



**United States  
Department of  
Agriculture**

Grain Inspection,  
Packers and  
Stockyards Administration

Federal Grain  
Inspection  
Service

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# **QUALITY HANDBOOK**



# Program Handbook

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## FOREWORD

The Quality Handbook sets forth the Grain Inspection, Packers and Stockyards Administration/Federal Grain Inspection Service (GIPSA/FGIS) policy for assuring the quality of official grain, rice, and pulse inspection and grading activities; and establishes a program for ensuring that prompt and appropriate action is taken to address intermarket grading problems. It also establishes guidelines for developing local programs, describes the components of these programs, and explains how the programs should function.

The goal of this handbook is to improve communication and interaction within the official inspection system. We need to move from problem-solving to problem preventing, from reactive to proactive. But, changing our “corporate culture” is a lot harder than changing rules and regulations. It requires a change in how we think and act; it requires a change in behavior. As with any other quality assurance/quality control (QA\QC) program or system, good intentions alone will not provide consistently accurate results--only commitment by the people involved will. FGIS’ quality assurance programs are only as good as the commitment of the field office and agency managers implementing and managing the programs. Without their commitment, the programs will be “just more paper,” with little or no importance to daily operations.

Our commitment will be tested as situations develop where decisions must be made to sacrifice output in order to maintain quality. Managers must set an example by invariably placing quality assurance above increasing production, regardless of the potential loss of revenue. If questionable results are certificated because management is willing to take a risk, the confidence of customers will be lost. Eventually, this practice results in intermarket complaints, loss of business, regulatory problems, and possible litigation.

FGIS’ QA\QC program is actually many separate, but interrelated programs. Arguably, the most important of these are the local programs--those that have been designed by the local FGIS field office to address the quality concerns of that office’s circuit. This Handbook provides field office and agency managers with information, suggestions, and guidance for developing their own local programs. Keep in mind that a local program need not be complicated to be effective. Most offices are already performing many of the things that are common to a good local program. Often, they will just need to strengthen or build upon existing structures.

In the initial design phase of a local program, it is important to remember to “keep it simple.” Envision the end product (perfectly accurate and consistent inspection results) as an integrated part of your plan. One common mistake is to think of the local program as a totally separate quality assurance function. As the program develops, it will be evident that each inspector and manager has a part to play and some responsibility for its effectiveness. Managers must also begin to be **proactive**--*thinking ahead to head-off problems*. They must recognize factors that lead to problems, and potential problem areas (manpower, materials, methods, machines, and management). We can't continue to wait for problems and then react, we must be constantly looking for weaknesses and correcting them before they grow into problems.

As we look to the future, U.S. agriculture will continue to have the capability to produce and market large volumes of grain, rice, and pulses. And, buyers and sellers will continue to demand faster, better, and more accurate quality assessments. To meet this demand, the official inspection system will have to do its job better. We simply must expand our concept of quality. We cannot be satisfied with “holding on to what we got.” For if we do, it will limit our horizons and force us into a defensive, rather than an offensive, mode of thinking.

We must go beyond simply reacting to problems. We--including every FGIS field office and official inspection agency--**must take a proactive approach** and eliminate problems before they get into the mainstream of the system. Proactive quality assurance is not only concerned with inspection quality, uniformity, and reliability, but also with the concerns of producers, millers, elevator operators, and end-users. We must do a better job of selling our services, applying our skills, resolving customer complaints, and providing timely quality information to service users and the public.

The programs referenced in this Handbook are tools that can help field office and agency managers do their jobs better. With these tools, with your help, and with our commitment to quality, customer service, and continuous improvement, we can focus on what we need to do to keep the U.S. Official Inspection System the best in world.

David R. Shipman  
Deputy Administrator  
Grain Inspection, Packers and Stockyards Administration

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CHAPTER 1

GENERAL INFORMATION

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## 1.1 POLICY

The Grain Inspection, Packers and Stockyards Administration, Federal Grain Inspection Service (FGIS), is responsible for the effective performance of the official inspection and weighing system. To ensure that the official system provides high quality service that meets or exceeds the customer's expectations, FGIS shall maintain a quality assurance\ quality control (QA\QC) program or system that encompasses all Federal, state, and private agencies delegated, designated, or otherwise authorized to provide official services.

