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Food Safety
and Quality
Service

Fruit and
Vegetable
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Fresh Products
Branch

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Southern Peas for Processing

Inspection Instructions

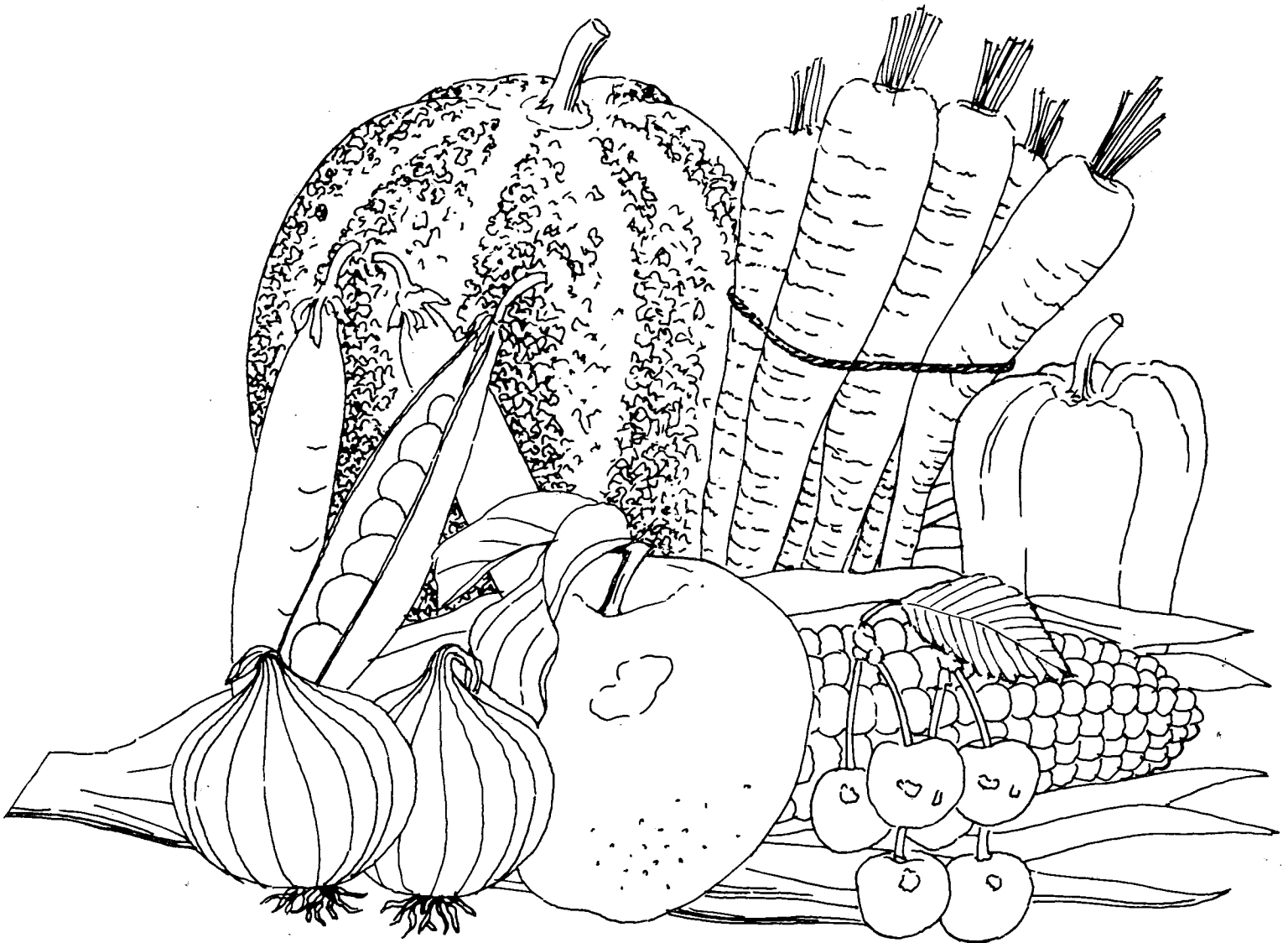


TABLE OF CONTENTS

	<u>Paragraph Numbers</u>
INTRODUCTION.....	1 - 4
GENERAL INSTRUCTIONS.....	5
INSPECTION EQUIPMENT.....	6 - 15
SAMPLING.....	16 - 19
ANALYSIS SAMPLE.....	20 - 21
EXTERNAL GRADING (Pods).....	22 - 28
Extraneous Material.....	23
Maturity.....	24
Freshness.....	25
Variety.....	26
Decay.....	27 - 28
GRADING THE SEEDS.....	29 - 53
Shelling, Weighing and Sorting.....	29 - 32
Variety.....	33
Maturity.....	34 - 38
Stings, Eggs and Worms.....	39 - 43
Discoloration.....	44 - 45
Decay.....	46
Splits, Cracked Skins and Bruises.....	47 - 49
Weighing Defects and Determining Grade.....	50 - 53
THE CERTIFICATE.....	54 - 59
REGRADES.....	60 - 61
SUBMITTED SAMPLES.....	62

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UNITED STATES DEPARTMENT OF AGRICULTURE
CONSUMER AND MARKETING SERVICE
FRUIT AND VEGETABLE DIVISION
FRESH PRODUCTS STANDARDIZATION AND INSPECTION BRANCH

SOUTHERN PEAS FOR PROCESSING
INSPECTION INSTRUCTIONS

INTRODUCTION

The name, "southern peas", has generally been accepted to designate the seed pods of a large group of varieties of the plant *Vigna sinensis* which are selected for their desirable edible quality. All varieties of this species of plant were formerly known as "field peas" or "cow peas", and these names still persist in connection with the edible varieties in many localities. The name "black-eye peas" is also used quite generally to denote one of the black-eyed or pink-eyed varieties. (1)

Production of southern peas is concentrated in the southeastern states and extending southwest to Texas. Leading states processing peas are Texas, Georgia, Tennessee, Arkansas, Alabama, and Oklahoma. A number of other southeastern states also pack considerable tonnages. (2)

Harvesting is a hand picking operation, although efforts are being made to develop a mechanical picker which will do a satisfactory job. The peculiar shape of the pods and their habit of uneven maturing make the job of mechanical harvesting very difficult. (3)

