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Dockage Treatment During the 1990 Kansas Wheat Harvest

by Harvey L. Kiser and David Frey

Research Report #14

Department of Agricultural Economics

Kansas State University

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DOCKAGE TREATMENT DURING THE 1990 KANSAS WHEAT HARVEST

by

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INTRODUCTION

This survey was an effort to establish how many companies were measuring for dockage, what method(s) were being used to measure dockage, and the percentage level of dockage being used to adjust the quantity of wheat purchased during the 1990 Kansas harvest. Additionally, this survey sought to determine if elevator operators were offering premiums for cleaner wheat, as well as assessing premiums or discounts on other factors.

Dockage in wheat is measured by the Carter-Dockage Tester under official Federal Grain Inspection Service (FGIS) grading procedures. Dockage ^{1/} is any material much smaller, larger, or lighter than wheat that is removed by the Carter-Dockage Tester. Any non-wheat material remaining in a sample after passing through the tester is then hand picked by inspectors and counted as "foreign material."

On May 1, 1987, FGIS promulgated a change in the method of reporting dockage from rounding down to the nearest 0.5% to rounding to the nearest 0.1%. The grain industry is still in the process of adjusting to that change.

As this survey indicates, most Kansas elevators measure for dockage. The survey also indicates that few grain companies use the Carter-Dockage Tester but instead generally employ simple devices to simulate official measurement of dockage. The diverse regions of the state have somewhat different climatic conditions, weed seeds, and other dockage-related issues and traditions in measuring dockage. Some of this diversity within the state shows up in this survey.

PROCEDURE

This survey was a cooperative effort by the Kansas Wheat Commission, Manhattan, Kansas; the Kansas Grain and Feed Association, Topeka; Kansas and Kansas State University's International Grains Program, Manhattan, Kansas. This informational survey (Appendix A) was sent by the Kansas Grain and Feed Association to its member grain elevators. The completed surveys were sent to the Kansas Wheat Commission and were summarized by the authors of this report. Surveys were returned by 186 elevator operators. The storage capacity reported by the responding companies represented 36 percent of state's commercial grain storage capacity. Ten grain elevator operators indicated that they had facilities in two crop reporting districts (See Appendix B for crop reporting districts). If an elevator operation had facilities in more than one crop reporting district, the district totals will reflect the company in each district. However, the total storage capacity of the elevator operations for the state was included only once.

^{1/} The official definition is: "All matter other than wheat that can be removed from the original sample by use of an approved device according to procedures prescribed in FGIS instructions. Also, underdeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the material other than wheat and that cannot be recovered by properly rescreening or recleaning."

The amount of storage reported by the respondents is shown in Table 1. The summation of storage by districts will not equal the state total because 10 respondents were in two districts. The share of the reported storage capacity as a percentage of the commercial grain storage capacity by crop reporting districts is shown in Table 2. The percentage of the total commercial storage capacity reported by the survey respondents ranged from a low of 20 percent in the northeast district to a high of 63.3 percent in the west central district. Based upon the number of responses and the commercial storage capacity represented in the survey, the results provide a statistically sound review of how dockage was measured statewide.

TABLE 1

**Grain Storage Capacity Reported by Respondents and
the Reported Capacity as a Percentage of Total
Commercial Grain Storage Capacity
by Crop Reporting District**

District	(m.b.) ¹	%	District	(m.b.)	%	District	(m.b.)	%
Northwest	24.8	45.9	North Central	33.3	46.4	Northeast	23.5	20.0
West Central	39.8	63.3	Central	67.6	49.3	East Central	40.6	48.9
Southwest	63.5	48.9	South Central	56.3	24.3	Southeast	7.3	20.3
Kansas	333.2 ²	36.0						

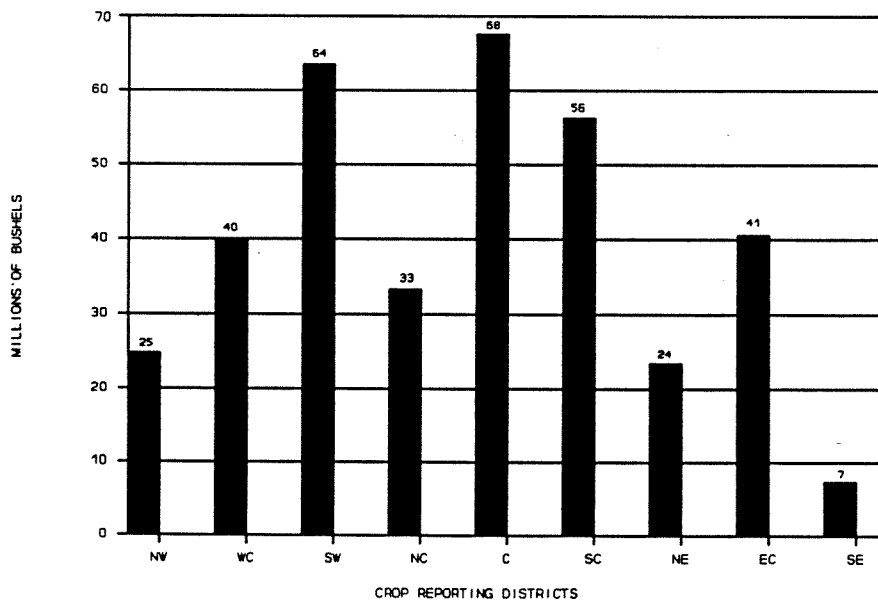
¹ m.b. = million bushels.

