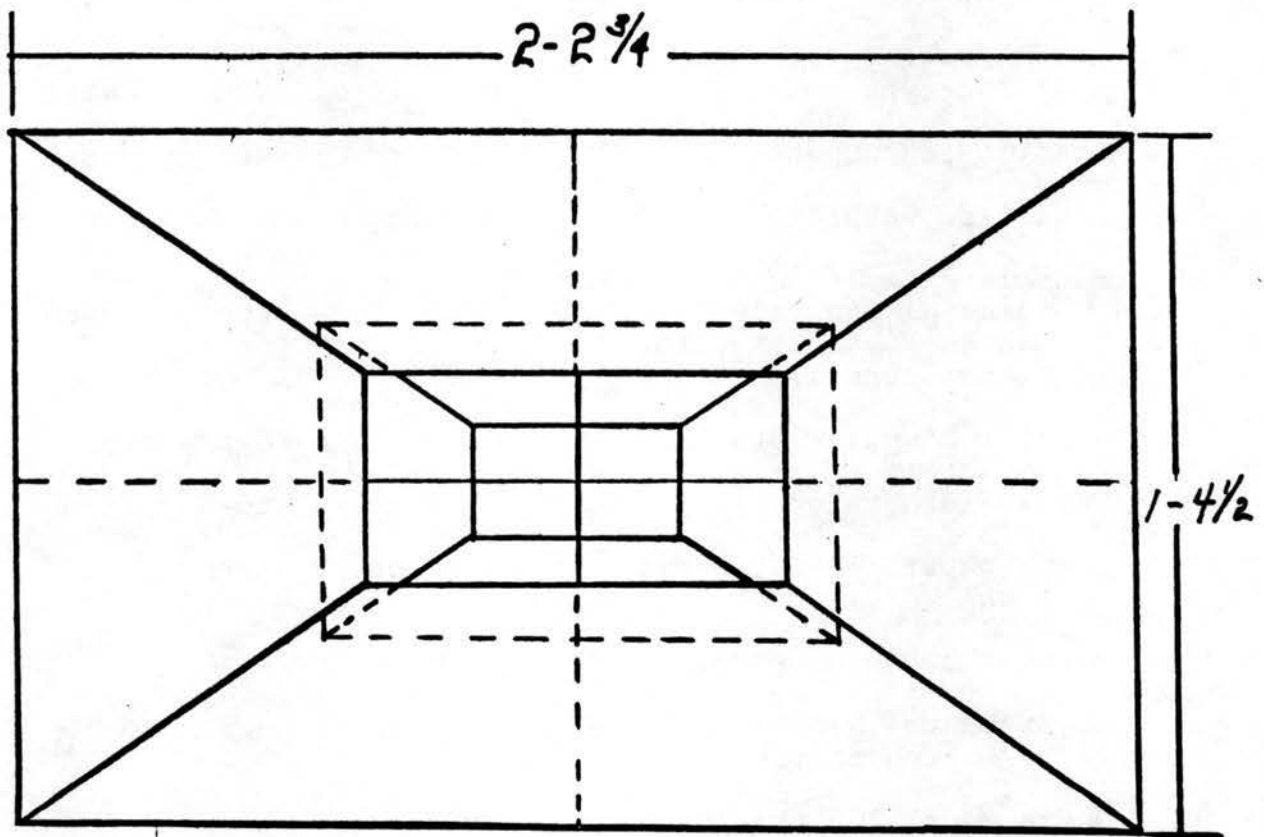
B

**CONCENTRIC-CONE DISTRIBUTOR
PREVENTS CONING**

(Courtesy of TVA)

FIGURE 17. Baffle for large packer holding bin

Designed to divide material taking into account the velocity at 4.5 tons per minute it handles.



e. Vertical Elevators

Most blend plants utilize vertical bucket elevators in their material receiving system or in the bulk load out system. The "conventional" all steel bucket and casing is susceptible to corrosion. In recent years wood and reinforced plastic legs are available from manufacturers and are being used very satisfactorily.

f. Testing Equipment

As a minimum, the following testing equipment items are required for quality control testing:

