AP42 Section: **9.9.4 Alfalfa Dehydrating**

Title: **Comments and correspondence to 1996 supplement**

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

February 28, 1997

To: AP-42 Section 9.9.4, Alfalfa Dehydration, Project File

From: Tom Lapp

Subject: National Emission Estimate

The recently published AP-42 Section 9.9.4, Alfalfa Dehydration, developed emission factors for total particulate (PM) and PM-10 for dehydrating facilities using two types of alfalfa dryers: (1) single-pass dryers and (2) triple-pass dryers. Existing dryers are fueled with natural gas, coal, or wood (sawdust). While it is possible to fuel dryers with oil, none of the existing dryers use this fuel. The factors derived in Section 9.9.4 can be used to develop estimates of total PM and PM-10 emissions, on a national basis, from the drying of alfalfa used to produce dehydrated alfalfa pellets. Because the emission factors are different for each dryer type and fuel used, data were needed for the percentage of pellets produced by each type of dryer. Ms. Wanda Cobb, American Alfalfa Processors Association (AAPA), was contacted for the percentage information and she requested assistance from selected alfalfa processing facilities. U. S. Department of Agriculture (USDA) data for production of dehydrated alfalfa pellets were provided by the AAPA. The USDA data are collated by areas, which may include a group of states or only a single state. For those areas comprised of a group of states, no data are provided by the USDA for the individual states within the area. To separate the grouped data by state, the state departments of air quality were contacted for information on the number and type of alfalfa dryers with air permits in that state. The grouped data were divided among the states within the group according to the number of alfalfa dryers in each state.

For each state, data are provided in Table 1 for the total dehydrated pellet production (USDA data), the AAPA estimate of the percentage of pellets produced by type of dryer, and the production by dryer type. The USDA data for total dehydrated pellet production were provided by areas; pellet production by state was separated by Midwest Research Institute (MRI) based on information provided by individual states. For two areas, Kansas (area 2) and Utah, Idaho, and Oregon (area 3), all or a portion of the alfalfa is dried by sun curing and no dryers are used. For each state, the production quantity by type was obtained by multiplying the total production by the appropriate percentage. Table 2 shows the AAPA or State departments of air quality estimate of the distribution of alfalfa dryers by type and fuel for each state or USDA area. The emission factors in the AP-42 section are in terms of pounds (lbs) of particulate per ton of pellet produced; the factors differ by dryer type and fuel used.

Using the pellet production quantity and the appropriate emission factor, an emission estimate of total PM (lbs) and total PM-10 (lbs) was calculated for each area for gas- and wood-fired single-pass dryers in Table 3 and for gas-, coal-, and wood-fired triple-pass dryers in Table 4. The results from Tables 3 and 4 are summarized in Table 5. On a national basis, estimated total PM emissions and PM-10 emissions from single-pass dryers were 475 tons and 71 tons, respectively. For triple-pass dryers, the estimated national emissions for total PM and PM-10 were 667 tons and 117 tons, respectively. Overall, the national emissions estimate from all dryers was 1,142 tons total PM and 188 tons PM-10.

TABLE 1. ALFALFA DEHYDRATION BY DRYING METHOD

State	Total pellet production, 10^3 tons[a,b]	Single-pass dryer		Triple-pass dryer		Sun-cured	
		%	10^3 tons	%	10^3 tons	%	10^3 tons
NE	221.6	42.9	95.1	57.1	126.5	0	0
KS	90.8	2.0	1.8	53.9	48.9	44.1	40.1
IA	14.1	69.5	9.8	30.5	4.3	0	0
MN	0						
SD	39.7	99	39.2	0		1.0	0.5
CO	0						
OK	0						
TX	32.2	99.0	31.9	1.0	0.3	0	0
NM	0						
AL	0						
AR	0						
MO	3.5	100	3.5	0	0	0	0
OH	45.6	40	18.2	60	27.4	0	0
NY	18.3	0		100	18.3	0	0
UT	1.6	0		0		100	1.6
ID	1.6	0		0		100	1.6
OR	1.6	0		0		100	1.6
TOTAL	470.6		199.5		225.7		45.4

[a]Sun cured alfalfa does not use a dryer kiln therefore there are no particulate emissions. The total quantity of sun cured alfalfa has been subtracted from the total production quantity to provide the total tonnage of kiln dried alfalfa.

[b]Estimated by MRI based on U.S. Department of Agriculture pellet production data for May 1995 through April 1996.

TABLE 2. ALFALFA DRYERS BY TYPE AND FUEL[a]

State	Single-pass dryer		Triple-pass dryer			Total
	Gas-fired	Wood-fired	Gas-fired	Coal-fired	Wood-fired	
NE	11	0	7	0	0	18
KS	3	0	6	0	0	9
IA	1	0	1	0	0	2
MN	0	0	0	0	0	0
SD	4	0	0	0	0	4
CO	0	0	0	0	0	0
OK	0	0	0	0	0	0
TX	1	0	2	0	0	3
NM	0	0	0	0	0	0
AL	0	0	0	0	0	0
AR	0	0	0	0	0	0
MO	1	0	0	0	0	1
OH	0	2	0	0	3	5
NY	0	0	0	2	0	2
UT, ID, OR[b]	0	0	0	0	0	0
Total	21	2	16	2	3	44

[a]Data provided by American Alfalfa Processors Association and estimates provided by State departments of air quality.
[b]100 percent sun-cured.

TABLE 3. EMISSIONS FROM SINGLE-PASS DRYERS

State	Gas-fired[a]			Wood-fired[b]			Total	
	Production, 10^3 tons	Total PM, 10^3 lb	PM-10, 10^3 lb	Production, 10^3 tons	Total PM, 10^3 lb	PM-10, 10^3 lb	PM, 10^3 lb	PM-10, 10^3 lb
NE	95.1	456.5	61.8	0			456.5	61.8
KS	1.8	8.6	1.2	0			8.6	1.2
IA	9.8	47.0	6.4	0			47.0	6.4
MN	0			0			0	0
SD	39.2	188.2	25.5	0			188.2	25.5
CO	0			0			0	0
OK	0			0			0	0
TX	31.9	153.1	20.7	0			153.1	20.7
NM	0			0			0	0
AL	0			0			0	0
AR	0			0			0	0
MO	3.5	16.8	2.3	0			16.8	2.3
OH	0			18.2	80.1	23.7	80.1	23.7
NY	0			0			0	0
UT, ID, OR	0			0			0	0
TOTAL	181.3	870.2	117.9	18.2	80.1	23.7	950.3	141.6

