No. 9600304

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Kansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE [illegible]GHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR [illegible]ORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE [illegible] PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT [illegible]D BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) [illegible] SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE N[illegible] GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SE[illegible]

WHEAT, COMMON

'2137'

In Testimony Thereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this fifteenth day of February, in the year of our Lord two thousand one.

Attest:

Acting Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

RODUCE LOCALLY. *Include form number and date on all reproductions.*

FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Kansas Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
KS92P0263-137
HBF0263-137

3. VARIETY NAME
2137

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Waters Hall, Kansas State University
Manhattan, KS 66506

5. TELEPHONE *(include area code)*
913-532-6147

6. FAX *(include area code)*
913-532-6563

FOR OFFICIAL USE ONLY

PVPO NUMBER
9600304

FILING DATE
JULY 8, 1996

FEES RECEIVED
FILING AND EXAMINATION FEE: $ 2450.00
DATE JULY 8, 1996
CERTIFICATION FEE: $ 320.00
DATE 11/13/00

7. GENUS AND SPECIES NAME
Triticum aestivum

8. FAMILY NAME *(Botanical)*
Gramineae

9. CROP KIND NAME *(Common name)*
Wheat

10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)* *(Common name)*
University

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Vernon A. Schaffer
Dept. of Agronomy, Throckmorton Hall
Kansas State University
Manhattan, KS 66506-5501

14. TELEPHONE *(include area code)*
913-532-6115

15. FAX *(include area code)*
913-532-6094

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow instructions on reverse)*

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of the Variety
d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Applicant's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($2,450), made payable to "Treasurer of the United States" *(Mail to PVPO)*

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*
☒ YES *(If "yes," answer items 18 and 19 below)* ☐ NO *(If "no," go to item 20)*

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☒ YES *(If "yes," give names of countries and dates)* ☐ NO
USA, Sept. 1995

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*

SIGNATURE OF APPLICANT *(Owner(s))*

NAME *(Please print or type)*
George E. Ham G. Ham

NAME *(Please print or type)*

CAPACITY OR TITLE
Associate Director of the Agricultural Experiment Station

DATE

CAPACITY OR TITLE

DATE

STD-470 (03-96) *(Previous editions are to be destroyed)*

(See reverse for instructions and information collection burden statement)

2137: Origin and Breeding History

2137 is a hard red winter wheat selected from the cross, W2440/W9488//2163. This line was selected by Pioneer winter wheat breeders, and was part of the Pioneer germplasm gift to Kansas State University when Pioneer closed their hard red winter wheat breeding efforts in 1990. Expanded completely, the pedigree is:
Sturdy/2/Coker68-15/MOW7510/3/TAM-W-101/5/IN4964A4-18-2/MOW7718/4/Sturdy/Kaw/6/2163

where W2440 = Sturdy/2/Coker 68-15/MOW7510/3/TAM W-101
W9488 = IN4946A-18-2/MOW7718/3/Sturdy/Kaw
2163 = IN4946A-18-2/MOW7470/3/NB#/SRW//SRW
(NB#) is of unknown origin but is from a CIMMYT screening nursery
SRW are unidentified soft red winter parental lines from the Pioneer Soft Wheat breeding program.

1984: The last cross was made in Hutchinson, KS

1985: F_1 individual plant was selected from a space planted nursery in Windfall, IN

1986: F_2 population was space planted at Hutchinson, KS and heads selected based upon maturity, plant height and disease resistance.

1987: F_3 head row populations planted at Hutchinson, KS and heads selected from outstanding individual head rows based upon maturity, plant height and disease resistance.

1988: F_4 head rows planted at Hutchinson, KS and a head row was selected, designated HBF0263 based upon good plant disease resistance.

1989: F_5 mini-plots were planted in observation trials; HBF0263 was selected based upon maturity, plant height and disease resistance.

1990: F_6 HBF0263 was planted in a single replication preliminary yield nursery at Hutchinson, KS. This line was selected based upon disease reaction, improved test weight patterns and yield performance. 25 heads were selected prior to combining for head row purification.

1991: F_7 bulked preliminary seed (HBF0263) was tested in an advanced yield nursery planted at 7 locations across Kansas. 8 head rowed lines were composited to form the selection 2137.

1992: F_8 2137 and its original bulk (HBF0263) was tested in elite trials planted at 16 locations across Kansas. 2137 was increased at Manhattan, KS.

1993: F_9 2137 was planted in elite trials at 18 locations across KS.

1994: F_{10} 2137 was planted in Kansas elite trials (18 locations), Kansas Variety Performance Tests (17 locations), and the Southern Regional Performance Nursery. Approximately 30 bushels of breeders seed was produced at Manhattan, KS

1995: F_{11} 2137 has been planted in elite, variety performance and Southern Regional Performance tests. Approximately 80 acres has been planted for Foundation seed production.

1996: 2137 was released and Foundation seed distributed. 2137 continues to be tested in the Kansas Variety Performance Test.

Evidence for uniformity and Stability:

2137 has been grown and evaluated in yield trials since 1990. In the 8 years it has been evaluated in has been observed to be uniform and stable. It presently is planted on 2.8 million acres in the Southern Great Plains and has always been observed to be uniform and stable.

Varients are limited to: slightly taller plants that occur at a frequency less than 1 in 100, taller plants, slightly later in maturity at a frequecny of less than 1 in 5,000 and awnless plants at a frequency of less than 1 in 10,000.

The Phenol test shows a reaction of 49% Fawn and 51% Brown-Black.

Exibit B: 2137

Novelty Statement:

2137 is a awned, white-chaffed, medium height, hard red winter wheat. The final parent utilized in its crossing pedigree was '2163' and this is the variety it most resembles. 2137 is approximately 2 inches taller, (paired ANOVA, $LSD_{(.05)}$ comparisons can be found in Tables 25-28 for 1994 tests, 11/15 tests were significantly different at the p=.05 level: 1995 comparisons can be found in Tables 25-28, 12/17 paired comparisons were signifcantly different at the p=.05 level). 2137 is 1 day later in maturity(1994 tables 21-24 6/15 paired comparisons significant at the p=.05 level; 1995 tables 21-24 9/15 paired comparisons significant at the p=.05 level). 2137 has approximately a 2 pound advantage in improved test weight (1994; tables 17-20, 14/15 paired tests significantly different at the p=.05 level; 1995 tables 17-20, 13/17 paired comparisons significant at the p=.05 level). It is intended to replace 2163 in Kansas and Oklahoma.