<u>Testing Equipment</u>	<u>Where to Obtain</u>
1. View box	Construct according to Figure 1.
2. Quart fruit jars, Ball Mason type	Grocery or hardware store
3. Plastic tablespoons	Grocery or variety store
4. Distilled water	Grocery or drugstore
5. Funnels with 16 mm ID opening (a metal equivalent funnel can be substituted for powder funnel)	Laboratory supply houses
6. Stiff 1-2" paint brush	Paint or hardware store
7. Twelve-inch ruler	Stationery store
8. Graph paper, 10x10 spaces/ inch	Stationery store
9. Plastic bags for samples	Grocery store
10. Eight ounce, wide-mouth, screw-top bottles	Laboratory supply houses
11. Ohaus model 710 triple beam balance	Laboratory supply houses
12. Drano (crystal) drain opener	Grocery store
13. Riffle	See TFI Method 112, p. 73
14. Sink	Plumbing or hardware store

15. Sampling probes:

a. Missouri "D" tube

American Tool and Die
917 Maple Street
Des Moines, IA 50267

or

b. 524 grain probe

Burrows Equipment Company
1316 Sherman Avenue
Evanston, IL 60204

or

c. Slotted single tube
probe, Burrows No.
599 or equivalent

Burrows Equipment Company
1316 Sherman Avenue
Evanston, IL 60204

16. Tyler screens 6, 8, 10, 14 and
20 mesh, 8" diameter, 2"
height (stainless steel
recommended with lid and
bottom pan)

Tyler Company

or

Laboratory supply houses

17. Alkacid pH paper

Laboratory supply houses

18. 100 ml PE Griffin low form
beakers

Laboratory supply houses

19. 100 ml PE graduated cylinders

Laboratory supply houses

20. Calculator - good, small
electronic is very
satisfactory

Department stores

SECTION E. OPERATIONS

One can have a well-designed plant plus excellent raw materials and still obtain unsatisfactory blends unless the operation procedures described in this section are followed:

1. Filling Bins

The horizontal bin should be filled with materials using the multi-point fill technique as illustrated in Figure 18. When filling vertical bins or silos, segregation of the various particle sizes can be minimized if anti-segregation devices described previously are used.

2. Payloader Approaches to Piles

When charging a blender, one normally withdraws materials from the same position of all piles being used; for example, the bottom of the ammonium nitrate, DAP and potash piles. If any material appears finer than expected, check by sampling and screening.

Extreme care is required when transferring material from a floor-level bin to the spreader truck, etc. Remove the product from the pile by "working the pile" with a payloader, for example, withdraw from left, center, right, left, center, right of the pile. The product can go into the bulk conveyance from the payloader or through either the belt conveyor or bucket elevator setups discussed earlier. In either case, "spread the load" by manual movement of the flexible spout.

3. Mixing

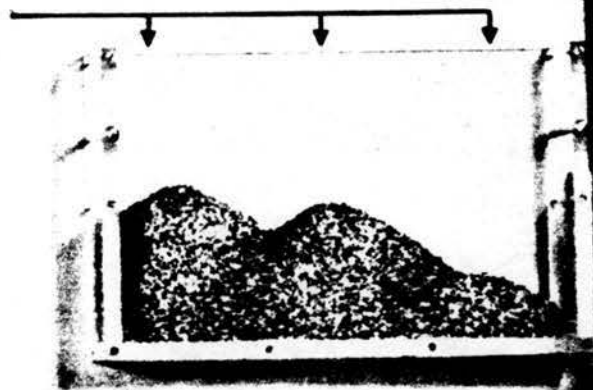
The first rule is to determine mixing time, but don't overmix! This mistake causes degradation (breakdown of particles) and, in effect, "unblending" of materials.

A mixing time of one minute per ton is generally satisfactory. However, a ribbon mixer requires about five minutes for a batch⁽⁶⁾. Generally, a rotary-barrel type mixer will produce a more uniform blend than other types of mixers.

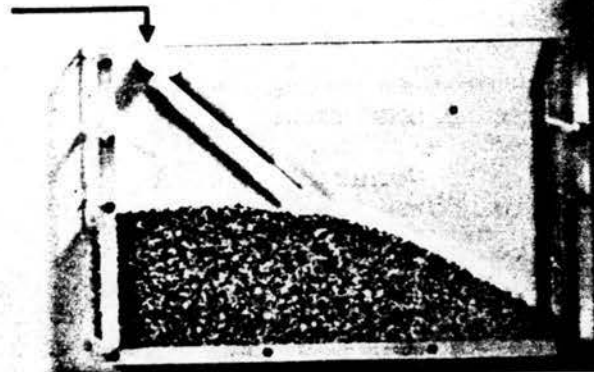
To determine the proper mixing time, first determine the time required in seconds to discharge two tons of product from the mixer. Then charge the mixer with a blend containing two or more materials matched in particle size. (Use the same