[a]Emission factors for gas-fired single-pass dryers: Total PM 4.8 lb/ton; PM-10 0.65 lb/ton

[b]Emission factors for wood-fired single-pass dryers: Total PM 4.4 lb/ton; PM-10 1.3 lb/ton

TABLE 4. EMISSIONS FROM TRIPLE-PASS DRYERS

State	Gas-fired[a]			Coal-fired[b]			Wood-fired[c]			Total	
	Production, 10^3 tons	Total PM, 10^3 lb	PM-10, 10^3 lb	Production, 10^3 tons	Total PM, 10^3 lb	PM-10, 10^3 lb	Production, 10^3 tons	Total PM, 10^3 lb	PM-10, 10^3 lb	PM, 10^3 lb	PM-10, 10^3 lb
NE	126.5	733.7	126.5	0			0			733.7	126.5
KS	48.9	283.6	48.9	0			0			283.6	48.9
IA	4.3	24.9	4.3	0			0			24.9	4.3
MN	0			0			0				
SD	0			0			0				
CO	0			0			0				
OK	0			0			0				
TX	0.3	1.7	0.3	0			0			1.7	0.3
NM	0			0			0				
AL	0			0			0				
AR	0			0			0				
MO	0			0			0				
OH	0			0			27.4	153.4	54.8	153.4	54.8
NY	0			18.3	137.3	ND	0			137.3	ND
UT, ID, OR	0			0			0			0	0
TOTAL	180.0	1,043.9	180.0	18.3	137.3	ND	27.4	155.1	55.4	1,334.6	234.8

[a]Emission factors for gas-fired triple-pass dryers:
Total PM 5.8 lb/ton
PM-10 1.0 lb/ton

[b]Emission factors for coal-fired triple-pass dryers:
Total PM 7.5 lb/ton (filterable only)
PM-10 No data (ND)

[c]No experimental emission factors are available for wood-fired, triple-pass dryers. Factors were estimated from the ratio of the emission factors for gas-fired, single and triple-pass dryers and the emission factors for wood-fired, single-pass dryers. Estimated emission factors for wood-fired, triple-pass dryers:
Total PM 5.6 lb/ton
PM-10 2.0 lb/ton

TABLE 5. ALFALFA DEHYDRATION-NATIONAL EMISSIONS ESTIMATE

State	Single-pass dryer, 10^3 lb		Triple-pass dryer, 10^3 lb		State total, 10^3 lb	
	Total PM	PM-10	Total PM	PM-10	Total PM	PM-10
NE	456.5	61.8	733.7	126.5	1,190.2	188.3
KS	8.6	1.2	283.6	48.9	292.2	50.1
IA	47.0	6.4	24.9	4.3	71.9	10.7
MN	0	0	0	0	0	0
SD	188.2	25.5	0	0	188.2	25.5
CO	0	0	0	0	0	0
OK	0	0	0	0	0	0
TX	153.1	20.7	1.7	0.3	154.8	21.0
NM	0	0	0	0	0	0
AL	0	0	0	0	0	0
AR	0	0	0	0	0	0
MO	16.8	2.3	0	0	16.8	2.3
OH	80.1	23.7	153.4	54.8	233.5	78.5
NY	0	0	137.3	ND	137.3	ND
UT, ID, OR	0	0	0	0	0	0
Total	950.3 (475 tons)	141.6 (71 tons)	1,334.6 (667 tons)	234.8 (117 tons)	2,284.9 (1,142 tons)	376.4 (188 tons)

Recd 9/10/96
TZ

American Alfalfa Processors Association
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Overland Park, Kansas 66212
Telephone 913-648-6800

September 4, 1996

Mr. Tom Lapp
Midwest Research Institute
Suite 350
401 Harrison Oaks Boulevard
Cary, NC 27513-2412

Dear Mr. Lapp:

Thank you for your phone call regarding our review, changes and comments on the draft version of Section 9.9.4, Alfalfa Dehydration, that the Environmental Protection Agency is proposing to publish in AP-42, Compilation of Air Pollutant Emission Factors.

Enclosed is a copy of the letter from Dick Ronning, Ronning Engineering Company, Inc. As I mentioned Ronning's inclusion as a reference is up to you.

I spoke with Don Verhoff, Verhoff Alfalfa Mills, Inc., and he will send you more recent Ohio test data.

I also spoke with George Cobb, AirSource Technologies, and he is writing a letter to AAPA clarifying that the baghouse was a part of the meal collector system of both Gothenburg Feed Products Co. and Shofstall Alfalfa, and was not related to the testing. George will also indicate in his letter that the control equipment tested at Lexington Alfalfa Dehydrators was a cyclone. As soon as we receive the letter from George, a copy will be forwarded to you for your records.

Thanks again for your assistance. If you have any questions, or need additional information, please let us know.

Sincerely,

Wanda L. Cobb
Executive Vice President

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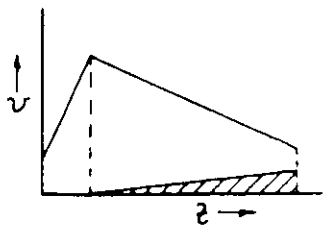

RONNING ENGINEERING COMPANY, INC.
7009 West 81st Street
Overland Park, Kansas 66204
913/649-3543
Fax 913/649-3545

August 12, 1996

Wanda Cobb
American Alfalfa Processors Association
9948 W. 87TH Street - Suite E
Overland Park, Kansas 66212

Dear Wanda,

I recommend the following changes in the Draft of Alfalfa Dehydration Emission Factor Document for AP-42.

2.2 The Mature Alfalfa - - - - is harvested by windrow wilting and then chopped out of the windrow with a Forage Harvester and - - - - plant.

2.2.1 - - - - Standing Alfalfa is cut and windrowed in the field to allow wilting to reduce moisture to an acceptable level balancing energy requirements, trucking requirements, and dehydrator capacity while maintaining the alfalfa quality and leaf quantity. The windrowed alfalfa is then chopped and hauled to the dehydration plant which is usually located within 20? miles of the field.
Within the drum - - - - the wet chops - - - - initial moisture content of 30 - 70% to 6 - 12%. Typical combustion - - - - 300° F to 1500° F - - - - . A fan - - - - primary cyclone (not cooling) - - - - .
In some mills vegetable oil or animal fat is added during grinding? Purpose - preserve. Disposition of the alfalfa meal - - - - . In some mills - - - - direct bagging, storage or shipping (out). In others - - - - pelletized - - - - or blended as formula feed.