² State total does not include ten respondents located in two districts.

Source: Appendix Table 3

FIGURE 1

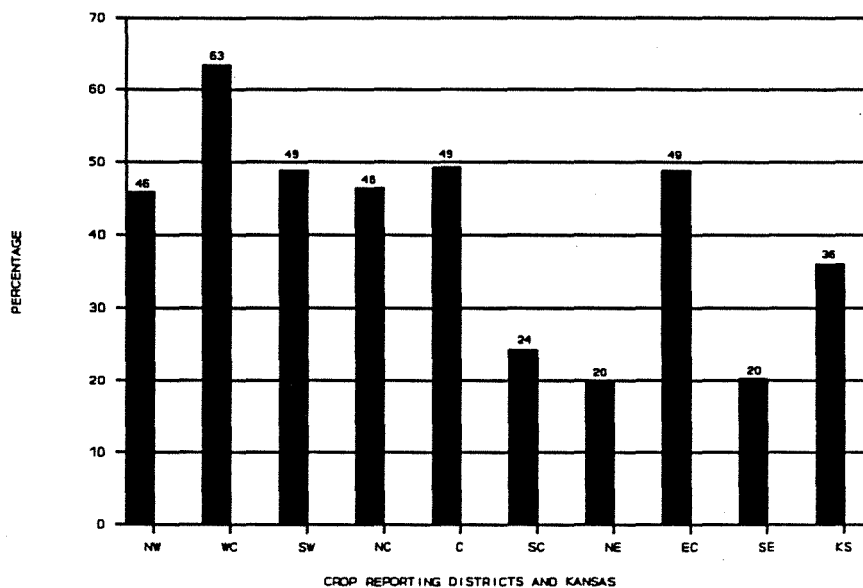
GRAIN STORAGE CAPACITY REPORTED BY RESPONDENTS



Source: Table 1

FIGURE 2

RESPONDENT'S GRAIN STORAGE CAPACITY AS A PERCENT OF
TOTAL COMMERCIAL STORAGE CAPACITY



Source: Table 1

The number of respondents from each crop reporting district ranged from 10 in the East Central District to 39 in the South Central District (Table 3). This is to be expected, because the East Central District has had the lowest share of the wheat crop (2.7 percent) and the South Central District has had the greatest share of the wheat crop (20.8 percent) in the last 5 years (Appendix Table 4).

TABLE 2

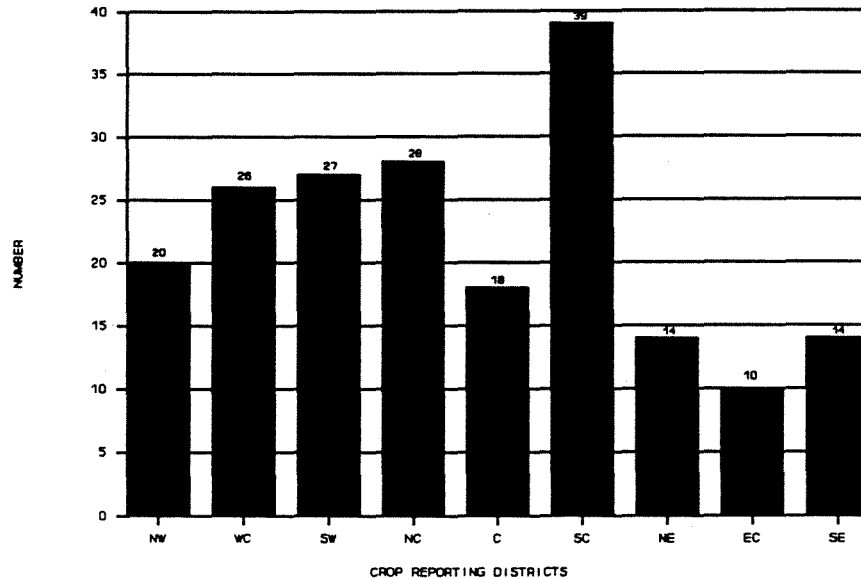
Number of Grain Elevator Respondents

District	No.	District	No.	District	No.
Northwest	20	North Central	28	Northeast	14
West Central	26	Central	18	East Central	10
Southwest	27	South Central	39	Southeast	14
Kansas	186 ¹				

¹ The total would be 196 including the double counting for 10 respondents in two districts.