- a. FGIS' QA\QC program is the fundamental basis upon which the official system relies on to provide quality service. Consequently, the QA\QC activities performed by the Board of Appeals and Review (BAR), FGIS field offices, or official agencies shall be considered as being of equal importance to providing official services.
- b. The complexity of local markets will govern both the design and staffing requirements of local QA\QC systems. The QA\QC program staffing needs in FGIS' export offices, which have direct authority over many agricultural commodity graders (ACGs) and serve as a liaison with domestic points of origin, will differ from the needs of FGIS' domestic offices. Likewise, the degree of direct involvement by the field office manager (FOM) will differ among offices depending on the level and complexity of original services provided by the office.
- c. Regardless of an office's situation, **QA\QC duties must be viewed as primary--not secondary--functions**, and each FOM must ensure that his/her respective quality assurance specialist (QAS) has adequate resources to operate an effective QA\QC system. Likewise, each official agency manager (OAM) must completely support his/her agency quality assurance specialist (AQAS).
- d. **Each FGIS field office and official agency must have at least one QAS.** Offices with two or more QAS/AQAS must designate one as the **Primary--**for BAR/field office liaison purposes. Offices may elect to have additional inspectors/graders who assist the QAS/AQAS; e.g., grading monitoring samples.

## 1.2 BACKGROUND

In January 1994, FGIS established a three-member *ad hoc* factfinding team (FFT) to evaluate the effectiveness of the national inspection system's quality assurance processes and to make recommendations for improvement. The FFT report, which was developed with input from FOMs, industry representatives, and senior FGIS managers, provided a basic framework for an effective QA\QC system. The report stated that the national inspection system's QA\QC system must be:

- ☞ Statistically-sound.
- ☞ Field-based and field-owned.
- ☞ Flexible--able to be tailored to any situation.
- ☞ Focused on preventing problems, not just finding them.
- ☞ Designed to encourage teamwork and lateral communication.
- ☞ Able to provide some performance measurement (i.e., mini-GIMS).
- ☞ Customer directed (i.e., BAR serves QAS; QAS serves ACGs and licensed inspectors (LIs)).

## 1.3 OVERVIEW

- a. FGIS' QA\QC program is a proactive system for monitoring grading accuracy and ensuring consistent inspection results, both on a national and a local basis. It also provides official agencies and FGIS field offices with a wealth of information and a wide range of analytical tools which will greatly enhance their ability to prevent quality problems and address quality concerns.
- b. The new QA\QC program involves multiple systems and activities working together to ensure that the national inspection system provides quality service. All levels of the national system--Federal, state, and private--play an important role.
- c. Key features of the new program are:
  - ✓ QA\QC-dedicated computers, with special software and expanded data storage/retrieval capability, are in place at the local level (field office).

- ✓ Local personnel are trained on data input, electronic data transfer, output, data analyses, and graphing.
- ✓ National QA\QC processes will be uniformly accomplished. The processes use a balance of feedback (reactive) and forward (proactive) control tools.
- ✓ Mandatory official agency participation in selected quality processes.
- ✓ Local QA\QC processes that are standardized but flexible in usage and used as needed to detect and prevent grading disagreements.
- ✓ Identification of critical control points (CCPs) at each service location. These are factors and/or subfactors that have historically needed special emphasis due to the difficulty of the test or frequency of the problems in the marketing system.
- ✓ A management philosophy/culture change from inaction→reaction to action→prevention.

#### 1.4 NATIONAL PROGRAMS

- a. National (QA\QC) programs are processes that must be uniformly conducted and/or participated in by all official inspection locations. These programs include:
  - (1) The national Sample Inspection and Monitoring System (SIMS),
  - (2) The BAR/QAS Subjective Testing and Evaluation Process (STEP),
  - (3) BAR-initiated referee and survey sample exchange programs,
  - (4) The Intermarket Monitoring Program (IMP),
  - (5) Crop quality studies, and

(6) The FGIS Early Alert Program.

The aforementioned programs provide a reasonable balance between performance and ability at the national level, and are considered critical to the credibility of official testing services.

**NOTE: It cannot be overemphasized that the quality tools and processes that comprise the national program represent the minimum QA\QC effort needed to assure national uniformity, prevent major problems, maintain grading tolerances, and evaluate the standards. But, to improve quality, field offices and agencies must develop strong, local (QA\QC) programs that build on the foundation laid by the national program.**

- b. Like the Grain Inspection Monitoring System (GIMS), national SIMS is a file sample monitoring program. Also like GIMS, it has two purposes: to monitor the quality of the inspection service provided by the official inspection system (primary), and to provide data to evaluate standards and procedures (secondary).
- c. BAR/QAS STEP program is a proactive quality control process that requires routine separation exchanges between the QAS and the BAR. The sample selection and submission rates may be varied according to the complexity of the market, prevailing market conditions, and the QAS' familiarity with and understanding of those conditions. When properly executed, STEP provides for continuous evaluation of the QAS' individual interpretive skills and provides specific and timely feedback to assure proper alignment at the local and national levels.
- d. BAR-initiated referee and survey sample exchange programs are also integral components of the national QA\QC framework. These programs provide FGIS with an efficient mechanism to identify weaknesses and direct and control needed improvement efforts. Referee/survey sample data compliments data obtained via SIMS and STEP. And, like STEP, referee/survey samples focus on ability, not performance.
- e. The IMP program compares origin and destination (domestic) inspection results on individual barge and railcar shipments; thus, serving as the ultimate verification as to whether the official system is meeting the needs and expectations of the customer.
- f. FGIS' Crop Quality and Early Alert programs provide the official system and end users with information about the quality of the new crop and recent regional shipments. This allows FGIS to "head-off" problems before they get out of hand.