2.2.2 O.K.

2.3 O.K.

2.4 Oil Additive?

Table 4 - 1 Average emission factors don't agree with reported in reference.

9.9.4.2 Process Description
- ¶ 1 same as 2.2.1 change
- ¶ 2 O.K.
- ¶ 3 O.K.
- ¶ 4 O.K.

9.9.4.3 O.K.

Comments:

The emission test data is limited in quantity but may represent an average of 1993, 1992, and 1987, operating circumstances.

Recent improvements in process technique and emission control technology will produce reduced AP-42 emission factors in the near future.

Please call if you have any questions.

Sincerely,

Richard L. Ronning

Richard L. Ronning

RLR/ca

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Telephone 913-648-6800

August 27, 1996

Mr. Dallas W. Safriet
U. S. Environmental Protection Agency
Environmental Engineer
Emission Factor and Inventory Group (MD-14)
Research Triangle Park, NC 27711

Dear Mr. Safriet:

We have reviewed and are enclosing our comments on the draft version of Section 9.9.4, Alfalfa Dehydration, that the Environmental Protection Agency is proposing to publish in AP-42, Compilation of Air Pollutant Emission Factors.

If you have any questions, or need additional information, please contact us.

Thank you for your work on the AP-42 emission factors for dehydrated alfalfa.

Sincerely,

Wanda L. Cobb
Executive Vice President

enc

EMISSION FACTOR DOCUMENTATION FOR AP-42
SECTION 9.9.4

ALFALFA DEHYDRATION

DRAFT REPORT

American Alfalfa Processors Association

August 1996

NOTE - AAPA

References to the baghouse as control equipment are in error. The baghouse is not connected to the drum or cyclone and was not tested. It is completely separate from the cyclone and is on the meal grinding system only. Deleting the baghouse reference does not change the test data since the baghouse is not a part of the process. See Figure 2-1 (page 2-3) and Figure 9.9.4-1 (page 9.9.4-2) for location of baghouse (bag filter). Also in the last paragraph of page 2- "Primary cyclones are not controlled by fabric filters because of the high moisture content in the resulting exhaust stream." And on page 9.9.4-3, "Primary cyclones are not controlled by fabric filters because of the high moisture content in the resulting exhaust stream."

Appendix G - Process data - The baghouse section should not have been completed in the questionnaire as it was not related to the testing.

Lexington Alfalfa - 4.1.8 Reference 8 - "No control device was in operation at the time of testing" is in error. The control device was a cyclone. See drawing Figures 2-1 (page 2-2) and Figure 9.9.4-1 (page 9.9.4-2).

Some of the enclosed changes in 2.2 PROCESS DESCRIPTION, 2.2.1. Alfalfa Dehydration are from a letter to the AAPA office from Richard L. Ronning, Ronning Engineering Co., Inc., Overland Park, Kansas, August 12, 1996. Perhaps Ronning's name should be included in References for Section 2 and Section 9.9.4.

COMMENT

We would like to have the following comment appear in AP-42, Section 9.9.4, Alfalfa Dehydration.

Recent improvements in process technique and emission control technology have reduced AP-42 emission factors. And future advanced technology will contribute to futher reductions in AP-42 emission factors.

2.1 INDUSTRY DESCRIPTION

Table 2-1. DEHYDRATED AND SUN CURED ALFALFA FACILITIES

Colorado, Oklahoma, New Mexico, Texas	No. of plants	~~3~~	4
	Total	~~46~~	47

2.2 PROCESS DESCRIPTION

.... The mature alfalfa ~~crop generally grown on a contractual basis~~ is harvested ~~with a silage or chopping machine~~ by windrow wilting and then chopped out of the windrow with a forage harvester and hauled as soon as possible to the dehydrating plant.

2.2.1 Alfalfa Dehydration

.... Standing alfalfa is ~~mowed and chopped~~ windrowed in the field to allow wilting to reduce moisture to an acceptable level balancing energy requirements, trucking requirements, and dehydrator capacity while maintaining the alfalfa quality and leaf quantity. ~~and transported by truck to a dehydrating plant, which is usually located within 20 miles of the field~~. The windrowed alfalfa is then chopped and hauled to the dehydration plant. .... Within the drum, the wet chops are dried from an initial moisture content of about 30 to ~~40~~ 70 percent (by weight, wet basis) to about 6 to 12 percent. Typical combustion gas temperatures within the gas-fired drum range from 154° to 538°C (300° to 1000° 1500°F) at the inlet to 60° to 95°C (140° to 210°F) at the outlet. A fan located at the dryer discharge pneumatically conveys the dried material to the primary ~~cooling~~ cyclone that separates the gases and steam from the dried material and releases them to the atmosphere.

.... ~~In some mills, vegetable oil or animal fat additives are introduced during the grinding operation. The primary purpose of such additives is to preserve and stabilize the carotene content of the alfalfa. Additionally, the wetting of these liquids reduces dust generation associated with subsequent handling and storage operations~~. The exhaust is recycled to a bag filter. ~~or into the primary cyclone. Disposition of the alfalfa meal discharged from the separator cyclone varies from the individual mill and the nature of intended market~~. The meal is conveyed to a pellet mill. ~~In some mills the meal is~~ The extruded pellets are conveyed directly to bagging, bulk storage, or bulk shipping facilities. ~~In others the meal may be pelletized or may be blended with other ingredients as a formula feed~~.

As-mentioned-previously,-some-mills-inject-an-oil-additive-during-the dehydration-process-to-preserve-carotene-content.--The-additive-tends-to-reduce dustiness-and-promote-agglomeration-thereby-assisting-in-particulate-removal by-the-cyclone-collectors.--However,-these-additives-may,-and-often-do,-have an-adverse-effect-on-the-baghouse-operation-by-plugging-or-clogging-the-bag openings.

4.1.5 Reference 5

This reference is a stack test conducted at the Gothenburg Feed Products alfalfa dehydrating plant in Gothenburg, Nebraska in 1993. The alfalfa dehydration plant consisted of a natural gas-fired, triple-pass dryer. The control equipment used at the site was ~~a single compartment baghouse and~~ a cyclone.

4.1.6. Reference 6

This reference is a stack test conducted at the Shofstall alfalfa dehydrating plant in Odessa, Nebraska in 1993. The alfalfa dehydration plant consisted of a natural gas-fired, triple-pass dryer. The control equipment used at the site was ~~a single compartment baghouse and~~ a cyclone.