Additional comments:

2137 has average protein concentration, comparable to 2163, medium to mellow mixing time and tolerance and acceptable hard wheat milling characteristics. Its baking properties have been rated average, but acceptable by the Wheat Quality Council in 1993-94 small scale tests.

2137 represents improvements in leaf rust resistance, test weight and milling yield compared to 2163. It also has improved tolerance to glume blotch. It is intended to replace the variety 2163 in north central Kansas, where its maturity and disease package make it best adapted. In addition it should replace 2163 on low pH soils in central and south-central Kansas. Its improved leaf rust resistance should also compliment and is different (Lr genes) than either 2163, Jagger or Custer. This additional diverstity of resistance hopefully will reduce leaf rust loss in the southern Great Plains in the years to come.

[1] Discrepancies involving stem rust reading at Manhattan (field and greenhouse tests) and reading at the Cereal Rust lab are due to intensities of infection and different virulent races used for infections. Although 2137 has a reaction to stem rust considered adequate in the southern Great Plains, its reaction in the northern plains would be too susceptible in many years.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT C
(Wheat)

BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Waters Hall
Kansas State University
Manhattan, KS. 66506

FOR OFFICIAL USE ONLY

PVPO NUMBER
9600304

VARIETY NAME OR TEMPORARY DESIGNATION
'2137'

Mod 4/15/99

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____

[2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[2][3][1] FIRST FLOWERING

[2][3][8] LAST FLOWERING

4. MATURITY (*50% Flowering*):

[0][2] NO. OF DAYS *EARLIER* THAN .....

[ ][ ] NO. OF DAYS *LATER* THAN .....

[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):

[0][9][5] CM. HIGH

[ ][ ] CM. TALLER THAN .....

[1][5] CM. SHORTER THAN .....

[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[1] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES (*Originating from node above ground*)

[2][3] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____

[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[2] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[1] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[1][2] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][4] CM. LEAF LENGTH (*First leaf below flag leaf*):

FORM LMGS 470-6 (6-82) (Formerly Form LPGS 470-6 (3-79), which may be used)

5

9600304

11. HEAD:

[1] Density: 1 = LAX 2 = DENSE

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0 8] CM. LENGTH

[1 1] MM. WIDTH

12. GLUMES AT MATURITY:

[2] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[3] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[3] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[ ] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK See Exhibit A

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0 6] MM. LENGTH

[0 3] MM. WIDTH

[3 1] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[1] STEM RUST (Races) TPMK

[2] LEAF RUST (Races) MBR-10

[0] STRIPE RUST (Races) _____

[0] LOOSE SMUT

letter 4/8/99

[2 1] POWDERY MILDEW

[ ] BUNT

[ ] OTHER (Specify) _____

4/15/99

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY

[1] APHID (Bydv.)

[1] GREEN BUG

[0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [2] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	2163	Seed size	2163
Leaf size	2163	Seed shape	2163
Leaf color	2163	Coleoptile elongation	2163
Leaf carriage	2163	Seedling pigmentation	2163

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

RE SDA-AS-PO 96 JUL 8 P 1:47

2137

Exhibit D. Additional Description of the Variety

2137 is resistant to leaf rust (Puccinia recondita), Wheat Soil Borne Mosaic Virus, Wheat Spindle Streak Mosaic Virus, powdery mildew (Blumeria graminis f.sp. tritici) and Hessian fly (Mayetiola destructor). It has good tolerance to speckled leaf blotch (Septoria tritici), glume blotch (Septoria nodorum), and tan spot (Helminthosporium tritici-repentis). It is moderately susceptible to stem rust (Puccinia graminis f.sp. tritici), Wheat Streak Mosaic Virus and Barley Yellow Dwarf Mosaic Virus. It is tolerant to aluminum toxicity caused by low soil pH.

2137 has average protein concentration, comparable to 2163, medium to mellow mixing time and tolerance and acceptable hard wheat milling characteristics. Its baking properties have been rated average, but acceptable by the Wheat Quality Council in 1993-94 small scale tests.

2137 represents improvements in leaf rust resistance, test weight and milling yield compared to 2163. It also has improved tolerance to glume blotch. It is intended to replace the variety 2163 in north central Kansas, where its maturity and disease package make it best adapted. In addition it should replace 2163 on low pH soils in central and south-central Kansas. Its improved leaf rust resistance should also compliment and is different (Lr genes) than either 2163, Jagger or Custer. This additional diversity of resistance hopefully will reduce leaf rust loss in the southern Great Plains in the years to come.

Appendix B
2137 PVP Application

Table 11. Chemical and Milling Data for the Pioneer Intrastate Nursery Composites of Hard Winter Wheat Lines Harvested in 1992.[a,b]