Peas are generally processed as frozen or canned pack. The requirements for the raw product are alike in most respects. However, canners can and often do use peas of a somewhat more advanced stage of maturity than that preferred by freezers. This is because the frozen peas are not cooked, and they retain the light color and any greenish cast of the raw pea. The canned product, on the other hand, must be cooked for a long time to insure keeping quality, and the peas all assume a light brown color regardless of their original color. (4)

GENERAL INSTRUCTIONS

The inspector shall be familiar with and be guided by: (5)

1. General Shipping Point Handbook which describes the duties and required conduct of an inspector.
2. Processor - Grower contract which establishes the basis for grading the commodity.

- (3) This handbook which is designed to help by supplementing the grade standards. Refer to it frequently.
- (4) Supplemental Instructions which may be issued by the supervisor.

INSPECTION EQUIPMENT

- (6) Items of equipment needed are as follows:

- Scales. Sensitive scales which can weigh very small quantities accurately. Gram scales are much better than pound scales because they make it easy to convert weights into percentages. Conversion of pounds and ounces into percentages creates difficult problems. Scales which can be read in tenths of pounds rather than in ounces are much preferred for this purpose. Scales should be equipped with a large scoop with a capacity of about 2,000 grams or 5 pounds of peas.
- (7) Sheller. A small electric motor-driven device designed expressly for removing the seed from the pods of inspection samples. It has two rubber rollers similar to those in an old-fashioned clothes wringer. The seeds are forced from the pods as they pass between the rollers.
- (8) Sample containers. A half dozen or more containers of about half bushel capacity. Wide, 16-quart metal or plastic pails serve this purpose very well.
- (9) Grading table. The table should be about 40 inches high so that the inspector can work without bending over. It should be at least 2-1/2 feet wide by at least 4 feet long to provide space for the sheller, the scales, some sorting pans and for writing certificates.
- (10) Pans for seeds. One square, deep pan, preferably made of plastic, which will fit under the sheller to catch the seeds as they drop through the slot. Several wide, very shallow pans, preferably white enameled, in which to spread the seeds for close examination.
- (11) Garbage can. A large can is needed for disposal of the empty pods and waste.
- (12) Pail. A clean metal or plastic pail can be used for returning the usable pea seeds to the processor.