4.1.8 Reference 8

This reference is stack test conduced at the Lexington Alfalfa Dehydrators plant in Darr, Nebraska in 1993. The alfalfa dehdyration plant operated a natural gas-fired, single-pass dryer. ~~No control device was in operation at the time of testing~~. The control equipment used at the site was a cyclone.

4.2 DEVELOPMENT OF CANDIDATE EMISSION FACTORS

Candidate emission factors shown in Table 4-2 were developed for a ~~single pass dryer with no controls,~~ for ~~a~~ two single-pass ~~dryer~~ dryers with ~~a cyclone~~ cyclones. and ~~a~~ two triple-pass ~~dryer~~ dryers with ~~a cyclone~~ cyclones. ~~and a cyclone plus single compartment baghouse.~~

TABLE 4-1. SUMMARY OF EMISSION TEST DATA FOR ALFALFA DEHYDRATION

Source	Control device	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton)[a]	Average emission factor, kg/Mg (lb/ton)	Ref. No.
Triple-pass dryer gas-fired	Cyclone~~/baghouse~~[b]	Filterable PM	2	B	1.5-3.3 (3.0-6.5)	2.4 (4.8)	5
		Condensible PM	2	B	0.12-1.7 (0.25-3.4)	0.91 (1.8)	5
Triple-pass dryer gas-fired	Cyclone/~~baghouse~~[b]	Filterable PM	3	A	1.9-2.9 (3.7-5.8)	2.3 (4.7)	6
		Condensible PM	3	A	0.08-0.09 (0.15-0.18)	0.08 (0.17)	6
Single-pass dryer gas-fired	Cyclone[b]	Filterable PM	3	A	0.44-0.73 (0.87-1.5)	0.57 (1.14)	7
		Condensible PM	3	A	0.08-0.19 (0.16-0.38)	0.13 (0.26)	7
Single-pass dryer gas-fired	~~None~~ Cyclone	Filterable PM	3	A	2.5-5.8 (4.9-11.5)	3.6 (7.2)	8
		Condensible PM	3	A	0.14-1.3 (0.28-2.6)	0.54 (1.07)	8
Single-pass dryer wood-fired	Cyclone	Filterable PM	3	A	1.6-2.2 (3.2-4.5)	1.9 (3.8)	9
		Condensible PM	3	A	0.8-1.5 (1.6-3.0)	1.3 (2.5)	9
Triple-pass dryer coal-fired	Cyclone	Filterable PM	3	C	3.3-4.1 (6.5-8.1)[c]	3.8 (7.5)[c]	10

[a]Emission factors are calculated using the emission rate in the cited reference and the production rate during the test period.
[b]~~Source test performed at duct from cyclone following the dryer (see Reference 4).~~
[c]Emission factor based on tons of dried alfalfa to the hammermill.

Note - Re reference b - All tests were stack tests.

Are the average emission factors, (lb/ton) Filterable PM plus Condensible PM = averages given in Section 4.1 REVIEW OF SPECIFIC DATA SETS.

Wc (AAPA)

TABLE 4-2. SUMMARY OF PARTICULATE EMISSION FACTORS FOR ALFALFA DEHYDRATION[a]

Source	Control device	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton)	Average emission factor, kg/Mg (lb/ton)	Ref. No.
Triple-pass dryer gas-fired	Cyclone/~~baghouse~~	Filterable PM	5	D	1.5-3.3 (3.0-6.5)	2.4 (4.8)	5,6
		Condensible PM	5	D	0.08-1.7 (0.15-3.4)	0.50 (1.0)	5,6
Triple-pass dryer coal-fired	Cyclone	Filterable PM	3	D	3.3-4.1 (6.5-8.1)[b]	3.8 (7.5)[b]	10
Single-pass dryer gas-fired	Cyclone	Filterable PM	3	D	0.44-0.73 (0.87-1.5)	0.57 (1.1)	7
		Condensible PM	3	D	0.08-0.19 (0.16-0.38)	0.13 (0.26)	7
Single-pass dryer wood-fired	Cyclone	Filterable PM	3	D	1.6-2.2 (3.2-4.5)	1.9 (3.8)	9
		Condensible PM	3	D	0.8-1.5 (1.6-3.0)	1.3 (2.5)	9
Single-pass dryer gas-fired	~~None~~ Cyclone	Filterable PM	3	D	2.5-5.8 (4.9-11.5)	3.6 (7.2)	8
		Condensible PM	3	D	0.14-1.3 (0.28-2.6)	0.54 (1.1)	8

[a]Emission factor units are kg (lb) of pollutant per Mg (ton) of finished pellets produced, unless noted.
[b]Emission factor based on quantity of dried alfalfa to the hammermill.

Note Recommend combine Ref. 7 & 8 data.
AAPA

9.9.4.2 Process Description

.... Standing alfalfa is ~~mowed-and-chopped~~ windrowed in the field to allow wilting to reduce moisture to an acceptable level balancing energy requirements, trucking requirements, and dehydrator capacity while maintaining the alfalfa quality and leaf quantity. ~~and-transported-by-truck-to-a-dehdyrating-plant, which-is-usually-located-within-20-miles-of-the-field.~~ The windrowed alfalfa is then chopped and hauled to the dehydration plant. .... Within the drum, the wet chops are dried from an initial moisture content of about 30 to ~~40~~ 70 percent (by weight, wet basis) to about 6 to 12 percent. Typical combustion gas temperatures within the gas-fired drum range from 154° to 538°C (300° to 1000° 1500°F) at the inlet to 60° to 95°C (140° to 210°F) at the outlet.

.... ~~Common variations include recirculating the exhaust gas stream from one or more of the downstream cyclones back through the primary cyclone and ducting a portion of the primary cyclone exhaust back into the dryer furnace. Another modification involves recirculating a part of the meal collector cyclone exhaust back into the hammermill with the remainder ducted to the primary cyclone or discharged directly to a bag filter. Also additional cyclones may be employed if the pellets are pneumatically rather than mechnically conveyed from the pellet mill to the cooler or if the finished or ground pellets are pneumatically conveyed to storage or loadout.~~ (1st paragraph)

.... ~~Some measure of secondary control can also be used on these cyclones by ducting their exhaust streams back into the primary cyclone.~~ (4th paragraph)

TABLE 9.9.4-1. EMISSION FACTORS FOR ALFALFA DEHYDRATION[a]