LINE	Wt/Bu[c] (lb)	1000 Kernel Weight (g)	Ash (%)	Protein[d] (%)	Kernel Sizing[e] L (%)	M (%)	S (%)	Hardness Score[f] NIR	USGMRL SKHT	Millers' Subject.	Flour Yield (%)	Milling Score[g]
Eastern												
Karl	58.6	30.5	1.50	13.4	44.5	53.8	1.7	52	61	6	72.5	90
TAM 107	54.5	26.2	1.54	12.2	31.4	65.5	3.1	62	71	6	69.4	88
2163	54.0	26.4	1.64	12.6	35.7	60.7	3.6	57	69	6	70.1	89
2180	56.6	26.0	1.57	13.8	34.9	63.2	1.9	79	82	6	72.4	87
Tomahawk	55.8	26.9	1.58	13.2	38.8	58.2	3.0	58	71	6	70.8	89
HBC302E	56.3	25.1	1.62	12.8	26.3	71.7	2.0	50	72	6	70.6	91
HBB036J	58.3	22.9 U	1.58	13.5	16.0	79.0	5.0	61	75	6	71.9	86
HBC2080	54.7	23.5	1.63	12.8	30.1	66.7	3.2	68	85	5	69.7	78 U
HBE0780A	55.2	26.9	1.61	11.7	40.1	58.0	1.9	16 U	25 U	5	69.7	93
HBE0780B	55.9	25.4	1.58	12.1	28.8	68.7	2.5	17 U	34 U	4 Q	64.2 U	86
HBC059E	55.3	30.2	1.61	13.0	51.2	47.5	1.3	52	73	6	70.6	87
HBE0272A	57.1	28.3	1.57	12.2	34.6	64.2	1.2	69	83	5	70.8	84
HBC458G	56.8	27.2	1.68	14.3	37.3	61.0	1.7	64	84	5	69.6	86
HCC0076A	55.6	24.5	1.64	13.8	25.1	70.7	4.2	61	77	5	68.9	87
HBC696-108	56.7	26.4	1.76	13.8	30.7	67.1	2.2	49	71	5	69.1	88
VBF0111-133	59.7	29.8	1.59	12.7	49.6	49.1	1.3	24 U	43 U	4 Q	67.3	87
VB60048-158	56.3	24.8	1.71	13.7	32.8	64.0	3.2	68	85	5	68.8	78 U
HBE0363-134	54.9	26.9	1.74	13.7	32.6	64.0	3.4	85	90	6	70.4	80
HBE0779-152	55.4	27.5	1.64	13.1	48.0	49.2	2.8	57	70	5	67.8	89
VBE017-113	56.6	28.4	1.57	12.3	53.5	44.1	2.4	44 Q	67	5	69.7	90
HBF0290-146	56.5	26.4	1.66	13.0	34.1	63.1	2.8	69	77	5	69.8	83
HBF0290-144	56.2	23.6	1.62	13.1	31.3	65.8	2.9	66	77	6	70.5	83
HBF0290-145	56.8	26.4	1.63	13.3	39.9	57.5	2.6	65	71	6	70.3	81
HBF0263-137	57.3	29.9	1.52	12.3	49.1	49.2	1.7	70	71	6	72.6	84
HBF0302-148	56.0	26.0	1.64	12.5	43.0	55.4	1.6	12 U	30 U	4 Q	64.9 U	86
HBF0140-190	58.5	29.2	1.49	12.9	47.1	51.5	1.4	84	85	6	71.6	79 U
HBF0303-156	51.5 U	25.9	1.73	13.2	34.1	61.7	4.2	74	91	5	65.4 U	80
HBF0337-112	55.5	29.8	1.59	12.9	53.8	44.9	1.3	67	81	5	69.6	83
HFB0435-130	57.3	32.9	1.56	13.0	64.7	34.3	1.0	54	70	6	71.0	86
VBE0186-148	57.6	28.2	1.53	13.3	52.6	45.6	1.8	58	63	6	72.2	86

9600304

Table II. (Continued)

LINE	Wt/Bu[c] (lb)	1000 Kernel Weight (g)	Ash (%)	Protein[d] (%)	Kernel Sizing[e] L (%)	M (%)	S (%)	Hardness Score[f] NIR	USGMRL SKHT	Millers' Subject.	Flour Yield (%)	Milling Score[g]
HBF0576-140	54.7	29.5	1.60	14.0	58.8	40.0	1.2	67	72	6	69.3	87
HBF0337-113	55.7	29.7	1.64	13.5	52.9	46.3	0.8	71	74	6	69.4	85
HBF0361-124	57.2	31.4	1.57	13.2	57.2	41.8	1.0	75	78	6	70.6	84
HBF0276-147	53.9	29.2	1.76	13.0	50.2	48.6	1.2	60	73	5	67.7	80
HBE0780-132	56.8	24.9	1.62	12.2	33.2	63.8	3.0	19 U	32 U	4 Q	66.3	90
HBE0780-130	55.4	26.2	1.64	12.1	31.6	66.0	2.4	18 U	32 U	5	69.3	91
HBF0425-155	54.9	27.5	1.55	13.8	47.6	50.2	2.2	72	82	6	73.0	83
VBF0223-108	58.5	29.8	1.58	13.1	56.3	41.7	2.0	49	64	6	72.8	88
VBF0223-107	58.8	30.2	1.57	13.0	54.5	43.8	1.7	48	61	5	71.3	91
HBF0248-146	54.8	27.0	1.59	13.4	39.9	57.2	2.9	59	69	5	71.5	88
(Average)	(56.2)	(27.4)	(1.61)	(13.0)	(41.3)	(56.4)	(2.3)	(56)	(69)	(5.4)	(69.8)	(86)
								r=.95				
Western												
Karl	59.7	27.7	1.46	14.9	40.3	58.3	1.4	55	69	6	71.3	85
TAM 107	60.8	31.2	1.23	12.1	57.0	41.7	1.3	63	77	6	72.5	82
2163	57.8	26.7	1.37	12.6	38.1	60.0	1.9	60	76	6	71.9	80
2180	60.6	29.6	1.31	13.6	47.6	51.1	1.3	82	86	6	73.5	78
Tomahawk	59.6	28.5	1.33	13.6	61.0	37.2	1.8	57	80	5	70.2	79
HBC059E	59.2	32.4	1.45	13.3	60.0	38.4	1.6	54	80	6	71.8	84
HBE0363-134	58.6	28.2	1.46	12.9	38.8	59.8	1.4	81	96	6	72.0	85
HBF0290-144	60.7	27.9	1.31	12.6	52.5	46.3	1.2	69	84	6	73.3	82
HBF0263-137	60.5	30.6	1.33	12.4	53.7	45.4	0.9	64	84	6	73.6	82
HBF0337-112	59.6	30.7	1.37	12.9	63.2	36.2	0.6	67	83	6	73.2	78
HBF0435-130	58.6	34.0	1.39	13.4	76.9	22.6	0.5	54	74	6	73.7	85
HBF0337-113	59.5	29.7	1.34	13.6	57.8	41.7	0.5	72	83	6	73.8	76
HBF0276-147	58.9	30.5	1.39	12.5	60.0	39.2	0.8	55	83	6	73.8	76
HBF0425-155	58.0	27.9	1.28	13.3	44.6	53.8	1.6	70	92	6	73.5	86
(Average)	(59.4)	(29.7)	(1.36)	(13.1)	(53.7)	(45.1)	(1.2)	(65)	(82)	(5.9)	(72.7)	(81)

9600304

Table III. Chemical and Mixograph Data for the Pioneer Intrastate Nursery Composite Flours of Hard Winter Wheat Lines Harvested in 1992.[a,b]