Light. A light fixture producing ample candle power should be hung about 3 feet above the grading table. An "Examolite" or reflector with 2 or 3 **fluorescent** light tubes will be adequate. (13)

Inspection Certificates. The certificate used should be especially designed for southern peas. (See Par. 54) (14)

Slide rule. If gram scales are used, there should be no need for a slide rule. If pound scales are used involving pounds and ounces or decimal parts of pounds, it will be necessary to use a slide rule to determine percentages. A rule with either 5-pound or 10-pound maximum range is required. (Printed calibration strips for mounting on wood slide rules are available to **shipping** point inspection supervisors from the Washington office.) (15)

SAMPLING

Peas are transported from farm to processing plant in several different container types. Small acreage growers generally use burlap "cotton sheets" on which they pile about 100 to 200 pounds of peas. The four corners of the "sheet" are tied together to make a bundle holding the peas. Large acreage growers usually haul peas in bulk in large pallet boxes or just loaded into the body of the truck. (16)

Representative sampling. Every reasonable effort shall be made to obtain a **representative** sample. When peas are delivered in "cotton sheets", a large handful should be taken from each container on the load. Try to force the closed hand down beneath the surface of the peas and get the handful from that point. (17)

Sampling bulk loads creates a serious problem. If the truck or pallet boxes are dumped immediately upon delivery, the sample should be drawn by taking large handfuls of peas from many places around the pile. This method should give a fairly representative sample, and no reference need be made to **restricted sampling**. However, if you are required to sample and grade the bulk load before it is dumped, you will be forced to make a **restricted sampling** inspection and report on the certificate under "Remarks" that it was restricted to the upper one foot of the load which is approximately ___ feet deep. Draw the sample by taking a handful of peas from each of many places over the top of the load. (18)

Size of Sample. Draw a sample several times larger than needed for grade analysis, in order to be sure that some peas are taken from many locations in the load. (19)

ANALYSIS SAMPLE

(20) Mixing. Mix the sample thoroughly so that pods from all portions of the load sampled will be fairly evenly distributed. Do not take the portion of the sample to be analyzed from the top of the sample container without having mixed it.

(21) Weighing. A portion of the mixed sample is weighed for the grade analysis. This should be an exact weight such as 1,000 grams or 2,000 grams or 2 pounds or 5 pounds. The supervisor shall give specific instructions of the quantity of sample to be analyzed.

EXTERNAL GRADING (PODS)

(22) The sample is analyzed first for external grade factors, and then for internal grade factors. The two examinations are made separately, and one should not influence the other. Only three factors are involved in the external grading, namely: extraneous material, maturity of the pods, and conditions of the pods.

(23) Extraneous material. Sort out any portions of the plant such as leaves or stems and also any foreign materials which are in the analysis sample. If portions of vines are attached to pods, separate the two and place the vine with the extraneous material. Weigh together all such material and record the percentage as extraneous material.

(24) Maturity. The standards define peas which are "fairly well matured" and those which are "excessively mature". Pods which are so young that the inner layer of the pod remains attached to the majority of the seeds when you attempt to shell them are considered not fairly well matured. A pod should be scored as excessively matured if it has lost most of its moisture and the seeds have become much smaller in size and doughy to hard in texture. Pick out these two classes of pods, if both are present, and weigh separately to determine the percentage of each.

(25) Freshness. The U. S. No. 1 grade requires the peas to be fairly fresh. Moderate wilting or flabbiness is to be expected in hot weather and should be permitted under the definition. If the pods are badly wilted, heated to a very warm temperature and becoming flabby, the lot should be automatically barred from U. S. No. 1. Such a lot could be graded as U. S. No. 2, provided it met the tolerance requirements. When this situation occurs, make a statement on the certificate under "Remarks" to show that load "Fails to grade U. S. No. 1 account not fairly fresh."