FIGURE 18. Suggested methods for reducing segregation during filling of floor-level storage bins

I. MULTI-POINT FILLING HELPS



II. TELESCOPING FILL PIPE PERMITS LEVEL FILLING AND GIVES BETTER RESULTS



(Courtesy of TVA)

total batch weight used for determining discharge time. Keep in mind the blender load should not occupy more than about 60 per cent of the total mixer volume.) Proceed to determine mixer performance in the manner described in Appendix 3.

4. Bagging

As described in the "Hopper Design" section and in Figure 16, bagging hoppers should have baffles to minimize coning, and hence segregation. The objective is to fill the bag with the correct products, properly mixed. The critical operations in achieving this are:

a. Labeling - This must conform with state and, as necessary, interstate regulations.

b. Weights - The net weight of material in the bag must be within state tolerances. Net weight is, of course, total minus tare (weight of empty bag). Determine tare weight by weighing 10 empty bags on a certified scale. This weight, divided by 10, is the tare weight per bag.

When using a volumetric bag filler, check-weigh on certified scales at least 10 per cent of the bags. Check-weighing usually can be reduced to five per cent of the bags when using gravimetric systems. Scales should be clean and standardized against standard weights at least once a day, preferably before startup in the morning.

The bags chosen for check-weighing should be selected at random. Adjust scales to deliver the correct weight of material.

c. Closure - The two usual methods of bag closure are sewing or tape over sewing (TOS). Sewing only is normally satisfactory if the bagged material is for immediate use. TOS is recommended if the blend contains ammonium nitrate, or a blend containing hygroscopic material.

d. Handling - Throwing or pitching the bags can rupture the closure or otherwise damage the bags. Rough handling of palletized material can result in punctured bags.

e. Bag-to-Bag Uniformity (Process Capability) - The composition of a given product in all bags must be uniform. At times it is necessary to determine bag-to-bag uniformity (in nutrient content). If the bagging hopper is poorly designed, or if the materials in the blend were not matched in size, bag-to-bag uniformity will be poor and can result in a farmer complaint, state deficiency, or both.

To determine the quality of blended material being discharged from the bagging hopper, proceed according to instructions in Appendix 3.

5. Bulk Loading Bins

Bulk blended-solid fertilizer is generally loaded into trucks, etc., from bagging bins or bins constructed in a similar manner. Anti-segregation devices like those installed in bagging hoppers will help prevent segregation while the blend is being discharged into spreader trucks and trailers or tote bins. In addition, minimize segregation by spreading the material as it goes into the bulk conveyance by use of a large grain shovel or allowing it to flow into the truck through a telescoping, flexible spout or large truck tire tube being manually moved about the truck (Burrows Equipment Company, 1316 Sherman Ave., Evanston, Illinois 60204, is one supplier of flexible car loading spouts. Sizes vary from 6" in diameter x 8' to 12" in diameter x 12').

If the blend is being transferred some distance to the bulk conveyance, avoid the use of long screw conveyors which break up granules and add to segregation. Use elevated belt conveyors or a bucket elevator - sliding spout setup which allows the fertilizer to fall into the conveyance through a movable flexible spout.

6. Filler Materials

Use dry granular materials (listed in Appendix 1) sized to match the fertilizer materials. Light weight materials such as vermiculite cannot be blended with granular fertilizers because they will segregate. Also, any finely sized material such as limestone or sand will segregate from granular fertilizer materials.

7. Additives

a. Secondary and Micronutrients

Refer to Section C, 4, for calculating formulas -- if a guaranteed grade must be maintained, remember to make "room" in the formula for the additive.

When the pounds of a secondary or micronutrient account for five per cent or more of the total weight charge to the blender, simply use a properly sized granular product and proceed in normal blending fashion.

If the additive accounts for less than five per cent of the total weight of materials charged to the blender, it is recommended that, in order to obtain homogeneity, a powdered material should be used along with one to three per cent binder. The binder causes the powder to adhere to the granules (1). Stated another way, the powdered micronutrient is stuck onto the fertilizer granules with about one to three per cent liquid (which will not normally affect the flowability of the blend and, in addition, serves as a dedusting agent).