EMISSION FACTOR RATING: D

Source	Control	Particulate (PM)		VOC	Ref.
		Filterable	Condensible		
Triple-pass dryer					
- Gas-fired (SCC 3-02-001-02)	Cyclone/~~baghouse~~	4.8	1.0	ND	8-9
- Coal-fired[b] (SCC 3-02-001-XX)	Cyclone	7.5	ND	ND	13
Single-pass dryer					
- Gas-fired (SCC 3-02-001-XX)	~~None~~ Cyclone	7.2	1.1	ND	11
	Cyclone	1.1	0.26	ND	10
- Wood-fired (SCC 3-02-001-XX)	Cyclone	3.8	2.5	ND	12
Meal collector (SCC 3-02-001-03)	Bag filter	ND	ND	NA	
Pellet collector (SCC 3-02-001-XX)	Cyclone	ND	ND	ND	
Pellet cooler (SCC 3-02-001-04)	Cyclone	ND	ND	NA	
Storage bin (SCC 3-02-001-XX)	Cyclone	ND	ND	NA	

[a]Emission factor units are lb/ton of finished pellet produced, unless noted. To convert from lb/ton to kg/Mg, multiply by 0.5. SCC = Source Classification Code. ND = No data. NA = Not applicable.
[b]Emission factor based on quantity of dried alfalfa to hammermill.

American Alfalfa Processors Association
9948 West 87th Street, Suite E
Overland Park, Kansas 66212
Telephone 913-648-6800

March 27, 1995

Mr. Tom Campbell
Midwest Research Institute
401 Harrison Oaks Boulevard
Cary, NC 27513

Dear Tom:

Please excuse the delay in getting the enclosed information for Section 6.1 Alfalfa Dehydrating AP-42 emission factors to you. Our Executive Committee reviewed the current information at our recent annual convention, and made the recommended changes.

A schematic drawing will be forwarded to you at a later date.

We look forward to working with you on this project. If you have any questions, or need additional information, please let us know.

Sincerely,

Wanda L. Cobb
Executive Vice President

ecn

6. FOOD AND AGRICULTURAL INDUSTRY

6.1 ALFALFA DEHYDRATING

6.1.1 General

Dehydrated alfalfa is a meal product resulting from the rapid drying of alfalfa by artificial means.~~at temperatures above 212°F (100°C).~~ Alfalfa meal is used in chicken rations, cattle feed, hog rations, sheep feed, turkey mash and other formula feeds. It is important for its protein content, growth and reproductive factors, pigmenting xanthophylls, and vitamin contributions.

A schematic of a generalized alfalfa dehydrator plant is given in Figure 6.1-1. Standing alfalfa is mowed and chopped in the field and transported by truck to a dehydrating plant, which is usually located within ~~10~~ 20 miles of the field. The truck dumps the chopped alfalfa (wet chops) onto a self-feeder, which carries it into a direct-fired rotary drum. Within the drum, the wet chops are dried from an initial moisture content of about ~~60 to 80~~ 30 to 40 percent (by weight) to about ~~8 to 16~~ 6 to 12 percent. Typical combustion gas temperatures within the ~~oil or~~ gas fired drum range from ~~1800 to 2000°F (980 to 1092°C)~~ 300 to 1000°F (154 to 538°C) at the inlet to ~~250 to 300°F (120 to 150°C)~~ 140 to 210°F (60 to 95°C) at the outlet.

From the drying drum, the dry chops are pneumatically conveyed into a primary cyclone that separates them from the high-moisture, high-temperature exhaust stream. From the primary cyclone, the chops are fed into a hammermill, which grinds the dry chops into a meal. The meal is pneumatically conveyed from the hammermill into a meal collector cyclone in which the meal is separated from the airstream and discharged into a holding bin. The exhaust is recycled to a bag filter or into the primary cyclone. Meal is then fed into a pellet mill where it is steam conditioned and extruded into pellets.

From the pellet mill, the pellets are either pneumatically or mechanically conveyed to a cooler, through which air is drawn to cool the pellets and, in some cases, remove fines. Fines removal is more commonly effected in shaker screens following or ahead of the cooler, with the fines being conveyed back into the meal collector cyclone, meal bin, or pellet mill. Cyclone separators may be employed to separate entrained fines in the cooler exhaust and to collect pellets when the pellets are pneumatically conveyed from the pellet mill to the cooler.

Following cooling and screening, the pellets are transferred to bulk storage. Dehydrated alfalfa is most often stored and shipped in pellet form; however, in some instances, the pellets may be ground in a hammermill and shipped in meal form. When the finished pellets or ground pellets are pneumatically or mechanically transferred to storage or loadout, additional cyclones may be employed for product airstream separation at these locations.

6.1.2 *Emissions and Controls*

Particulate matter is the primary pollutant of concern from alfalfa dehydrating plants although some odors arise from the organic volatiles driven off during drying. Although the major source is the primary cooling cyclone, lesser sources include the downstream cyclone separators and the bagging and loading operations.

Emission factors for the various cyclone separators utilized in alfalfa dehydrating plants are given in table 6.1.1. Note that, although these sources are common to many plants, there will be considerable variation from the generalized flow diagram in figure 6.1-1 depending on the desired nature of the product, the physical layout of the plant, and the modifications made for air pollution control. Common variations include ducting the exhaust gas stream from one or more of the downstream cyclones back through the primary cyclone and ducting a portion of the primary cyclone exhaust back into the furnace. Another modification involves ducting a part of the meal collector cyclone exhaust back into the hammermill, with the remainder ducted to the primary cyclone or discharged directly to ~~the atmosphere~~ a bag filter. Also, additional cyclones may be employed if the pellets are pneumatically rather than mechanically conveyed from the pellet mill to the cooler or if the finished pellets or ground pellets are pneumatically conveyed to storage or loadout.

Table 6.1-1. PARTICULATE EMISSION FACTORS FOR ALFALFA DEHYDRATING PLANTS
EMISSION FACTOR RATING: PRIMARY CYCLONES: A
ALL OTHER SOURCES: C

Sources[a]	Emissions	
	lb/ton of product[b]	kg/MT of product[b]
Primary cyclone	~~10~~[c]	~~5~~[c]
Meal collector cyclone[d]	~~2.6~~	~~1.3~~
Pellet collector cyclone[e]	Not Available	Not Available
Pellet cooler cyclone[f]	~~3~~	~~1.5~~
~~Pellet regrind cyclone[g]~~	~~8~~	~~4~~
Storage bin cyclone[h]	Neg.	Neg.

[a] The cyclones used for product/air stream separation are the air pollution sources in alfalfa dehydrating plants.

[b] Product consists of meal or pellets. These factors can be applied to the quantity of incoming wet chops by dividing by a factor of four.