Variety. The standards make no provision for distinguishing between varieties of peas in the pods. No **attempt** should be made to separate varieties until after the peas are shelled. (26)

Decay. Generally speaking, decay is not a very important factor, except **when** the inspection covers lots held in bulk for some time and allowed to become overheated. A pod should be classed as decayed even if only a portion of it has become mushy or broken down due to decay organisms. Weigh any decayed pods found and determine the percentage by weight. (27)

If peas are inspected and graded after being held over, or after being transported long distances in bulk, a sufficient number of pods may develop decay to prevent them from meeting either grade. The interested parties should be advised of the fact when a lot fails to grade for this reason only. (28)

GRADING THE SEEDS

Shelling sample. After the external grade factors have been determined and recorded, the sample shall be shelled to permit grading of the seeds. Run the 1,000 grams or 2,000 grams sample (or 2 or 5 lbs.) through the sheller, being careful to avoid losing any seeds. Immature pods will not release their seeds cleanly from the flesh of the pod, and such seeds shall not be included when determining the percentage of recoverable peas. (29)

Weighing recoverable seeds. Weigh all of the recoverable seeds which are practically free from **adhering** flesh of the pod. Record the weight on the note sheet. If the purchase specifications are based upon the percentage of recoverable seeds as well as the grade, determine that percentage and report it on the certificate. Regardless of whether the percentage of recoverable seeds is a part of the purchase specifications, the total weight of the recoverable seeds may be used in some cases as the basis for determining the percentage of defective seeds. (30)

Sorting seeds for defects. After the weight of the recoverable seeds has been recorded, the seeds are sorted for defects. This grading of the seeds is done without reference to the previous step of grading the pods. (31)

In order to facilitate the figuring of percentages and to avoid mistakes, it is advisable to use a predetermined weight of the seeds for internal quality analysis, rather than using the total quantity shelled out. Use 300, 400, or 500 grams, preferably the larger amount, depending upon the quantity of seeds from the original sample and the time available. Place All of the seeds in the scales scoop. Then rake off enough with the fingers to bring the weight down to the quantity to be analyzed. The various seed quality factors are discussed below. (32)

- (33) Variety. Both U. S. grades require that the seeds be of "similar varietal characteristics". A mixture of several varieties is permissible if the seeds are of similar size and color. However, if the lot contains some seeds which are distinctly different in appearance and contrast with the majority of seeds, the contrasting seeds shall be scored against the 5 percent tolerance for dissimilar varieties.
- (34) Maturity. The stage of maturity has a considerable effect on the appearance of the seeds, and some persons think that they also have better flavor before they reach the advanced stages of maturity. Greenish color of the seeds is a good indication that they are in the early to middle stages of maturity, which is highly desirable for freezing. Consequently the U. S. No. 1 grade requires that "light colored seeded" varieties have 50 percent or more of the seeds with at least a tinge of green.
- (35) Spread the seeds and sort them rapidly for color. A seed must have a greenish cast to meet this requirement, although the green may be ~~limited~~ to a very small portion of the surface. If the percentage of seeds showing green is well above or well below the 50 percent requirement, it will be satisfactory to estimate and report in rounded percents such as 35, 40, 60, or 70 percent. However, if the percentage of green seeds is close to 50, the inspector shall completely sort out and weigh them to be sure whether they can meet the No. 1 grade requirement.
- (36) The U. S. No. 2 grade has no requirement for green colored seeds. Lots which fail to meet U. S. No. 1 on account of insufficient green can meet U. S. No. 2 if the other grade factors are within the No. 2 tolerances.
- (37) Some varieties of peas have predominantly yellowish or brownish color casts, and do not normally show green even in the intermediate stages of maturity. These varieties are considered to be not "light colored seeded" varieties and are not subject to the green tinge requirement. They can meet the requirements of U. S. No. 1 grade if the other grade factors are within tolerance.
- (38) Bear in mind that lack of green color is treated as an indication of the stage of maturity, and is not classed as a grade defect. Therefore none of the tolerance for defective or dissimilar variety seeds may be used to reduce the requirement for 50 percent of seeds with a tinge of green.
- (39) Stings. The pea curculio is a common and very troublesome pest which infests southern pea fields.
- (40) The adult insect punctures the pod and the skin of the seed to deposit an egg. This puncture hole, called a sting scar, gradually

turns a darker color and becomes very noticeable. Stings are especially objectionable and are classed as serious defects.