The liquids or binding agents include oils, high-analysis fertilizer solutions and sometimes, water. (Keep in mind that both Tennessee Valley Authority and American Cyanamid Company independently developed patented procedures (7) for coating powdered micronutrient materials on fertilizers with binding agents.)

Figure 19 (8) illustrates equipment which is used for coating granules with micronutrients. If the binder is an oil, the system illustrated in Figure 19 can also be used for pesticides.

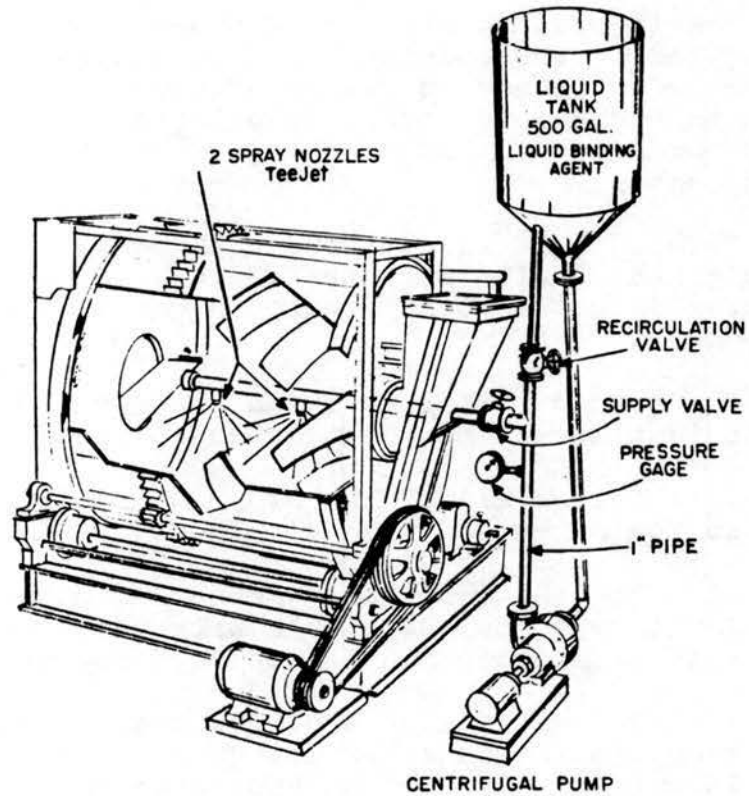
The procedure for sticking powdered materials onto granular fertilizers normally is as follows:

- (1) Charge all of the granular fertilizer materials to the mixer and mix one minute.
- (2) Add the calculated amount of powdered material (which must be compatible with the granules) to the mixer. Mix one minute before spraying with the liquid.
- (3) Spray the liquid binder onto the moving bed of granules in the mixer using a line pressure of about 25 psi (8). Spray time should be about one minute.
- (4) Blend for one minute after spraying and then empty the mixer.

TVA and the industry have found that diesel and reclaimed motor oils are effective binders - normally, additions of these at 0.5 per cent of the product weight are adequate. Do not add oil or similar materials to mixtures of ammonium nitrate because of the potential hazards of fire and explosions. Also, diesel oils tend to "bleed" through paper bags, so reclaimed motor oil is better in this case.

Blended solid fertilizers containing powdered micronutrients stuck onto the granules by liquid binders should be applied to the field fairly soon after being made because storage for any length of time often results in the binder

FIGURE 19. Spray system for coating granules in rotary mixer



(Courtesy of TVA)

being absorbed into the granule - this causes the powdered micronutrient to drop off. Fertilizer solutions and water are more likely to cause caking than oils. (Oil can be and is often used as a dedusting agent.)

b. Pesticides

Adding a liquid pesticide to a blend is analogous to using oil as a binder for micronutrients. Of course, when calculating the formula for a guaranteed nutrient blend, "room" must be provided for the liquid. For calculating formulas containing a liquid pesticide, refer to Section C,4.

Concentrated or solid pesticides can be diluted or dissolved in a suitable solvent. (Caution! Take the necessary steps to prevent fires and wear the recommended protective clothing. Plant personnel must thoroughly understand the toxicity and flammability of the pesticide and its solvent and know what to do in case of skin contact or inhalation. See supplier's OSHA material safety data sheet for needed information including fire fighting.)