LINE	FLOUR Ash (%)	FLOUR Protein[c] (%)	FLOUR Color Value[d]	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time[e] As Rec'd (min)	MIXOGRAPH Mix Time[e] Corr. (min)	MIXOGRAPH Tolerance[f]
Eastern							
~~Karl~~	~~0.41~~	~~12.5~~	~~83~~	~~63.8~~	~~4.38~~	~~-~~	~~4~~
TAM 107	0.44	11.1	82	61.0	4.38	3.92	5 E
~~2163~~	~~0.48~~	~~11.6~~	~~82~~	~~63.3~~	~~3.38~~	~~3.24~~	~~4~~
2180	0.48	12.9	79	64.8	3.50	-	3
Tomahawk	0.42	11.9	83	63.8	3.38	3.34	3
HBC302E	0.41	11.6	83	62.6	3.38	3.21	3
HBB036J	0.44	12.3	81	63.5	4.50	4.50	4
HBC2080	0.53	11.4	80	63.0	3.00	2.77	3
HBE0780A	0.47	11.2	90	60.1	3.00	2.73 Q	2 Q
HBE0780B	0.44	11.4	90	59.8	3.38	3.12	2 Q
HBC059E	0.45	11.7	83	61.6	3.50	3.37	3
HBE0272A	0.45	10.9	80	61.8	5.00	4.36	5 E
HBC458G	0.43	12.8	82	63.8	3.50	-	3
HCC0076A	0.44	12.5	81	62.8	2.50 U	-	2 Q
HBC696-108	0.45	12.5	81	62.8	3.00	-	1 Q-U
VBF0111-133	0.42	12.0	92	61.5	5.38	-	4
VB60048-158	0.50	12.1	79	64.1	3.63	-	4
~~HBE0363-134~~	~~0.52~~	~~12.1~~	~~78~~	~~64.6~~	~~4.75~~	~~-~~	~~5 E~~
HBE0779-152	0.42	12.0	82	63.1	2.88	-	4
VBE017-113	0.42	11.3	84	61.5	4.38	4.03	5 E
HBF0290-146	0.46	11.6	81	62.1	3.50	3.31	4
HBF0290-144	0.46	11.6	78	62.1	3.00	2.86	2 Q
HBF0290-145	0.48	11.9	81	62.6	3.38	3.34	3
~~HBF0263-137~~	~~0.45~~	~~11.0~~	~~82~~	~~61.0~~	~~3.38~~	~~2.97~~	~~3~~
HBF0302-148	0.45	11.7	91	60.0	3.63	3.48	3
HBF0140-190	0.49	11.8	78	65.0	3.75	3.66	3
HBF0303-156	0.54	12.0	79	64.0	3.13	-	3
HBF0337-112	0.46	11.5	80	63.1	3.50	3.31	3
HFB0435-130	0.42	11.6	85	62.6	3.75	3.56	4
VBE0186-148	0.40	11.7	84	59.6	3.38	3.27	3
HBF0576-140	0.43	12.6	81	62.2	3.13	-	2 Q
HBF0337-113	0.43	12.0	83	64.5	3.63	-	2 Q
HBF0361-124	0.45	11.9	80	64.8	4.00	3.95	5 E
HBF0276-147	0.54	11.7	80	62.5	3.50	3.38	4
HBE0780-132	0.44	11.7	89	60.5	3.38	3.25	4
HBE0780-130	0.48	11.5	88	60.1	3.00	2.83	4
HBF0425-155	0.47	12.2	80	62.8	2.50 U	-	2 Q
VBF0223-108	0.43	11.8	84	62.3	3.75	3.68	5 E
VBF0223-107	0.39	11.9	87	62.1	4.00	3.93	5 E
HBF0248-146	0.45	12.2	84	62.8	4.13	-	5 E
(Average)	(0.45)	(11.8)	(83)	(62.5)	(3.61)	(3.46)	(3.5)

Table III. (Continued)

LINE	FLOUR Ash (%)	FLOUR Protein[c] (%)	FLOUR Color Value[d]	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time[e] As Rec'd (min)	MIXOGRAPH Mix Time[e] Corr. (min)	Tolerance[f]
Western							
~~Karl~~	~~0.40~~	~~13.7~~	~~78~~	~~65.5~~	~~4.00~~	~~4.00~~	~~3~~
TAM 107	0.34	10.6	80	61.6	3.38	2.81	5 E
~~2163~~	~~0.41~~	~~11.0~~	~~84~~	~~62.3~~	~~2.50 U~~	~~2.20 U~~	~~2 Q~~
2180	0.41	12.0	79	64.5	3.38	-	3
Tomahawk	0.37	12.0	81	65.0	3.50	-	4
HBC059E	0.40	11.9	83	64.6	2.88 Q	2.85	3
~~HBE0363-134~~	~~0.43~~	~~11.8~~	~~79~~	~~66.3~~	~~4.25~~	~~4.14~~	~~4~~
HBF0290-144	0.42	11.6	81	61.8	2.75 Q	2.60 Q	3
~~HBF0263-137~~	~~0.41~~	~~11.1~~	~~84~~	~~62.5~~	~~2.75 Q~~	~~2.45 U~~	~~3~~
HBF0337-112	0.43	11.4	83	65.0	2.88	2.67 Q	2 Q
HBF0435-130	0.39	11.9	84	64.8	3.13	3.09	3
HBF0337-113	0.43	11.8	83	67.5	2.63 Q	2.56 Q	2 Q
HBF0276-147	0.48	11.0	84	64.3	3.00	2.65 Q	1 Q-U
HBF0425-155	0.40	12.3	81	66.3	2.38 U	-	2 Q
(Average)	(0.41)	(11.7)	(82)	(64.4)	(3.10)	(2.95)	(2.9)

[a]Data expressed on a 14% moisture basis.

[b]O, E, S, Q, and U = outstanding, excellent, satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfactory rating is inferred in the absence of a designated one. One unsatisfactory rating characteristizes a variety as undesirable for hard winter wheat milling and breadmaking purposes.

[c]Protein content measured by a Dickey John NIR.

[d]Color values were obtained by an Agtron Photoelectric Colorimeter with a modified method (AACC Method 14-30) using flour samples rather than using slurry samples with Agtron certified calibration disks "63" for 0% setting and "97" instead of "85" for 100% setting.