Eggs. Most of the peas with stings show no egg under the sting. An occasional pea may be found which does contain a curculio egg, and the inspector shall examine each sting carefully. The egg is oval in shape, pearly white and only slightly larger than the point of a pin. It is located just beneath the puncture. U. S. No. 1 Grade permits no tolerance for eggs, but U. S. No. 2 Grade provides a 2 percent tolerance for seeds with insect eggs or decay.

(41)

Worms. To look for either an egg or a very small larva (worm), break the seed open at the point of the sting. This can be done with the thumb nail or a knife blade. The egg or larva, if present, is usually located directly beneath the sting. If the larva has attained some size, it is easily seen, but in its initial stage detection requires a very careful examination. The egg is also difficult to see.

(42)

Worms (insect larvae) are barred from both U. S. grades of southern peas. When any seed is found to be infested with an insect of any description, the sample shall be reported as "off grade", regardless of the other grade factors determined for the sample. In such cases, report the grade factors as usual but also report the number of worm infested seeds found in the sample. Some processors may agree to accept loads with very small amounts of infestation which they believe will not materially hurt their pack. However, this is a matter between grower and processor, and the inspector shall report the presence of worms if he finds them. In most areas, pea fields must be dusted or sprayed on very precise schedules in an effort to keep the crop practically free from curculio damage. Exact adherence to recommend dusting schedules and use of high grade insecticides usually prove highly successful.

(43)

Discoloration. A fairly common defect of the seeds is a stain-like discoloration of the skin. It occurs in many variations. Most of the discoloration is in various shades of brown, but some is gray, or almost black. Usually it is limited to the skin of the seed. Score as defective any pea on which the discoloration shows conspicuously, but do not score those which are not materially affected.

(44)

Very dark brown or nearly black discoloration which is extremely objectionable in appearance is classed as serious damage by the standards. It shall be scored against the restricted tolerance for serious defects.

(45)

Decay. Under normal circumstances, there usually will be little or no decay affecting the seeds. Dark discoloration may be mistaken for decay, and the inspector should be careful not to score

(46)

discoloration as decay. If breakdown has penetrated the flesh of the seed under the skin or if there is mold on its surface, it should be scored as decay.

(47) Splits. Some seeds, as they reach a stage approaching full maturity, have a tendency to split in the sheller with the two halves of the seed coming apart. The fact that they split in the sample sheller is an indication that they are weak and probably would have split in the commercial sheller. Such seeds are objectionable and are scored as damaged.

(48) Cracked skins. When the skin is cracked and the flesh of the seed is exposed, it is classed as damaged, even though the seed has not split. This condition is apparently the result of failure of the skin to keep pace with the growth of the seed. Thus, the skin is stretched to the breaking point.

(49) Bruises. Some of the seeds may get bruised from the sheller or elsewhere along the line during harvesting. Such bruised seeds shall be ignored unless there is evidence that the load has a large percentage of peas which have been mechanically damaged. In that case, the seeds which have been badly bruised or crushed by rough handling shall be scored as damaged.

(50) Weighing defects. When sorting has been completed, there may be as many as 6 categories of defects to be weighed and recorded:

1. Dissimilar varieties.
2. Damaged kernels-light to medium skin discoloration, split skins and splits.
3. Seriously damaged kernels-stings and dark skin discoloration.
4. Decayed.
5. Insect eggs.
6. Wormy.

(51) Category 1 above stands alone, scored against the 5 percent tolerance for dissimilar varieties. Categories 2, 3, 4, 5, and 6 are added together to determine the total percentage of defects. Categories 3, 4, 5, and 6 added together gives the total percentage of serious defects. Categories 4 and 5 added together gives the total of seeds affected by decay or containing eggs.

(52) Determining Grade. The inspector must bear in mind that U. S. No. 1 grade provides no tolerance for seeds containing either insects or insect eggs. If neither of these are present in the analysis sample and the lot meets the requirements for external quality, seed color and internal quality, the lot shall be certified as U. S. No. 1 grade.