The pesticide solution (normally the commercially available - about 45 per cent solutions are used) must be compatible with materials in the blend, otherwise, the pesticide may degrade before the fertilizer is applied to the soil. (Caution! Many pesticides are organic and the same precautions in Section 7a should be followed.) Usually, application is within a few hours after the blend is made. If the pesticide-fertilizer blend is sticky or does not flow well, add 0.5-1.0 per cent of a conditioning agent (1) such as powdered kaolin, sierra, talc, attapulgate, etc., after the spraying is completed. Mix one to two minutes more.

After the granular fertilizer materials have been blended two minutes, spray the calculated amount of pesticide solution onto the moving bed of granules in the mixer at line pressure of about 20-25 psi. Spray time should be about one minute. Blend the mixture an additional minute and discharge.

The addition of granular pesticides to blended-solid fertilizers is not recommended. Density of granular pesticides is normally only about one-half that of fertilizer materials and particle size is smaller, so segregation will occur. In addition, dust from pesticide granules can be toxic to personnel in the mixing area (7) (Caution! Thoroughly clean all equipment used with a pesticide-fertilizer mixture before using for another grade.)

c. Grass Seed

These are added in some areas to custom mixes, especially for pastures. The seeds cannot, because of size and density, be uniformly dispersed in the fertilizer, but farmers and state officials are aware of this problem. Other seeds such as oats are also added.

Bulk blenders providing custom application equipment should be especially careful with their seed-fertilizer mixtures. Unless application equipment, augers, conveyor belts, and storage bins are completely cleaned after each seed-fertilizer mixture there will be contamination of seed in subsequent batches or loads. Such contamination can be highly detrimental to certified seed producers where mixing of crops results.

8. Tally and Batch Sheets

In order to keep up with what he is doing and/or has done, the operator should have tally or batch sheets (or tickets) on each grade and/or order filled for blended material. These tickets should show the precise amounts of materials in one batch or a sequence of batches containing the same amount of nutrients. The tickets or tally sheets should be retained in the office until the plant manager is sure there is no farmer or state official dissatisfaction about the blend. Examples of one type of blank and completed batch tickets are given in Figure 20.

FIGURE 20. An example of blank and completed batch tickets

Sample

BATCH TICKET

N^o 1524

Grade

Total Lbs. _____

Cust. Name _____

Seed	
33½-0-0	
Scale	
18-46-0	
Scale	
0-46-0	
Scale	
0-0-60	
Scale	
0-0-50	
Scale	
Scale	
Lime	
Total Lbs.	

NUMBER OF BATCHES

BATCH TICKET

Grade *12-24-24* N^o 1522

Total Lbs. *16,000*

Cust. Name *John Doe*

Seed	
33½-0-0	<i>620</i>
Scale	<i>620</i>
18-46-0	<i>4,180</i>
Scale	<i>4,800</i>
0-46-0	
Scale	
0-0-60	<i>3,200</i>
Scale	<i>8,000</i>
0-0-50	
Scale	
<i>45-0-0 or anything</i>	
Scale	
Lime	
Total Lbs.	

NUMBER OF BATCHES

SECTION F. HOUSEKEEPING

1. Appearance Value - Cross Contamination

Good housekeeping is vital. Appearance of the plant, as well as that of the product, is important to the farmer as well as to the state control official. It is a direct reflection on the quality of the operation, and can affect product quality, as well.

The blend should not only appear to be uniform but be free of foreign materials such as trash or chunks of other fertilizer material. Therefore, it is very important to see that each bin contains only one fertilizer material and that no material is cross-contaminated at the bottom of the bin (piles can run together due to sloppy payloader operation). The work alley used by the payloader and all plant equipment should be kept in reasonably clean condition while blends are being made. The equipment outside the plant and the general plant area will be impressive if kept in neat condition.

2. Bin Labeling

All bins of materials should be correctly labeled. Durable bin placards can be obtained from TFI at nominal cost. The photo on the following page is an example of such placards.

3. Payloader Alleys

Keep workways free of fertilizer, debris, and moisture. Although difficult to achieve, this condition can be realized with good housekeeping practices, such as these:

- a. Keep outside doors closed, especially when relative humidity is high.
- b. Should workways accumulate moisture, scrape every several hours to remove the damp, hygroscopic material.
- c. After each scraping apply an absorbent drying material. Do not leave these until they become sticky or slimy, but remove materials after they have absorbed one-third to one-half their weight in water.