FIGURE 3

NUMBER OF ELEVATORS RESPONDING TO 1990 WHEAT
DOCKAGE SURVEY BY CROP REPORTING DISTRICT



Source: Table 2

Measure and Deduct for Dockage in Wheat?

Sixty-eight percent indicated that they measured for dockage. However, only 54 percent of the respondents reported on the dockage percentage used for adjusting the gross weight of purchased wheat.

The responses by crop reporting district is listed in Appendix Tables 1 and 2. Because the sample number per crop reporting district is small, the differences in percentage of respondents measuring and deducting for dockage in each district were not statistically significant. However, the number of respondents is sufficiently large for the state to say that there is about 1 in 20 chances that the population (elevators) percent is more than 8 to 10 percent away from the sample percentages (68 percent for measuring dockage; 54 percent for those deducting for dockage).

Dockage Deduction Percentage

Of the 100 respondents who reported the level of dockage at which they began to deduct weight from the wheat receipts, approximately one-third deducted at 0 or 0.1 percent, and about one-third used 0.5 percent and one-third used 1.0 percent.

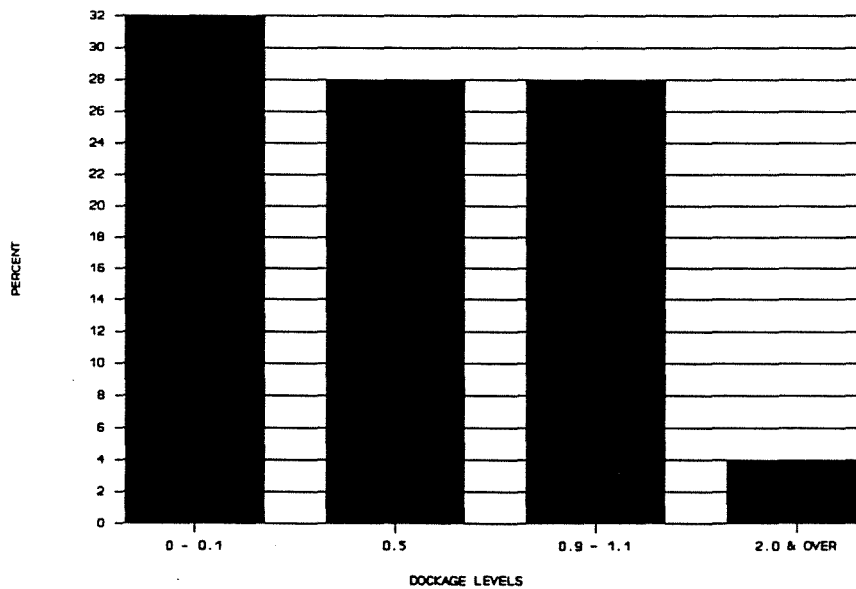
TABLE 3

Percentage of 100 Respondents Using Dockage Levels

Dockage Percentage Level	Percentage of Respondents
0.0	17
0.1	15
0.2 - 0.4	7
0.5	28
0.6	1
0.9 - 1.1	28
2.0 & over	4

FIGURE 4

PERCENTAGE OF ELEVATORS USING DIFFERENT PERCENTAGE LEVELS TO ADJUST FOR DOCKAGE



Source: Table 3

Relationship between Storage and Receiving Capacities & Dockage % Level

Using the results of the survey, an attempt was made to see if there was a connection between the dockage level used for deduction and the storage capacity or the receiving capacity. It is impossible to conclude that there is

any relationship between the storage capacity or receiving capacity and the level at which elevator operators deducted dockage from the wheat receipts. Table 5 shows that for the state, the average storage capacity was largest for those who used 0.0 - 0.1% dockage, whereas the average receiving capacity (bu./hour) was the largest for those using 0.2 - 0.5% dockage. It is clear that the means in Table 5 are not statistically different from one another, because the variance is so great.