[e]Mixing times for samples having less than 12% protein were corrected (Corr.) to 12% protein. (-) denotes the same mix time on as received (Rec'd).

[f]Mixing tolerance was rated with numbers: 6 for O; 5 for E; 4 for S; 3 for S-Q; 2 for Q; 1 for Q-U; and 0 for U.

Table IV. Bread-Making Data for the Pioneer Intrastate Nursery Composite Flours of Hard Winter Wheat Lines Harvested in 1992.[a,b]

LINE	FLOUR Protein[c] (%)	Absorption (%)	Mix Time[d] As Rec'd (min)	Mix Time[d] Corr. (min)	Ascorbic Acid (ppm)	Crumb Grain[e]	Loaf Volume[f] As Rec'd (cc)	Loaf Volume[f] Corrected to 12.0 P (cc)	Loaf Volume[f] Regression (cc/%)
Eastern									
Karl	12.5	67.6	5.25	-	50	3	942	907	67
TAM 107	11.1	70.6	5.25	4.69	50	3	907	969	74
2163	11.6	66.5	3.50	3.35	50	3	862	884	65
2180	12.9	70.6	4.50	-	50	3	950	893	66
Tomahawk	11.9	69.1	3.63	3.59	50	2 Q	818	824	58 U
HBC302E	11.6	66.2	4.25	4.03	50	3	835	860	62
HBB036J	12.3	69.2	5.75	-	50	3	935	916	68
HBC208O	11.4	67.4	4.25	3.93	50	3	847	886	65
HBE078OA	11.2	62.5	4.75	4.32	50	3	875	925	69
HBE078OB	11.4	61.6	4.13	3.81	50	3	875	917	69
HBC059E	11.7	64.2	4.25	4.10	50	3	860	879	64
HBE0272A	10.9	65.1	5.88	5.13	50	3	863	934	70
HBC458G	12.8	67.1	3.63	-	50	2 Q	883	835	59 U
HCC0076A	12.5	64.2	2.75 Q	-	50	2 Q	910	878	64
HBC696-108	12.5	64.6	2.88 Q	-	50	2 Q	915	884	65
VBF0111-133	12.0	64.0	5.25	5.23	50	4	905	905	67
VB60048-158	12.1	67.3	3.75	-	50	3	900	892	66
HBE0363-134	12.1	69.8	6.50 Q	-	50	3	850	843	60
HBE0779-152	12.0	65.2	3.13	-	50	4	938	938	71
VBE017-113	11.3	64.4	4.25	3.91	50	2 Q	830	870	63
HBF0290-146	11.6	65.1	3.75	3.55	50	3	940	972	75
HBF0290-144	11.6	66.2	3.75	3.57	50	3	923	951	72
HBF0290-145	11.9	65.6	3.63	3.59	50	3	940	947	72
HBF0263-137	11.0	65.2	3.50	3.08	50	4	885	954	73
HBF0302-148	11.7	61.0	4.13	3.96	50	3	850	871	63
HBF0140-190	11.8	68.3	4.75	4.63	50	2 Q	880	893	66
HBF0303-156	12.0	71.0	3.50	-	50	3	825	825	58 U
HBF0337-112	11.5	66.6	4.13	3.90	50	3	945	978	75
HFB0435-130	11.6	64.8	4.50	4.27	50	3	900	929	70
VBE0186-148	11.7	63.1	3.38	3.27	50	2 Q	875	891	66

96003 04

Table IV. (Continued)

LINE	FLOUR Protein[c] (%)	Absorption (%)	Mix Time[d] As Rec'd (min)	Mix Time[d] Corr. (min)	Ascorbic Acid (ppm)	Crumb Grain[e]	Loaf Volume[f] As Rec'd (cc)	Loaf Volume[f] Corrected to 12.0 P (cc)	Loaf Volume[f] Regression (cc/%)
HBF0576-140	12.6	65.6	3.38	-	50	2 Q	905	865	63
HBF0337-113	12.0	68.7	4.13	-	50	3	920	920	69
HBF0361-124	11.9	67.2	4.63	4.57	50	4	873	879	64
HBF0276-147	11.7	64.7	4.88	4.71	50	2 Q	840	857	62
HBE0780-132	11.7	63.1	4.25	4.09	50	3	865	885	65
HBE0780-130	11.5	61.1	4.38	4.13	50	4	885	916	68
HBF0425-155	12.2	65.2	2.88 Q	-	50	2 Q	885	872	64
VBF0223-108	11.8	64.7	5.13	5.03	50	3	880	890	66
VBF0223-107	11.9	63.4	4.50	4.42	50	4	945	955	73
HBF0248-146	12.2	65.0	5.00	-	50	4	910	899	67
(Average)	(11.8)	(65.2)	(4.24)	(4.10)	(50)	(2.9)	(889)	(900)	(67)
Western									
Karl	13.7	68.4	5.00	-	50	3	918	918	69
TAM 107	10.6	68.7	4.50	3.74	50	2 Q	956	956	72
2163	11.0	66.7	3.13	2.75	50	3	868	868	63
2180	12.0	68.7	4.25	-	50	4	950	950	72
Tomahawk	12.0	69.2	4.13	-	50	3	885	885	65
HBC059E	11.9	67.9	3.50	3.47	50	2 Q	880	873	65
HBE0363-134	11.8	69.4	5.13	5.00	50	2 Q	850	863	63
HBF0290-144	11.6	64.9	3.50	3.31	50	2 Q	915	944	72
HBF0263-137	11.1	63.7	3.38	3.01	50	3	830	889	65
HBF0337-112	11.4	66.1	3.25	3.01	50	2 Q	900	943	71
HBF0435-130	11.9	65.6	4.00	3.95	50	3	930	937	71
HBF0337-113	11.8	65.5	3.50	3.40	50	3	928	942	72
HBF0276-147	11.0	65.1	3.63	3.21	50	2 Q	853	921	68
HBF0425-155	12.3	67.5	2.88 Q	-	50	2 Q	848	782	59 U
(Average)	(11.7)	(67.0)	(3.84)	(3.65)	(50)	(2.6)	(890)	(898)	(68)