If the lot does not meet U. S. No. 1 grade, the more liberal tolerances may permit it to meet U. S. No. 2 grade which has no seed color requirement, and does permit up to 2 percent decay or insect eggs. However, this grade also provides no tolerance for wormy peas, and a lot containing any worms must be classified as "Off grade" for that reason. (53)

THE CERTIFICATE

A certificate form designed expressly for reporting the results of inspections of southern peas is recommended. For greater convenience, the certificates should be bound together in pads. They should be serially numbered with not less than an original and three copies of each numbered certificate. (54)

Form. Printing on the certificate should include a heading showing that the form is a southern pea inspection certificate issued by the local State department of agriculture and the U. S. Department of Agriculture cooperating. There should be space for the inspection point and the date, name and address of the applicant (buyer or processor), and name and address of the grower (shipper). A recommended form of certificate is shown as a sample. (55)

Clearing with Washington office. When plans are being made to establish inspection service for southern peas, the Federal supervisor should work with the processors as far in advance as possible. A draft form of an inspection certificate should be drawn up after careful study of the purchasing specifications which are intended to be used. A copy of the proposed form shall be submitted to the Washington office for approval before an order for printing is placed. (56)

SOUTHERN PEAS INSPECTION CERTIFICATE

Department of Agriculture
and
U. S. Department of Agriculture Cooperating

Processor _____ Inspection Point _____
Address _____ Date _____

Grower _____ Hour _____
Address _____

EXTERNAL QUALITY

INTERNAL QUALITY

Size sample analyzed _____ grams.
Contains the following:

Size sample analyzed _____ grams.
Contains the following:

Extraneous material _____ grams _____ percent

Seeds showing green _____ grams _____ percent

Not fairly well matured _____

Dissimilar varieties _____

Excessively mature _____

Damaged seeds _____

Decay _____

Serious damage _____

SHELLING TEST

Decay _____

Recoverable seeds _____

Dark Discoloration _____

(Count) _____

Insect eggs () _____

Worms () _____

Grade _____

Total seed () _____

defects _____

REMARKS:

I, the undersigned, on the above date, made personal inspection of a sample believed by me to be representative of the load from which the sample was taken, and do certify that the quality and condition of the sample was as shown above.

Inspector.

PROCESSOR'S RECORD

Load number _____

Variety of Type _____

Weight of load _____ lbs.

Care of Certificates. The inspector shall be held responsible for the supply of certificates in his possession. He should see that they are kept in a safe place, and make sure that they are not used by unauthorized persons. At the end of the inspection season or whenever he terminates his inspection work, he shall turn over all of the remaining certificates to his supervisor. (57)

Distribution of copies. The supervisor will give instructions on the distribution of the certificate copies. Usually, the processor keeps the first copy, the grower the second copy, the third is turned over to the supervisor or mailed to the inspection office, and the fourth, if there is one, is kept on file by the inspector. (58)

Correcting certificates. Inspectors should be careful to avoid errors in writing certificates. If a mistake of a minor nature is made which does not affect the grade or pricing of the load, the inspector may make a correction and place his initials on the certificate close to the correction. In the case of a more serious mistake which would affect the grade and price, the certificate should be voided by marking it VOID in very large letters diagonally across its face. Another certificate shall be written to take its place bearing the correct information. The voided certificate (all copies), shall be turned over to the supervisor or inspection office so that the records will show how it was used. (59)

REGRADES

The grower or processor may request another grade on the load if he believes that the first grade does not accurately represent the quality of the load. Any reasonable request should be complied with. A new sample should be drawn and graded in the usual manner. If the results of the two inspections are not far apart, the two shall be averaged and the averages reported as the grade for the load. If the two results are so widely different as to make it apparent that the first grade was in error, a certificate shall be issued on the basis of the second sample. (60)

A certificate may have already been written covering the original grade before the regrade was requested. In this case, the inspector shall take back all copies of that certificate and mark them VOID as instructed in paragraph 59. However, the instructions in the preceding paragraph relative to averaging the first and second sample grade results apply the same as if the certificate had not been issued. (61)

SUBMITTED SAMPLES

The inspector may be asked to grade a sample of peas brought to him by the processor or grower. It will be satisfactory to run a grade on the sample. However, he shall not show any grower's name (62)

on the top of the certificate because he did not draw the sample, and he cannot certify that it is representative of any specific load. Even though the processor's employee may state that the sample came from a certain grower's load, the inspector shall write "Unknown" in the space provided for the grower's name. He may show under "Remarks" that "Applicant states submitted sample drawn from load of (grower's name)."