Bin Placards Available From TFI



Several sources of absorbent materials are:

1. The Oil Dri Corp. of America
520 N. Michigan Avenue
Chicago, IL 60611
2. A. P. Green Refractories Company
Subsidiary of U.S. Gypsum Company
Oran, MO 63771
3. Floridin Company
3 Penn Center
Pittsburgh, PA 15235
4. Minerals & Chemicals Division
Engelhard Minerals & Chemical Corp.
Menlo Park
Edison, NJ 08817
5. The Andersons
Maumee, OH 43537

4. Dust and Toxicity Problems

All states now have regulations limiting the amounts of particulate matter that may be released into the air. Furthermore, the Occupational Safety and Health Act (OSHA) provides for the regulation of workroom environment, including protection of the health and safety of employees (9).

The blend plant manager needs to know and abide by his state environmental regulations regarding allowable contamination of the air outside and within blend plants. It may be necessary to install dust collectors. As previously indicated, most blended fertilizers can be "dedusted" to a considerable extent by spraying one-half a per cent oil onto the moving bed of granules in the blender such as shown in Figure 21(9). Materials such as ammonium polyphosphate solution are also effective. (Caution! See page 53 for precautions.)

Producers supplying solvents, oils, pesticides and products classified as hazardous materials, can furnish their customers with documents called OSHA Material Safety Data Sheets describing precautions required. It is suggested these data sheets be obtained and followed. It is most important to protect employees from pesticide inhalation and skin contact and to know what to tell the physician in cases involving pesticides.