[c] This average factor may be used even when other cyclone exhaust streams are ducted back into the primary cyclone. Emissions from primary cyclones may range from 3 to ~~35~~ 15 lb/ton (1.5 to ~~17.5~~ 7.5 kg/MT) of product and are more a function of the operating procedures and process modifications made for air pollution control than whether other cyclone exhausts are ducted back through the primary cyclone. Use 3 to 15 lb/ton (1.5 to 7.5 kg/MT) for plants employing good operating procedures and process modifications for air pollution control. Use higher values for older, unmodified, or less well run plants.

[d] This cyclone is also called the air meal separator or hammermill cyclone. When the meal collector exhaust is ducted back to the primary cyclone and/or the hammermill, this cyclone is no longer a source.

[e] This cyclone will only be present if the pellets are pneumatically transferred from the pellet mill to the pellet cooler.

[f] This cyclone is also called the pellet meal air separator or pellet mill cyclone. When the pellet cooler cyclone exhaust is ducted back into the primary cyclone, it is no longer a source.

[g] ~~This cyclone is also called the pellet regrind air separator. Regrind operations are more commonly found at terminal storage facilities than at dehydrating plants.~~

[h] Small cyclone collectors may be used to collect the finished pellets when they are pneumatically transferred to storage.

Equipment modification provides another means of particulate control. Existing cyclones can be replaced with more efficient cyclones and concomitant air flow systems. In addition, the furnace and burners can be modified or replaced to minimize flame impingement on the incoming green chops. In plants where the hammermill is a production bottleneck, a tendency exists to overdry the chops to increase throughput, which results in increased emissions. Adequate hammermill capacity can reduce this practice.

Secondary control devices can be employed on the cyclone collector exhaust streams. Generally, this practice has been limited to the installation of secondary cyclones or fabric filters on the meal collector, pellet collector, or pellet cooler cyclones. Some measure of secondary control can also be effected on these cyclones by ducting their exhaust streams back into the primary cyclone. Primary cyclones are not controlled by fabric filters because of the high moisture content in the resulting exhaust stream. Medium energy wet scrubbers are effective in reducing particulate emissions from the primary cyclones, but have only been installed at a few plants.

Some plants employ cyclone effluent recycle systems for particulate control. One system skims off the particulate-laden portion of the primary cyclone exhaust and returns it to the furnace for incineration. Another system recycles a large portion of the meal collector cyclone exhaust back to the hammermill. Both systems can be effective in controlling particulates but may result in operating problems, such as condensation in the recycle lines and plugging or overheating of the hammermill.

survey.tlc

CONTACT REPORT--MRI Project No. 4604-04

From: Janet J. Marron, Environmental Engineering Department

Date of Contact: February 4, 5, and 6, 1997

Contacted by: Telephone

Company/Agency: Listed below

Telephone Number: Listed below

Person(s) Contacted/Title(s)

Listed below

CONTACT SUMMARY:

Information was requested from the following agency/industry representatives on the number of alfalfa dryers in their respective states or at their facility, the type of fuel used, and whether the dryer is a single or triple pass dryer.

Contact	Date	Information
Chief Alfalfa Grinnell, Iowa 515-236-4634	2/5/97	1 single pass gas fired; 1 triple pass gas fired
State of Iowa Clark Ott 515-281-4899	1/21/97	1 gas fired dryer
State of South Dakota Michelle Ferris 605-773-3351	1/30/97	4 single pass gas fired
Ohio facility...	1/__/97	5 wood fired dryers
Ohio EPA Toledo District Adam Zolcheck 419-697-5134	2/6/97	Toledo District: 1 single pass coal fired (Note: probably mistaken, he didn't seem sure and USDA doesn't list any single coal fired dryers)

Contact	Date	Information
Ohio EPA Columbus District Mike Ahern 614-644-2270 mahern@central.epa.ohio.gov	2/6/97 2/10/97	Mr. Ahern can search a database by SIC and provide a list of alfalfa dryers in the state; waiting for response, sent a reminder email - no response as of 2/28/97
Minnesota Pollution Control Agency Don Smith 612-296-7331	2/5/97	alfalfa dryers are not tracked in their inventory system
New York Department of Environmental Conservation Stationary Sources Compliance and Permitting Gordon Howe 518-457-7230	2/4/97	left message - no response as of 2/28/97.
Colorado Air Pollution Control Division Hans Buenning 303-692-3100	2/5/97	no alfalfa dryers currently operating in Colorado
Oklahoma Air Quality Services Inventory Group Morris Moffet 405-290-8247	2/4/97	No alfalfa dryers listed in OK inventory. Suggested checking with Dept. of Ag. 405-521-3864
Oklahoma Department of Agriculture Gary Bledsoe 405-521-3864	2/7/97	left message. no response as of 2.28/97.
Texas Natural Resources Conservation Commission Kay Galluzzo T-512-239-1000 F-512-239-0888	2/4/97	see Jerry Blizzard
Texas Natural Resources Conservation Commission Jerry Blizzard 512-239-0991	2/6/97	Can do a search of permitting database by SCC for $80 to $120; search by SIC would cost $50 to $80. Did not pursue search.
New Mexico Air Quality Bureau Jim Shively 505-827-1494 x1468	2/4/97 2/6/97	None permitted in state

Contact	Date	Information
Missouri DNR APCP Enforcement Group Mr. Refaat 573-751-417	2/5/97	He is checking with permitting and inventory groups. Uncertain of presence of any dryers within state.
Arkansas Department of Pollution Control and Ecology Air Division Ruby-Department Secretary 501-682-0739	2/5/97	checked permits, no alfalfa dryers permitted, not very much alfalfa is grown in AR.
Alabama Department of Environmental Management Al Stewart 334-271-7700	2/6/97	they have peanut cleaners and cotton gins but no alfalfa dryers.