TABLE 4

The Range of Storage and Receiving Capacity for the Various Dockage Levels Used to Adjust for Dockage

% Dockage Used to Adjust for Dockage	Range of Storage Capacity	Range of Receiving Capacity
0.0 - 0.1%	96,400 to 30,000,000 bus.	3,000 to 80,000 bushels/hour
0.2 - 0.5%	287,000 to 6,500,000 bus.	5,000 to 100,000 bushels/hour
0.6% & over	14,400 to 4,900,000 bus.	5,000 to 73,000 bushels/hour

TABLE 5

Relationship between Average Reported Storage Capacity and Average Reported Receiving Capacity and the Dockage Percentage Level Used by Respondents

Dockage Percentage	Average Storage Capacity (bushels)	Average Receiving Capacity ¹ (bushels per hour)
0.0 - 0.1	2,811,570	21,696
0.2 - 0.5	1,635,083	33,860
0.6 & over	1,739,220	27,775

¹ Some elevators indicated bushels per day, and this number was divided by 10 hours to obtain a bushel per hour.

Method of Determining Dockage

The most common method used to measure dockage was the use of "Hand Sieves." This method was checked 87 times (Table 6). A respondent could check more than one method and those that checked hand sieves also checked the visual

method 18 times, table top equipment three times, and a Carter-Dockage Tester once.

Under official grain inspection procedures, a Carter Dockage Tester is used to prepare samples for grading by removing the readily separable foreign matter. Generally, the foreign material removed consists of all matter lighter, larger, or smaller than wheat. What is removed by the Carter Dockage Tester is defined as dockage. The remaining non-wheat material in the sample is picked as foreign material.

However, the use of hand sieves to determine dockage is a commercial procedure and is not used by official grain inspectors licensed by the Federal Grain Inspection Service, because they must use the latest precision mechanical equipment that will provide the most accurate and more uniform results. The method to determine dockage in wheat using hand sieves is included in Kansas State University Extension Service Bulletin MF-436 Revised, February 1982 titled "Procedures for Hand Sieving Wheat, Corn, Sorghum and Soybeans to Determine Quality and Grade." After proper sampling procedures, the sieves can be used to determine the percentage of dockage in the sample. Following this procedure should provide data reasonably comparable to those from official methods, such as the Carter Dockage Tester.

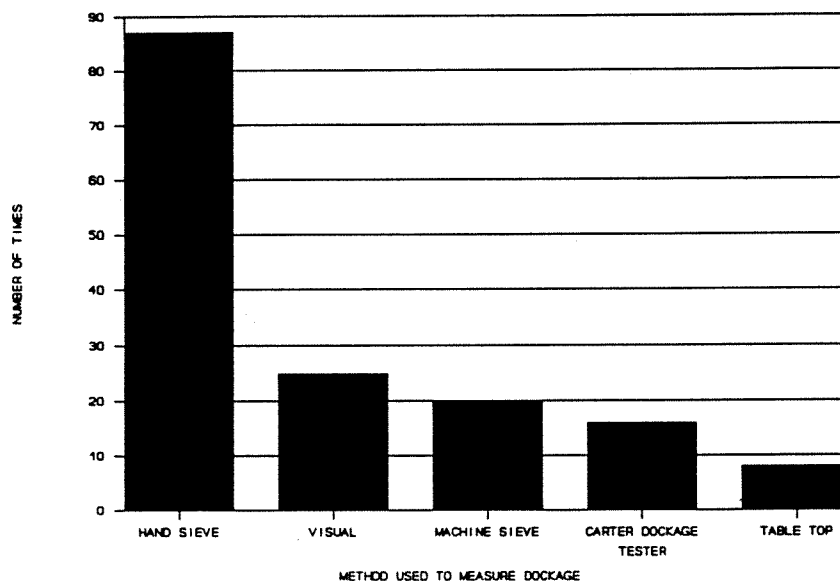
TABLE 6

Methods Used by Elevators to Measure Dockage

Method	Number of Times Method was Used
Hand Sieves	87
Visual Identification	25
Machine Shakers/Sieves	20
Official Carter Dockage Tester	16
Tabletop Aspirator	7
Tabletop Screener/Aspirator	1