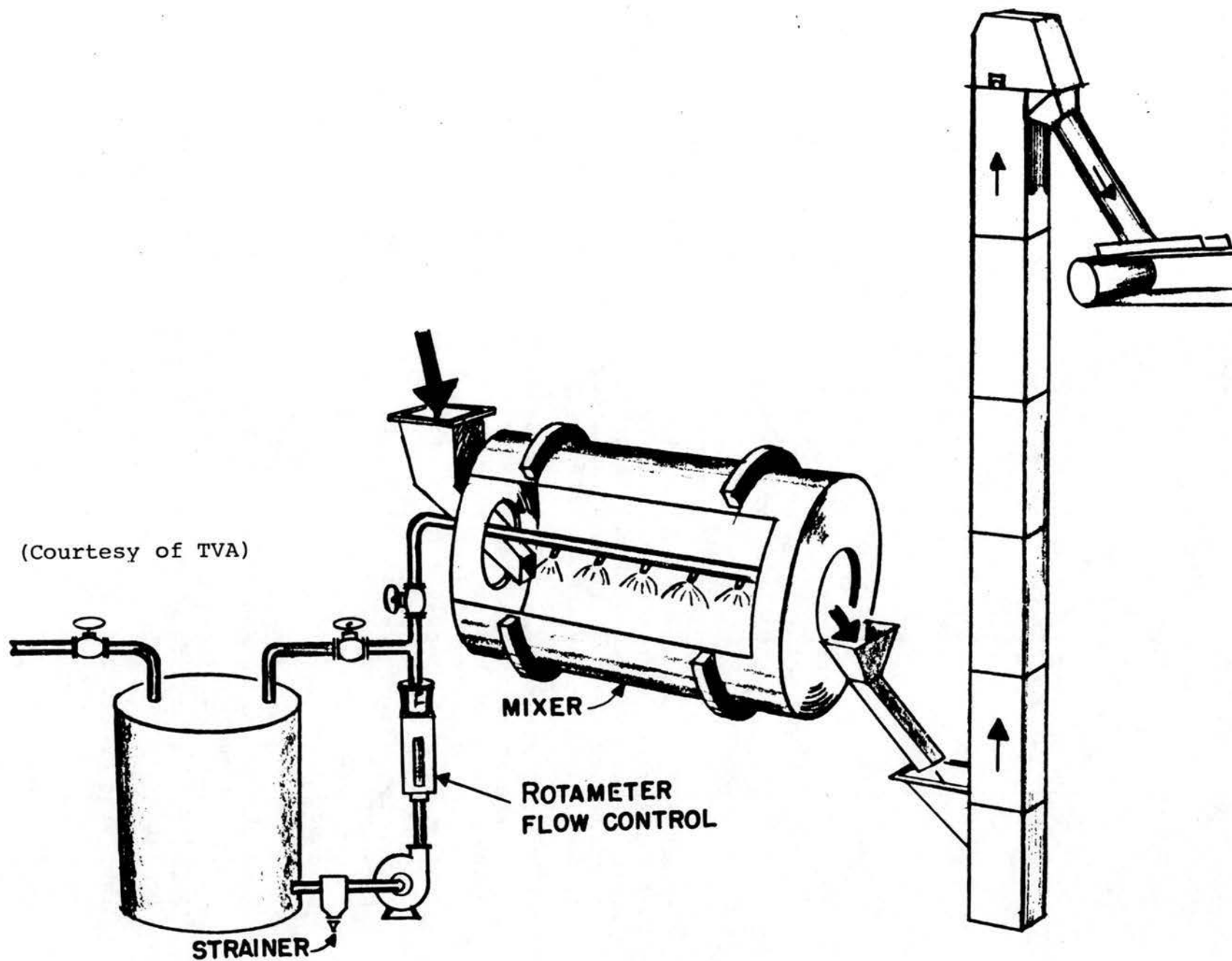


FIGURE 21. Dust control by liquid sprays

Tables 3, 4, 5, 6 and 7⁽¹⁰⁾ on the following pages give the acute toxicity rating and possible effects of over-exposure to many of the materials used in fertilizer blend plants. TLV means "threshold level value" - any amount above the TLV is or can be harmful.

LD50 (lethal dose, 50 per cent) refers to the dose, expressed in weight of agent per unit weight of animal, which will cause death to 50 per cent of an exposed population of test animals. The type of animal and the method of administration are important factors.

5. Fire Prevention

Do not store or use explosive devices in or near a fertilizer blending plant. Ammonium nitrate, especially if contaminated with oil or carbonaceous materials, can be detonated. Do not store solvents and pesticides near ammonium nitrate!

Obtain a copy of NFPA No. 490 entitled, "Storage of Ammonium Nitrate," 1970, from the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110. It also is available from The Fertilizer Institute. Chapter 7 covers fire protection, and Appendix A discusses fire fighting procedure with the first rule being to cool burning ammonium nitrate by applying large volumes of water while ventilating the area.

The types of fire extinguishers needed for extinguishing pesticide fires are given in the supplier's Material Safety Data Sheet. Foam and carbon dioxide extinguishers may be necessary for certain equipment or other types of fires. All electrical equipment and wiring should comply with local or national codes.

6. Covering Fertilizer Materials

It is important to tightly cover hygroscopic piles of materials with polyethylene (PE) sheeting, especially during periods of high relative humidity. Moisture picked up by ammonium nitrate, urea, or potash can result in caking of blends and deficiencies.

7. Scale Care and Standard Weights

As discussed under Sections D and E, scales must be kept clean and be certified by state weight inspectors. The plant should have its own set of standard weights to check weighing hoppers and platform scales. Check and, if necessary, adjust these weighing devices at least once daily.

Table 3. Toxicity/dose relationship in hazard potential

Toxicity	Dose	Hazard potential
High	High	High
High	Low	Intermediate
Low	High	Intermediate
Low	Low	Low

Table 4. Some bulk blend fertilizer materials

Material	Acute toxicity rating ^a	Possible effects of overexposure
Ammonium nitrate	Moderate	Broken skin & mucous tissue irritation. Allergic reaction (13).
Ammonium nitrate sulfate	Moderate	Broken skin & mucous tissue irritation.
Ammonium sulfate	Moderate	Broken skin & mucous tissue irritation.
Ammonium phosphate nitrate	Moderate	Broken skin & mucous tissue irritation.
Diammonium phosphate	Moderate	Broken skin & mucous tissue irritation.
Superphosphate, high analysis ^b	Moderate	Broken skin & mucous tissue irritation.
Triple superphosphate ^b	Moderate	Broken skin & mucous tissue irritation.
Fluoride impurities	Very toxic to extremely toxic	Skin & mucous tissue irritant. Respiratory effects. Bone damage (6). TLV ^c 2.5 mg/m ³ (fluoride), 2mg/m ³ (HF), (15).
Potassium chloride	Moderate	Probably minimal. LD50 ^d , 2,430 mg/kg, rat, oral (5).
Urea	Practically nontoxic	Unknown. May be low hazard substance (7,13).
Limestone	Slight	"Inert" or "nuisance" dust when quartz content below 1%. TLV ^c , 10 mg/m ³ (15).
Rice hulls	Unknown	Unknown
Sewage sludge	Unknown	Unknown