Source: USDA

brain market news office St. Joseph MO 1-816-238-0678 missouri office-USDA Phil McFall called 1/17/97 data not confidential

PRODUCTION

Dehydrated & Suncured Alfalfa - 1000 Tons

August 2, 1996

	EAST OF ROCKIES							WEST OF ROCKIES	
	1	2	4	5	6	7	TOTAL	3	TOTAL
April, 96	7.7	5.3	3.3	3.7	0.1	1.9	22.0	0.2	22.2
April, 95	0.8	3.7	2.8	1.4	0.2	-	8.9	0.5	9.4
April, 94	4.2	3.6	3.3	1.2	0.3	-	12.6	0.5	13.1
May, 95	2.9	5.2	2.6	1.9	0.9	2.4	15.9	0.2	16.1
May, 94	16.4	10.0	2.2	1.0	0.7	3.0	33.3	0.2	33.5
June, 95	36.6	11.0	4.5	2.8	0.8	14.0	69.7	-	69.7
June, 94	31.2	11.7	8.9	1.6	0.8	6.7	60.9	1.0	61.9
July, 95	40.1	10.2	6.9	3.1	0.7	16.3	77.3	-	77.3
July, 94	29.5	5.3	7.3	2.4	0.5	7.1	52.1	0.2	52.3
August, 95	36.5	11.6	6.7	2.4	0.9	12.0	70.1	0.8	70.9
August, 94	35.3	8.2	7.1	1.7	0.4	4.8	57.5	0.5	58.0
September, 95	26.8	8.6	6.3	2.2	0.1	8.0	52.0	1.2	53.2
September, 94	23.7	5.7	6.5	2.9	-	3.2	42.0	0.2	42.2
October, 95	21.2	6.9	5.0	2.8	-	3.4	39.3	1.0	40.3
October, 94	20.8	5.2	4.4	3.2	-	1.6	35.2	1.0	36.2
November, 95	11.3	7.4	4.0	2.8	-	1.9	27.4	0.7	28.1
November, 94	15.7	4.6	4.2	3.0	-	-	27.5	0.5	28.0
December, 95	8.3	5.9	3.7	3.1	-	2.0	23.0	0.2	23.2
December, 94	8.9	3.5	3.3	2.6	-	-	18.3	1.1	19.4
January, 96	8.8	6.6	3.4	2.6	-	0.3	21.7	-	21.7
January, 95	8.8	3.5	2.7	1.7	-	-	16.7	0.1	16.8
February, 96	9.9	6.9	4.4	2.4	-	0.3	23.9	0.3	24.2
February, 95	6.7	2.7	3.1	1.8	-	-	14.3	-	14.3
March, 96	11.5	5.2	3.0	2.4	-	1.4	23.5	0.2	23.7
March, 95	4.3	3.0	3.2	2.3	-	-	12.8	0.1	12.9
→ May-April, 95-96	221.6	90.8	53.8	32.2	3.5	63.9	465.8	4.8	470.6
May-April, 94-95	202.1	67.1	55.7	25.6	2.6	26.2	379.3	5.4	384.7

FAX TRANSMITTAL # of Pages
AMERICAN ALFALFA PROCESSORS ASSOC.
TO: Tom Lacy FROM
CO. MCT PHONE: (913) 648-6800
FAX # FAX # (913) 842-2205
COMMENTS

P.1

DEC 04 '96 09:11AM

Source: USDA

DEHYDRATED & SUNCURED ALFALFA MEAL & PELLET PRODUCTION MAY 1 - APRIL 30

	EAST OF ROCKIES			WEST OF ROCKIES			TOTAL		TOTAL
	DEHY	SUNCURED	TOTAL	DEHY	SUNCURED	TOTAL	DEHY	SUNCURED	DEHY & SUNCURED
'69-'70	1,457,300	86,100	1,543,400	279,700	252,900	532,600	1,737,000	339,000	2,076,000
'70-'71	1,396,700	86,700	1,483,400	301,400	284,400	585,800	1,698,100	371,100	2,069,200
'71-'72	1,397,400	93,900	1,491,300	236,600	264,700	501,300	1,634,000	358,600	1,992,600
'72-'73	1,305,900	115,200	1,421,100	232,500	284,000	516,500	1,538,400	399,200	1,937,600
'73-'74	1,293,300	181,300	1,464,600	257,200	391,900	649,100	1,550,500	563,200	2,113,700
'74-'75	1,238,500	132,100	1,370,600	186,900	226,200	413,100	1,425,400	358,300	1,783,700
'75-'76	1,236,600	171,100	1,407,700	116,800	181,600	298,400	1,353,400	352,700	1,706,100
'76-'77	1,282,500	171,800	1,454,300	82,400	217,100	299,500	1,364,900	388,900	1,753,800
'77-'78	1,418,700	258,000	1,676,700	47,800	123,600	171,400	1,466,500	381,600	1,848,100
'78-'79	1,168,700	263,400	1,431,100	39,200	135,100	174,300	1,207,900	398,500	1,605,400
'79-'80	1,149,600	323,900	1,473,500	33,200	126,700	159,900	1,182,800	450,600	1,633,400
'80-'81	1,069,800	309,500	1,379,300	25,700	128,500	154,200	1,095,500	438,000	1,533,500
'81-'82	926,300	213,400	1,139,700	28,100	124,900	153,000	954,400	338,300	1,292,700
'82-'83	784,600	308,900	1,093,500	15,500	104,100	119,600	800,100	413,000	1,213,100
*'83-'84			1,047,900			146,500			1,194,400
*'84-'85			1,006,200			115,400			1,121,600
*'85-'86			822,100			33,400			855,500
*'86-'87			770,200			48,000			818,200
*'87-'88			621,600			48,700			670,300
'88-'89			556,100			28,800			584,900
'89-'90			512,600			28,900			541,500
'90-'91			522,600			24,300			546,900
'91-'92			461,800			18,700			480,500
'92-'93			516,500			18,700			535,200
'93-'94			434,000			10,800			444,800
*'94-'95			379,300			5,400			384,700
*'95-'96			465,800			4,800			470,600