FIGURE 5

NUMBER OF TIMES EACH METHOD OF MEASURING
DOCKAGE WAS USED BY RESPONDING ELEVATORS



Source: Table 6

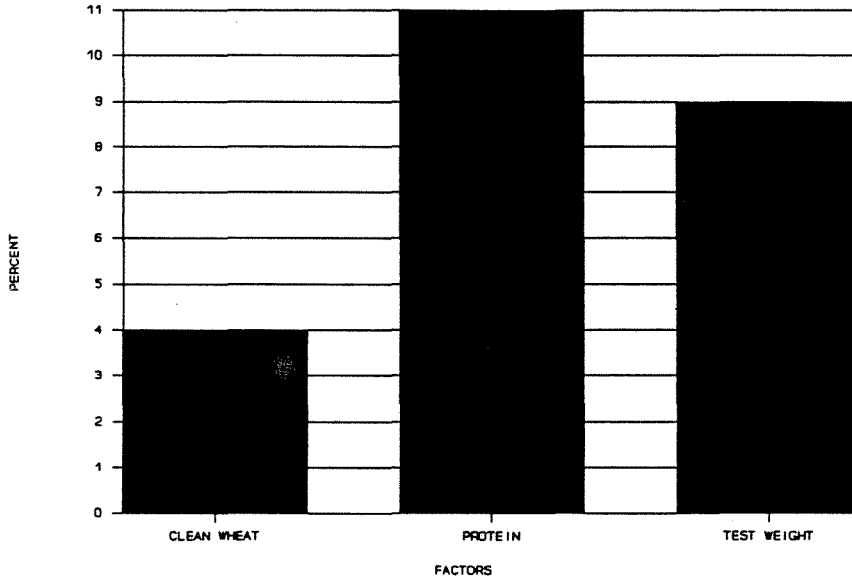
Application of Premiums and Discounts

Some elevator operators are paying premiums for wheat that is "cleaner" or has less dockage. In this survey, seven respondents or four percent of 186 indicated that they paid a premium for wheat with less dockage. Of these seven, four also paid a premium for test weight. A total of 16 respondents or nine percent indicated that a premium was paid for test weight. (Figure 6)

Twenty respondents or 11 percent of 186 indicated that they paid a premium for protein. This is an indication that some elevator operators in the state have changed their method from purchasing wheat on a station average for protein to paying a premium for specific loads.

FIGURE 6

PERCENTAGE OF ELEVATORS PAYING PREMIUMS FOR
CLEAN WHEAT, PROTEIN, TEST WEIGHT



Source: Appendix Table 5

The amount of premium paid at any one time by the market for higher levels of protein will vary, depending upon the protein supply/demand relationship of the average protein in the Kansas crop and of the average protein of the hard red spring wheat crop and the time of the marketing season, i.e., the protein level tends to be higher at harvest or shortly thereafter. Thus, the average protein will vary each year. The payment of a premium for protein probably is an area that could be studied further. The table below, shows how the average protein has varied over the last 5 years at Kansas City in mid-July and mid-August.

TABLE 7

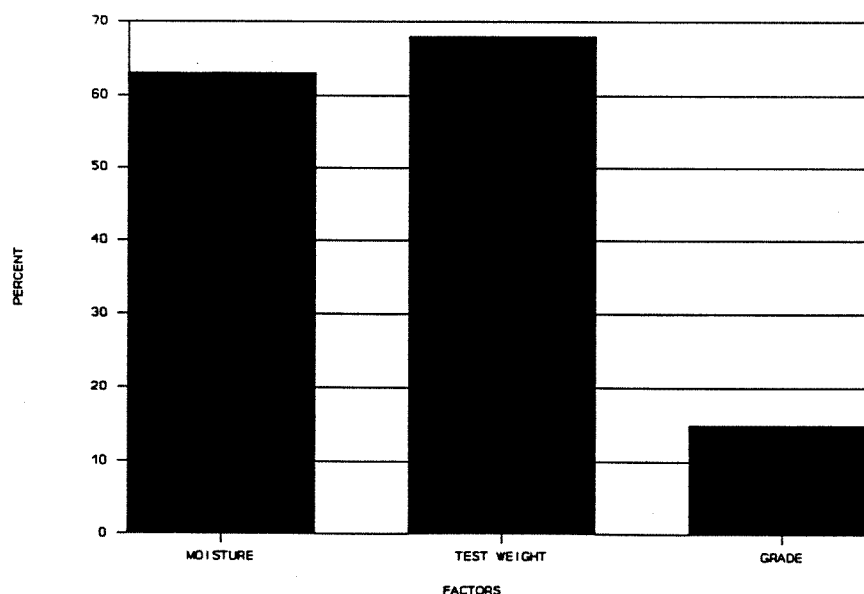
Average Protein in Kansas Wheat Crops and Premium for 13 Percent over Ordinary Protein in Kansas City for Mid-July and Mid-August 1986-1990

Year	Average Protein	Premium Protein for 13% Protein over Ordinary Protein	
		Mid-July	Mid-August
1990	12.2	2.0	3.5
1989	13.4	3.0	1.5
1988	12.5	7.5	1.0
1987	11.5	22.5	24.0
1986	11.8	22.0	21.0

For the other grading factors, most of the respondents indicated that discounts were assessed. These factors were moisture (63 percent or 117 respondents of 186), test weight (68 percent or 127 respondents of 186), and grade (15 percent or 27 respondents of 186)(Figure 7).