96000304

Appendix A
2137 PUP Application

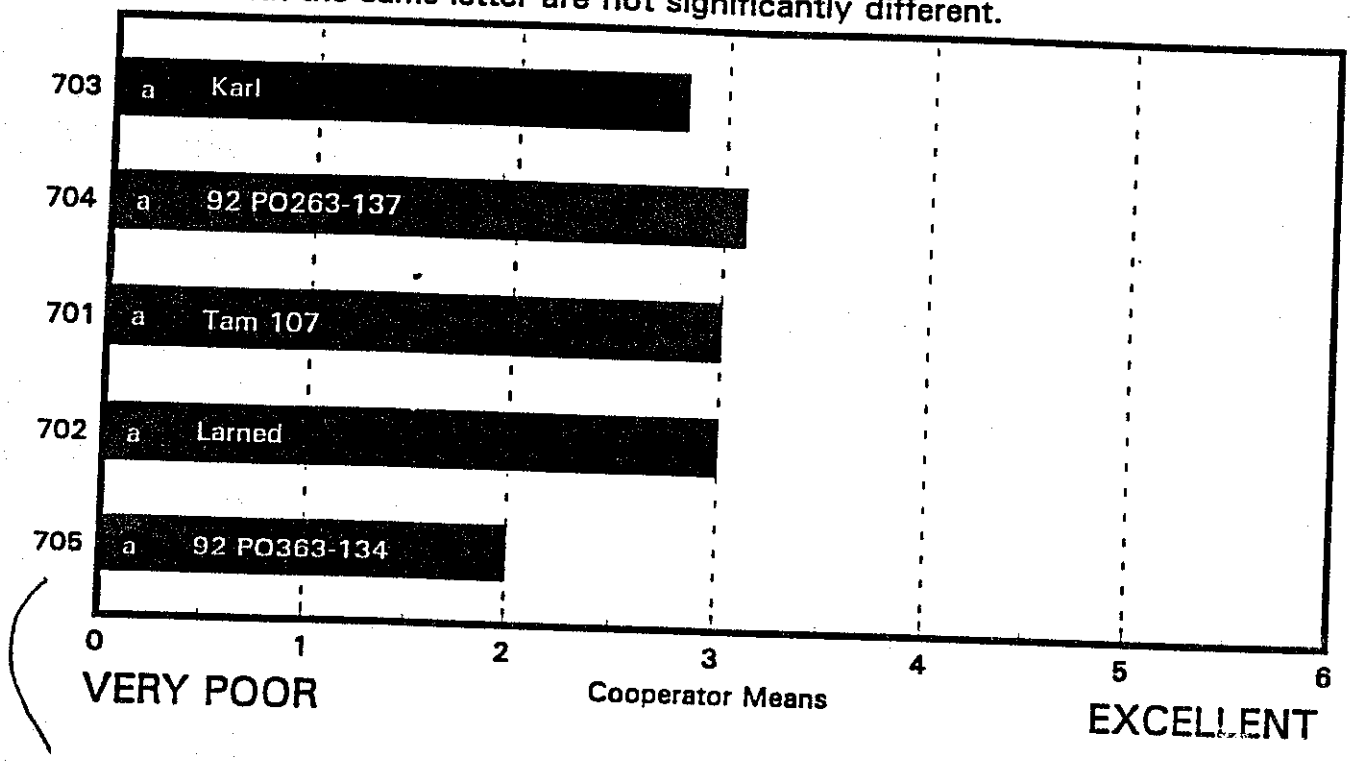
9600304

Table 14

OVERALL BAKING QUALITY

GROUP A: HAYS, KS

Means with the same letter are not significantly different.



MILLING SUMMARY

2137

SAMPLE NUMBER	93–701	93–702	93–703	93–704	93–705
VARIETY IDENTIFICATION	TAM 107	Larned	Karl	92PO263–137	92PO363–134
FROM CUMULATIVE ASH CURVES (above)					
Total Flour Extraction (%)	73.1	73.9	73.7	72.8	73.3
Patent Flour (% of flour)	95.3	93.4	94.3	94.9	92.9
Ash (% *)	0.38	0.40	0.40	0.39	0.40
Protein (% *)	10.5	11.7	11.0	11.0	11.6
MILLING EVALUATION					
1,2 Break, Redust Flour Produced (%)	23.3	19.3	17.9	20.3	14.9
Bran (%)	20.6	20.5	20.5	21.1	20.4
Bran Clean–up	FAIR	FAIR	FAIR	FAIR	GOOD
Overall Milling Quality	GOOD	GOOD	GOOD	FAIR	GOOD

Table 15

HARD WHEAT MILL & BAKE REPORT

Sheet 1 of 2 – Wheat, Milling

Dept. of Grain Science & Industry, Kansas State University, Manhattan, KS 66506 (913/532-6161)

Crop Year 1993 Group Western KS PIN (Martin) Hays, GC, Ness Co. Osborne Co.

Sample No.	Variety / Selection	Bu. Wt. lb	Kernel Size Ov 7W %	Kernel Size Ov 9W %	Kernel Size Th 9W %	Hardness Score NIR	Hardness Score Single Kernel Ave.	Hardness Score Single Kernel S.D.	Flour Yield %	Flour Ash % *	Flour Color	Comments
PIN – 1	Karl-92	60.6	48.9	50.9	0.2	52.9	69.5	15.1	72.5	0.45	84.0	
2	2163	57.1	45.7	54.1	0.3	48.9	71.3	15.6	69.7	0.49	85.0	
3	Tomahawk	58.7	68.6	31.3	0.1	62.6	73.5	14.2	71.6	0.44	82.0	
4	HBF0425-155	58.3	55.7	44.2	0.1	72.5	78.4	16.0	72.5	0.51	80.0	
* 5	HBE0363-134	58.4	58.2	41.8	0	76.7	81.5	15.8	72.4	0.52	77.0	*
* 6	HBF0263-137	59.0	44.1	55.8	0.1	59.8	71.7	15.6	70.6	0.47	85.0	*
7	HBF0290-144	59.1	46.6	53.3	0.1	68.6	79.1	16.6	71.5	0.47	81.0	
8	HBC0 59E	56.8	53.3	46.6	0.1	53.2	68.1	16.0	71.3	0.47	83.0	
9	HBF0337-113	58.7	59.1	40.8	0.2	66.6	74.6	15.5	70.1	0.47	84.0	
10	HBF0435-130	57.2	69.5	30.4	0.1	51.6	67.0	17.0	70.1	0.44	85.5	
11	HBF0337-112	58.7	62.7	37.2	0.1	59.4	76.0	13.9	69.5	0.47	84.0	
12	HBF0276-147	57.0	58.6	41.4	0.1	53.4	68.0	15.6	68.6	0.52	82.0	
13	KS91H213	58.2	48.3	51.4	0.3	47.8	67.3	17.6	70.3	0.47	85.5	
14	HBE0363-135	58.5	58.3	41.6	0.1	75.9	81.9	14.2	72.1	0.50	77.0	
15	HBC0 59E-117	56.7	48.8	51.0	0.2	51.6	69.4	15.1	70.6	0.46	84.0	
16	HBF0276-141	56.8	56.6	43.4	0.1	55.0	66.3	16.0	70.0	0.50	82.0	
17	HBF0441-163	57.1	66.8	33.1	0.1	59.1	68.9	15.5	73.1	0.50	83.0	
18	HBF0425-156	57.9	46.5	53.3	0.2	68.9	77.9	15.2	71.9	0.52	79.0	
20	HBF0441-132	56.9	62.0	37.8	0.2	60.8	69.6	16.1	72.3	0.50	83.0	
21	HBF0551-137	56.5	60.1	39.8	0.1	67.9	78.4	16.6	69.6	0.57	[illegible]	