*Dehy & Suncured Combined

American Alfalfa Processors Association

17.5% since 92.5% Triple

Source: USDA

PRODUCTION

Dehydrated & Suncured Alfalfa - 1000 Tons

September 6, 1996

	EAST OF ROCKIES							WEST OF ROCKIES	
	1	2	4	5	6	7	TOTAL	3	TOTAL
June, 96	30.3	13.6	4.6	2.7	0.6	9.0	60.8	0.2	61.0
June, 95	36.6	11.0	4.5	2.8	0.8	14.0	69.7	-	69.7
June, 94	31.2	11.7	8.9	1.6	0.8	6.7	60.9	1.0	61.9
July, 95	40.1	10.2	6.9	3.1	0.7	16.3	77.3	-	77.3
July, 94	29.5	5.3	7.3	2.4	0.5	7.1	52.1	0.2	52.3
August, 95	36.5	11.6	6.7	2.4	0.9	12.0	70.1	0.8	70.9
August, 94	35.3	8.2	7.1	1.7	0.4	4.8	57.5	0.5	58.0
September, 95	26.8	8.6	6.3	2.2	0.1	8.0	52.0	1.2	53.2
September, 94	23.7	5.7	6.5	2.9	-	3.2	42.0	0.2	42.2
October, 95	21.2	6.9	5.0	2.8	-	3.4	39.3	1.0	40.3
October, 94	20.8	5.2	4.4	3.2	-	1.6	35.2	1.0	36.2
November, 95	11.3	7.4	4.0	2.8	-	1.9	27.4	0.7	28.1
November, 94	15.7	4.6	4.2	3.0	-	-	27.5	0.5	28.0
December, 95	8.3	5.9	3.7	3.1	-	2.0	23.0	0.2	23.2
December, 94	8.9	3.5	3.3	2.6	-	-	18.3	1.1	19.4
January, 96	8.8	6.6	3.4	2.6	-	0.3	21.7	-	21.7
January, 95	8.8	3.5	2.7	1.7	-	-	16.7	0.1	16.8
February, 96	9.9	6.9	4.4	2.4	-	0.3	23.9	0.3	24.2
February, 95	6.7	2.7	3.1	1.8	-	-	14.3	-	14.3
March, 96	11.5	5.2	3.0	2.4	-	1.4	23.5	0.2	23.7
March, 95	4.3	3.0	3.2	2.3	-	-	12.8	0.1	12.9
April, 96	7.7	5.3	3.3	3.7	0.1	1.9	22.0	0.2	22.2
April, 95	0.8	3.7	2.8	1.4	0.2	-	8.9	0.5	9.4
May, 96	7.2	8.9	3.8	3.8	0.8	11.4	35.9	0.2	36.1
May, 95	2.9	5.2	2.6	1.9	0.9	2.4	15.9	0.2	16.1
May-June, 96-97	37.5	22.5	8.4	6.5	1.4	20.4	96.7	0.4	97.1
May-June, 95-96	39.5	16.2	7.1	4.7	1.7	16.4	85.6	0.2	85.8

may, 95 + June, 95

may, 96 + June, 96

Source: USDA

DISAPPEARANCE

Dehydrated & Suncured Alfalfa - 1000 Tons

September 6, 1996

	EAST OF ROCKIES							WEST OF ROCKIES	
	1	2	4	5	6	7	TOTAL	3	TOTAL
June, 96	15.3	7.4	4.3	2.5	1.7	8.9	40.1	0.2	40.3
June, 95	14.9	5.5	2.7	1.6	(2.3)	(10.6)	11.8	(0.5)	11.3
June, 94	12.8	7.9	6.3	2.3	(9.3)	1.7	21.5	(0.1)	21.4
July, 95	19.7	5.8	2.1	2.2	(6.9)	8.6	31.5	0.4	31.9
July, 94	17.3	4.7	5.1	2.2	(1.4)	1.6	29.5	0.6	30.1
August, 95	17.6	5.8	5.3	2.1	(2.1)	4.2	32.9	0.3	33.2
August, 94	20.4	6.9	4.0	1.8	(5.6)	3.1	30.6	0.5	31.1
September, 95	19.3	8.0	5.6	2.1	(1.4)	9.4	43.0	0.7	43.7
September, 94	18.6	6.0	4.8	1.7	(2.9)	1.8	30.0	0.5	30.5
October, 95	24.6	5.7	6.3	3.1	(2.2)	4.4	41.9	0.9	42.8
October, 94	21.2	11.7	3.8	4.5	0.2	1.6	43.0	0.9	43.9
November, 95	21.0	12.7	3.5	3.5	0.5	6.6	47.8	0.8	48.6
November, 94	22.6	4.7	5.4	3.1	0.6	2.1	38.5	0.5	39.0
December, 95	19.4	10.0	5.2	2.8	3.9	6.6	47.9	0.3	48.2
December, 94	18.4	4.6	4.7	2.3	3.4	1.1	34.5	0.3	34.8
January, 96	21.2	8.1	3.4	2.4	4.4	7.7	47.2	0.1	47.3
January, 95	16.6	1.5	5.7	1.6	3.4	2.2	31.0	0.6	31.6
February, 96	18.0	8.0	6.5	3.2	3.3	7.1	46.1	0.7	46.8
February, 95	13.5	4.3	3.2	2.1	4.3	2.1	29.4	(0.6)	28.8
March, 96	23.5	11.1	5.4	3.6	3.8	6.7	54.1	0.2	54.3
March, 95	16.8	5.5	6.6	2.4	2.6	2.0	35.9	0.1	36.0
April, 96	19.7	5.8	3.9	4.2	2.5	7.2	43.3	0.3	43.6
April, 95	16.0	4.1	3.2	1.3	1.6	3.2	29.4	1.1	30.5
May, 96	7.2	6.2	3.0	4.3	2.1	1.8	24.6	0.4	25.0
May, 95	8.1	5.7	3.0	4.3	2.1	1.8	24.6	0.3	23.7
May-June, 96-97	22.5	13.6	7.3	6.8	3.8	10.7	64.7	0.6	65.3
May-June, 95-96	23.0	11.2	5.7	1.4	1.1	(7.2)	35.2	0.6	35.8

Areas	State(s)	Number of Plants Reporting June 1996	Number of Plants Reporting June 1995
EAST OF ROCKIES			
1	Nebraska	16	19
2	Kansas	9	9
4	Iowa, Minnesota, South Dakota	5	5
5	Colorado, Oklahoma, New Mexico, Texas	4	4
6	Missouri, Arkansas, Alabama	2	2
7	Ohio, New York	8	8
	Sub-Total	44	47
WEST OF ROCKIES			
3	Utah, Idaho, Oregon	3	3
	Total	47	50

Rec'd 9/24/96 YC

AIRSOURCE TECHNOLOGIES

September 16, 1996

Ms. Wanda Cobb
America Alfalfa Processors Assoc.
9948 W. 87th Street
Overland Park, KS 66212

Subject: Clarification of Sampling Locations for Project 411922

Dear Wanda:

There appears to be some confusion about the sampling locations at the following facilities:

- Lexington Alfalfa Dehydrators, Inc.
- Shofstall Alfalfa
- Gothenburg Feed Products Co.

The Shofstall sample location was in the outlet from the ID fan which is located immediately after the cyclone. The baghouse described in the report controlled emissions from another part of the process.

The Gothenburg facility also utilizes a cyclone. The testing was performed on the outlet duct of the cyclone. The baghouse referred to in the report controlled emissions from the hammermill.

The Lexington facility also utilized a cyclone to control emissions from the dryer. Once again the sample was collected from the outlet of this cyclone.

Once again, I apologize for the confusion between the process descriptions and the actual sample locations. If you have any further questions or need for clarification, please feel free to call me.

Sincerely,

George R. Cobb
President

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