FIGURE 7

PERCENTAGE OF ELEVATORS ASSESSING DISCOUNTS ON MOISTURE, TEST WEIGHT, AND GRADE



Source: Appendix Table 5

Individual Comments about Changes during Harvest

The operators of the elevators were asked if they changed any of these procedures of dockage determination or in applying premiums and discounts during harvest. The information gained from this open-ended question indicated the pressures of competition in the market place. Below is a summary of these comments from 26 who indicated they did make changes during the harvest period.

Measuring for dockage:

Twenty-three respondents provided comments about the practice of measuring or not measuring for dockage. Seven indicated that they took dockage this year and five indicated that it was the first time. Four of the latter were from the orth central district. Among these seven, one had taken dockage at 1/2% for 4 years, and one other said the level will be less than 1% next year. One of those that started to measure dockage this year at 1% also said the percentage was going to be less next year. Another company decreased the amount of dockage allowed from 1/2% to actual dockage during harvest. One other said that the company changed from no dockage to dockage over 1/2% and premium for over 60 pounds for 2 days and then changed back.

Six respondents indicated that they began to take dockage or had intended to, but the competition, who had indicated they would take dockage, did not and so these respondents said they decided not to take it. Four of these were in the west central and southwest districts, and two were in the south central district. Three had indicated they purchased or intended to use special equipment to measure dockage, but did not use it. Two of the respondents said that it took too much time to check for dockage (1 1/2 minutes per load) or they didn't have the time (when too many competitors didn't). Another said that the competition decided to absorb the dockage because it was running about 0.4, which is not too bad, so they did the same but it still cost them 1 cent per bushel. Another elevator operator said that the dockage was so minimal that "I stopped on most of the loads," whereas another one said that dockage was measured last year but not this year.

Consequently, even though several operators indicated that they took dockage for the first time this year, others said that they had intended to but the competition prevented them from implementing the plan or caused them to stop taking dockage.

Premiums for test weight, clean wheat, and moisture:

Three respondents indicated that they began a new procedure this year of paying premiums on high test weight or low dockage for clean grain or discounting for moisture, dockage, and test weight of clean grain. Seven other comments were made about changing procedures for other grading factors, such as moisture and test weight. The moisture level was mentioned by three -- 13.5% and then shrunk, no discount until 14.51%, and raised moisture level to 16% without discount. On test weight, one reduced the discounts, and another one dropped the discount.

Summary

Based upon the survey, most of the grain elevators in Kansas measured for dockage in wheat during the 1990 wheat harvest. However, based upon some of the comments, a few elevator operators had planned to deduct for dockage but stopped this practice when the nearby competitors did not adjust for dockage.

Four summary points can be made.

1. Sixty-eight percent of the elevator operators measured for dockage.
2. One-third assessed for dockage at 0 percent or 0.1 percent, and about one-third assessed at 0.5 percent and at 1.0 percent.
3. The use of hand sieves was the predominant method for measuring dockage.
4. Some elevator operators paid premiums for protein, test weight, and clean wheat.

APPENDIX A

INFORMATIONAL SURVEY

DOCKAGE TREATMENT AT 1990 WHEAT HARVEST

1. Did you measure for dockage this harvest? Yes _____ No _____

If yes, how did you measure dockage?
(mark as many as apply)

- Visual Identification _____
- Official Carter Dockage Tester _____
- Tabletop Aspirator _____
- Tabletop Screener/Aspirator _____
- Hand Sieves _____
- Machine Shaker/Sieves _____
- Other _____

2. Did you deduct from the gross weight the amount of dockage? Yes _____ No _____

If yes, at what percentage level of dockage was the payment or quantity adjusted? _____%

3. Did you pay premiums or assess discounts at harvest for: (mark as many as apply) Discount Premium

- Dockage _____
- Protein _____
- Moisture _____
- Test weight _____
- Grade _____