96003304

Table 16

HARD WHEAT MILL & BAKE REPORT

Sheet 2 of 2 – Flour Properties

Dept. of Grain Science & Industry, Kansas State University, Manhattan, KS 66506 (913/532-6161)

Crop Year 1993 Group Western KS PIN

Sample No.	Variety / Selection	Flour		Mixograph		Bread Bake							Comments
		Prot. % *	RVA	Abs. % *	Peak min.	Oxid. AA mg	Absorption % *	Mix Time min.	Dough Prop.	Loaf Vol. cc	Crumb Grain	Crumb Color	
PIN-1	Karl-92	11.4	138.5	65.5	7.7	0	65.0 S	8.3	BVB	894 VS	3.3	W	
2	2163	11.5	118.0	65.5	3.5	50	63.5 S-SB	4.4	SB	876 S-Q	4.0	W	
3	Tomahawk	11.6	137.5	68.9	4.0	38	63.5 S-SB	4.3	VSB	843 Q	3.8	W	
4	HBF0425-155	11.5	133.0	65.8	4.2	25	64.5 S	4.1	M-VSB	833 Q	4.0	W	
* 5	HBE0363-134	11.8	126.0	69.3	7.2±	0	68.5 E	8.6	B-VB	866 Q	3.3	W	*
* 6	HBF0263-137	11.6	130.0	64.9	4.7	0	65.5 S-VS	5.7	SB	893 S	3.8	W	*
7	HBF0290-144	11.6	123.0	62.9	4.0	25	64.0 S	5.1	SBB	936 S	3.8	W	
8	HBCO 59E	11.6	117.5	62.9	5.4	0-13	63.5 S-SB	5.9	SBB	908 S	3.3 ii	W	
9	HBF0337-113	11.4	139.0	64.6	4.0	25	67.5 VS-E	5.1	SB	888 S	3.8	W	
10	HBF0435-130	11.7	121.5	63.1	5.0	0	64.5 S	6.7	SB	841 Q	3.3	sl. Cr	
11	HBF0337-112	11.2	133.0	62.8	4.1	13	66.5 VS	4.9	SB	865 S	3.6	W	
12	HBF0276-147	11.0	121.0	62.3	4.7	0	64.0 S	5.4	SB	881 S	3.6	Cr	
13	KS91H213	11.0	126.0	60.3	5.0	0	63.0 SQ	5.3	SB	780 Q	3.6	Y	
14	HBE0363-135	12.0	126.5	68.8	7.0	0	67.5 VS	8.4	B-VB	888 Q	2.0	W	
15	HBC059E-117	11.3	124.0	63.9	5.3±	0	63.5 S-SQ	5.8	B	891 S	3.0	V.W	
16	HBF0276-141	11.1	117.5	62.5	4.7±	0-13	64.5 S	5.5	B	879 S	3.6	sl. Y	
17	HBF0441-163	11.2	117.5	62.8	5.0	0	66.0 VS	6.3	B	893 S	3.8	V.W	
18	HBF0425-156	11.5	142.0	63.1	3.7	25	66.0 VS	4.4	SB	843 Q	3.8	sl. Y	
20	HBF0441-132	11.3	122.5	65.8	6.0	0-13	66.0 VS	7.2	SBB	893 S	3.3	V.W	
21	HBF0551-137	11.8	127.0	62.7	4.8								

96000304

Table 17

HARD WHEAT MILL & BAKE REPORT

Sheet 1 of 2 – Wheat, Milling

Dept. of Grain Science & Industry, Kansas State University, Manhattan, KS 66506 (913/532-6161)

Crop Year 1993 Group Sears Samples P2N – pr, hu, cw, SJ comp.