Table 5. Some secondary and micronutrients

Material	Acute toxicity rating	Possible effects of overexposure
Boron	Moderate to very toxic	Irritant. Borax LD50, oral mouse. 2,000 mg/kg (5). TLV (boron oxide)=10 mg/m ³ (15)
Magnesium oxide	Moderate	Central nervous system and respiratory effects. TLV=5 mg/m ³ (as Mn) (15)
Manganese oxide	Moderate	
Sulfur	Moderate	Irritant
Zinc oxide	Moderate	Fume may cause a mild transitory illness called "metal fume fever." ZnO powder as used in fertilizers probably has low hazard. TLV fume 5 mg/m ³ (15)
Zinc sulfate	Very toxic	Skin, mucous tissue, and respiratory irritant LD50 intraperitoneal, rat 40 mg/kg

^aScale: practically nontoxic, slightly toxic, moderately toxic, very toxic, extremely toxic, and super toxic. (3)

^bPhosphate fertilizers may contain several percent by weight of fluoride impurity (5).

^cTLV refers to threshold limit value of airborne contaminants (6).

^dLD50 (lethal dose, 50%) refers to the dose, expressed in weight of agent per unit weight of animal, which will cause death to 50% of an exposed population of test animals. The type of animal and method of administration are important factors.

Table 6. Some fertilizer conditioners

Material	Acute toxicity rating	Possible effects of overexposure
Alumina silicates (zeolite)	Slightly toxic when quartz content <1% and toxic impurities are not present.	Unknown
Calcium carbonates	Low when impurities are not present.	Respiratory effects. "Inert" or "nuisance" dust. TLV = 10 mg/m ³ (15)
Calcium silicates	Slightly toxic when quartz content <1% and toxic impurities are not present.	Respiratory effects.
Diatomaceous earth	Moderate when quartz content <1%.	Respiratory effects. TLV = 20 million particles per ft ³ of air (15) LD50 3,160 mg/kg, oral, rat (5).
Kaolin	Slightly toxic when quartz content <1%.	Respiratory effects. TLV 10 mg/m ³ (15).
Surfactants	Depends on chemical composition. Most are probably moderately toxic.	Respiratory effects and mild skin irritation.

Table 7. Some pesticides used in bulk blending plants

Material	Use	Acute LD50, mg/kg
Aldrin (USDA)	Insecticide (persistent)	55, oral, rat (10) (TLV 0.25 mg/m ³) (15)
Dasanit ^a	Nematocide-insecticide	About 2-10, oral, rat; rapidly absorbed through skin (10)
Disulfoton (USDA)	Insecticide-acaricide	12.5 (tech.) oral, rat (10)
Mocap ^b	Nematocide-soil insecticide)	80, oral, rat; 60, skin, rat (5)
Nitralin (USDA)	Herbicide: preemergence	>2,000, oral, mouse, rat (10) >2,000, dermal, rabbit (10).
Phorate (USDA)	Insecticide-soil & systemic	2-4 (highly toxic) oral, male rat, about 630 dermal, guinea pig (10)
Tillam ^c	Preplant herbicide	1,120, oral, rat; >2,936 dermal, rabbit (10)
Trifluralin (USDA)	Herbicide: preemergence	>10,000 oral, rat (10)

^aTrade name -- Chemagro Corp.

^bTrade name -- produced by Mobil Chemical Co.

^cTrade name -- Stauffer Chemical Co.

8. "Tight" Building Construction

A tight building is extremely important because it helps keep moisture away from fertilizer materials and plant equipment (much of which will rust and, as a result, malfunction). Therefore, building maintenance is extremely important and should receive top priority on days and periods when there is little or no commercial activity at the plant.

9. Spillage and Cross-Contaminated Fertilizer Materials

Clean waste fertilizer materials can be picked up and placed in a special bin (or barrels) labeled, "Waste - Not For Sale." There should be no problem salvaging this waste by randomly blending 25-50 pounds of it per ton.

10. Location of Nitrogen Bins

These materials tend to cake badly so, in horizontal bins, they should be the farthest from the door or, generally, near the mixer. When material is not being withdrawn from the pile, and especially in the case of ammonium nitrate, the nitrogen piles should be covered well with polyethylene (PE) sheeting. This helps control relative humidity and, therefore, caking.