4. Did you change any of these procedures during this harvest? Yes _____ No _____

If yes, how? _____

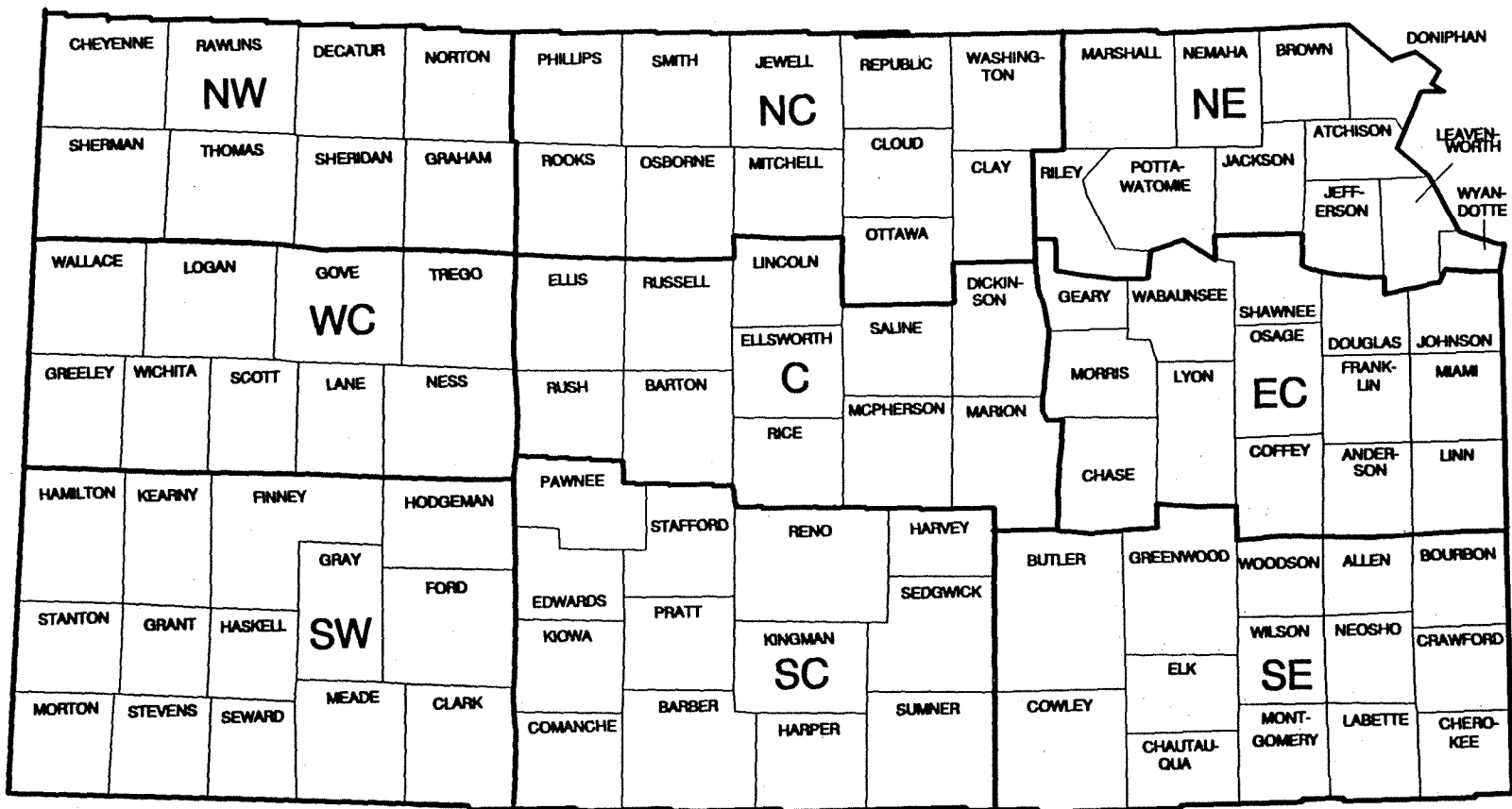
5. To help us would you please give some additional information.

- Location: County(ies) _____
- Storage capacity _____ (for all locations)
- Receiving capacity _____ (for all locations)
- Bushels Received during this harvest _____
(for all locations)

THIS SURVEY IS A JOINT PROJECT OF THE KANSAS WHEAT COMMISSION, KANSAS STATE UNIVERSITY'S INTERNATIONAL GRAINS PROGRAM, AND THE KANSAS GRAIN AND FEED ASSOCIATION. RESULTS WILL BE PUBLISHED IN THE KANSAS GRAIN AND FEED ASSOCIATION'S NEWSLETTER.

THANK YOU FOR YOUR RESPONSE. PLEASE RETURN IN THE ENCLOSED ENVELOPE.

KANSAS CROP REPORTING DISTRICTS



APPENDIX B

APPENDIX C

TABLES

APPENDIX TABLE 1

The Number and Percentage of Survey Respondents by Agricultural Statistics Districts Indicating Yes, No, or No Answer to the Question -- Did You Measure for Dockage This Harvest?