Sample No.	Variety / Selection	Bu. Wt. lb	Kernel Size Ov 7W %	Kernel Size Ov 9W %	Kernel Size Th 9W %	Hardness Score NIR	Hardness Score Single Kernel Ave.	Hardness Score Single Kernel S.D.	Flour Yield %	Flour Ash % *	Flour Color	Comments
P2N – 1	Karl-92	57.3	48.7	49.9	1.4	54.4	64.3	17.3	71.1	0.45	82.0	
2	2163	56.4	60.2	38.0	1.3	62.0	65.5	17.7	68.2	0.50	81.0	
3	Tomahawk	54.5	45.8	53.0	1.2	54.0	64.9	18.6	67.8	0.50	77.0	
4	HBF0425-155	55.8	58.5	40.2	1.3	66.2	72.8	18.6	71.1	0.54	76.0	
* 5	HBED363-134	57.7	58.9	40.2	0.9	81.9	77.2	16.4	70.2	0.54	74.0	*
* 6	HBF0263-137	59.0	74.9	24.8	0.3	67.0	67.1	17.2	69.6	0.50	79.0	*
7	HBF0290-144	57.8	55.9	43.1	0.9	64.8	69.3	17.9	69.7	0.48	77.5	
8	HBC059E	56.6	67.8	31.8	0.5	66.4	71.2	18.2	69.7	0.51	79.0	
9	HBF0337-113	55.8	62.8	36.7	0.4	61.0	69.5	17.5	68.9	0.50	79.0	
10	HBF0435-130	57.4	77.3	22.6	0.1	52.8	64.4	17.4	70.9	0.44	82.0	
11	HBF0337-112	55.1	71.4	28.3	0.3	58.0	69.7	17.4	68.5	0.49	80.0	
12	HBF0276-147	55.3	68.9	30.6	0.5	63.8	70.4	20.3	68.4	0.54	75.0	
13	KS91H213	56.5	72.0	27.4	0.6	46.0	64.9	18.8	70.3	0.47	81.0	
14	HBE0363-135	56.8	56.9	42.2	1.0	74.1	75.9	17.1	69.9	0.55	73.0	
15	HBC059E-117	53.6	59.2	39.7	1.1	51.6	67.5	21.6	69.6	0.51	78.0	
16	HBF0276-141	54.9	60.1	39.0	0.8	51.8	63.9	18.0	68.4	0.53	75.0	
17	HBF0441-163	54.8	69.1	30.5	0.4	61.3	69.1	17.0	70.5	0.50	78.0	
18	HBF0425-156	53.6	44.2	54.2	1.5	61.1	71.1	18.7	68.0	0.54	75.0	
20	HBF0441-132	55.8	68.9	30.7	0.4	59.3	67.0	16.4	70.0	0.52	78.0	
21	HBF0551-137	56.0	69.8	29.7	0.6	68.9	72.6	16.9	69.4	0.55	76.0	

9600304

Table18

HARD WHEAT MILL & BAKE REPORT

Sheet 2 of 2 – Flour Properties

Dept. of Grain Science & Industry, Kansas State University, Manhattan, KS 66506 (913/532-6161)

Crop Year 1993 Group Sears Samples PIN-Pr, Hu, CW, SJ Comp

Sample No.	Variety / Selection	Flour		Mixograph		Bread Bake							Comments
		Prot. % *	RVA	Abs. % *	Peak min.	Oxid. AA mg	Absorption % *	Mix Time min.	Dough Prop.	Loaf Vol. cc	Crumb Grain	Crumb Color	
PIN-1	Karl-92	12.0	131.5	65.5	6.8	0	61.5 Q	7.0	B-VB	912 S	3.6	DW	
2	2163	11.4	93.0	65.6	4.2	25-38	63.0 SQ	4.4	VSB	861 S-Q	3.8	DW	
3	Tomahawk	12.5	117.0	68.3	4.5	50+	59.0 U	4.1	SB	899 Q	3.8	sl. Cr	
4	HBF0425-155	11.9	127.0	66.4	4.3	38-50	60.5 Q	4.0	M	873 Q	3.8	sl. Cr	
* 5	HBED363-134	12.1	122.0	67.7	6.0	0	65.0 S	7.1	B-VB	843 Q	3.0	DW	*
* 6	HBF0263-137	10.6	122.5	63.4	4.5	25	63.0 SQ	4.7	SB-B	836 S	3.8	DW	*
7	HBF0290-144	11.5	116.0	63.8	4.2	38	63.0 SQ	4.2	SB	890 S	3.8	sl. Cr	
8	HBC059E	11.7	119.0	64.1	5.5±	0	65.0 S	7.0	BVB	838 Q	3.6	DW	
9	HBF0337-113	11.3	125.0	63.5	4.0	25	63.0 SQ	4.8	SB	865 S-Q	3.8	W	
10	HBF0435-130	11.1	112.0	63.2	5.0	25	62.5 SQ	5.6	SB-B	835 Q	3.8	Cr	
11	HBF0337-112	11.6	103.5	65.9	4.5	13-25	64.0 S	5.4	SB-B	886 S	3.6	W	
12	HBF0276-147	11.7	121.0	64.1	5.5	0	62.0 SQ	6.5	SB	884 S-Q	3.0	DW	
13	KS 91H213	11.4	123.0	60.6	3.8	38	61.5 SQ-U	3.7	VSB-M	810 Q	3.8	Y	
14	HBE0363-135	12.6	132.5	66.4	5.8	0	66.0 S	6.9	B-VB	890 Q	3.3	DW	
15	HBC059E-117	12.0	123.5	64.5	5.3	0	66.0 S-VS	7.0	B-VB	915 S	3.0	DW	sprouted?
16	HBF0276-141	11.5	96.5	63.8	5.0	0	61.5 SQ-U	5.0	SB	893 S	3.6	W	
17	HBF0441-163	11.9	122.0	64.4	4.7	25	62.0 SQ	5.0	SB	923 S	3.6	V.W	
18	HBF0425-156	12.4	125.5	65.1	3.4	125	62.5 SQ	3.4	M	861 Q	3.8	Cr	
20	HBF0441-132	11.6	131.0	63.9	4.6	0	62.5 SQ	5.4	SB-B	893 S	3.6	W	
21	HBF0551-137	11.7	120.5	64.1	5.0	0	63.5 SQ	4.9	SB	853 Q	3.6	sl. Cr	

9600304

REPRODUCE LOCALLY. *Include form number and edition date on all reproductions.*

FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
KANSAS AGRICULTURAL EXPERIMENT STATION

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
KS92P0263-137
HBF0263-137

3. VARIETY NAME
2137

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*
WATERS HALL, KANSAS STATE UNIVERSITY
MANHATTAN, KS 66506

5. TELEPHONE *(include area code)*
785-532-6147

6. FAX *(include area code)*
785-532-6563

7. PVPO NUMBER
9600304

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? [X] YES [ ] NO
If no, give name of country

10. Is the applicant the original owner? [X] YES [ ] NO *If no, please answer one of the following:*

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?
[ ] YES [ ] NO **If no, give name of country**

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?
[ ] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to compete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

2137

Exhibit E. Statement of the Basis of Applicant Ownership

The variety for which Plant Variety Protection is hereby sought was developed by Dr. R.G. Sears, an employee of Kansas State University Experiment Station, all rights to any invention, discovery, or development made by the employee while employed by Kansas State University Experiment Station, were assigned by Kansas State University Experiment Station with no rights of any kind retained by the employees.