District	Yes		No		NA ¹	
	Number	Percent	Number	Percent	Number	Percent
1-NW	15	75.0	5	25.0		
2-WC	9	34.6	17	65.4		
3-SW	19	70.4	8	29.6		
4-NC	18	64.3	10	35.7		
5-C	12	66.7	6	33.3		
6-SC	32	82.1	6	15.84	1	2.6
7-NE	8	57.1	6	42.9		
8-EC	7	70.0	3	30.0		
9-SE	13	92.9	1	7.1		
Total ²	129	67.8	59	31.7	1	0.5

¹ No Answer

² The total does not include the 10 respondents who were in two districts.

APPENDIX TABLE 2

The Number and Percentage of Survey Respondents by Agricultural Statistics Districts Indicating Yes, No, or No Answer to the Question -- Did You Deduct from the Gross Weight the Amount of Dockage (in this Harvest)?

District	Yes		No/NA ¹	
	Number	Percent	Number	Percent
1-NW	14	70.0	6	30.0
2-WC	3	11.5	23	88.5
3-SW	14	51.9	13	48.1
4-NC	18	64.3	10	35.7
5-C	9	50.0	9	50.0
6-SC	26	66.7	13	33.3
7-NE	5	35.7	9	64.3
8-EC	6	60.0	4	40.0
9-SE	10	71.4	4	28.6
Total	100	53.8	86	46.2

¹ No Answer

² The total does not include the 10 respondents who were in two districts.

APPENDIX TABLE 3

Total Kansas Commercial Grain Storage Capacity, December 1, 1989 and Commercial Grain Storage Capacity Reported by the Survey Respondents by Kansas Agricultural Statistics Districts and by Regional Sections of Kansas.

Districts	Grain Storage Capacity Reported by the Survey Respondents ¹	Commercial Grain Storage in Kansas 12/1/89 ²	Storage Capacity of Survey Respondents as a Percentage of Total Commercial Storage
(1,000 bushels)			
1-NW	24,756.4	53,943	45.9
2-WC	39,760.8	62,827	63.3
3-SW	63,464.2	129,905	48.9
Western	115,981.4	246,675	51.9
4-NC	33,312.1	71,811	46.4
5-C	67,624.1	137,169	49.3
6-SC	56,319.8	231,972	24.3
Central	157,256.0	440,952	35.7
7-NE	23,540.9	117,938	20.0
8-EC	40,624.0	83,110	48.9
9-SE	7,332.9	36,065	20.3
Eastern	69,619.8	237,113	30.2
Total ³	333,203.8	924,740	36.0

¹ Four elevators did not indicate storage capacity; 1 each in Agricultural Statistics Districts 1, 3, 4, and 7.

² Kansas Agricultural Statistics, Kansas State Board of Agriculture, Topeka, KS.

³ State total does not include the duplication of 10 elevators in two districts.

APPENDIX TABLE 4

Percentage of Kansas Wheat Crop by Crop Reporting District, 1986-90

District	1986	1987	1988	1989	1990	TOTAL
	(percent)					
1-NW	12.1	12.8	10.0	12.9	12.4	12.0
2-WC	11.0	13.0	8.6	16.0	12.1	11.9
3-SW	20.6	19.6	16.8	19.0	19.0	19.0
4-NC	11.4	14.7	12.5	5.6	12.4	11.9
5-C	15.1	14.8	14.9	6.5	14.1	13.6
6-SC	23.7	18.5	23.5	18.9	19.4	20.8
7-NW	1.5	2.4	3.7	4.0	3.3	2.9
8-EC	1.4	1.6	3.4	5.2	2.7	2.7
9-SE	3.2	2.6	6.6	12.0	4.6	5.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: Kansas Agricultural Statistics, Kansas State Board of Agriculture, Topeka, Kansas

APPENDIX TABLE 5

Number of Elevator Operators Indicating that Premiums or Discounts Were Assessed on Wheat Receipts at the 1990 Harvest

Crop Reporting District	Dockage		Protein		Moisture		Test Weight		Grade	
	Discount	Premium	Discount	Premium	Discount	Premium	Discount	Premium	Discount	Premium
1-NW	9	0	0	1	12	0	15	0	4	0
2-WC	3	0	1	6	15	1	11	1	1	1
3-SW	9	2	0	2	11	0	15	0	1	0
4-NC	13	1	0	7	19	0	21	0	5	0
5-C	8	0	0	0	13	0	14	4	0	0
6-SC	17	2	0	2	20	0	25	10	8	1
7-NE	5	0	0	1	13	0	13	0	5	1
8-EC	4	0	0	1	8	0	8	0	2	0
9-SE	8	2	0	0	12	0	12	2	1	0
TOTAL ¹	72	7	1	20	117	1	127	16	27	3

¹ State total does not include duplication of ten respondents located in two districts.



Agricultural Experiment Station, Kansas State University, Manhattan 66506-4008

Department Report

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