## 1.5 LOCAL PROGRAMS

- a. Local (QA\QC) programs are vital links in the quality chain. Unlike the national program, local programs allow field offices and agencies an opportunity to directly address or prevent local/regional problems and to monitor factors and subfactors that are unique to their area. These programs also promote team building and provide a fertile ground for pilot testing new, innovative QA\QC approaches. Local programs must be flexible. Consequently, they will vary from circuit to circuit. But, within each circuit, local programs must be uniformly conducted and/or participated in by all service points and official personnel. Local programs may include:
- (1) A local Sample Inspection and Monitoring System (SIMS),
  - (2) QAS/AQAS Subjective Testing and Evaluation Processes (STEP),
  - (3) Field office-initiated referee and survey sample exchange programs, and
  - (4) A wide range of QA\QC tools, such as over-the-shoulder reviews, opinion samples, and same portion monitoring.
- b. Every FGIS field office manager **must** develop a local program for his/her circuit by October 1, 1996. Local programs should be designed to focus on factors/subfactors and procedures that most affect the quality of the inspections performed in the circuit.
- (1) Assessing Needs. Prior to developing a local program, the FOM should meet with key field office and official agency personnel to identify and prioritize the circuit's inspection vulnerabilities; i.e., what factors are most likely to challenge the circuit's inspectors.
  - (2) Designing Local Programs. The local program must be:
    - ✓ Focused--target factors/subfactors that are of most importance.
    - ✓ Flexible--able to be changed as the local situation changes.

- ✓ Sound--use nationally recognized QA\QC tools.
- ✓ Easy to administer--keep red-tape to a minimum.
- ✓ Able to provide accountability--show progress and improvement.
- ✓ Measurable--can be gauged in terms of money and human resources.

(3) Documenting Local Programs. Local programs must be documented, in writing, and signed by the FOM.

✍ Documentation must be holistic--cover all local/field office concerns including the technical supervision of ACGs, as well as the monitoring of official agencies.

✍ Documentation must be specific; i.e., who will do what, what will be done, when will it be done, and where will it take place.

✍ Documentation must provide for periodic evaluation and revision.

✍ Documentation must address intermarket complaint monitoring/ resolution, new crop studies, and early alerts.

✍ Documentation must cover all local crops and programs.

(4) Announcing Local Programs. The FOM must share the details of the local program with all effected groups and individuals, including ACGs.

## 1.6 ONLINE QUALITY CONTROL

One of the most important actions we can take for assuring quality is to provide inspectors the tools needed to ensure that analyses are performed correctly the first time. Inspectors need to know that the equipment that they are using is performing accurately. They also need to have tools available to aid them in making difficult subjective determinations. The best way to improve quality is by providing online personnel with the tools needed to prevent errors in the first place. Online quality control tools include:

- ✘ Check testing procedures.
- ✘ Instrument calibrations.
- ✘ Reference samples.
- ✘ Interpretive line slides.
- ✘ Interpretive line prints.
- ✘ Wheat variety samples.
- ✘ Wheat classification handbook.

## 1.7 ROLES AND RESPONSIBILITIES

- a. Director - Field Management Division. Responsible for ensuring that providers of official inspection services optimize the utilization of the QA\QC system and deliver quality service to customers.
- b. Director - Technical Services Division. Provides technical services to support the FGIS' QA/QC system; e.g., technical training, research, central reference standards, and problem solving support.

c. Quality Coordinator.

- (1) Serves as FGIS' primary contact/representative for QA\QC issues and programs;
- (2) Oversees the day-to-day operation of the national program;
- (3) Works in close relationship with the BAR in initiating modifications and changes to BAR-directed QA\QC programs and otherwise serves as an active liaison between the BAR and FGIS field offices in planning, developing, and implementing national QA\QC initiatives;
- (4) Participates, with the Director of Field Management Division, in evaluating QA\QC programs and effectuating changes when deemed necessary;
- (5) Works with the FGIS Training Officer to plan, direct, and coordinate QA\QC training;
- (6) Facilitates QA\QC communications between Headquarters, Technical Services Division (TSD), the BAR, FGIS field offices, and official agencies; and
- (7) Coordinates QA\QC technical (computer/statistical) support activities.

d. Board of Appeals and Review.

- (1) Serves as the central reference for grading factors;
- (2) Checktests, align, and calibrate inspection equipment, including moisture meters, dockage testers, and protein analyzers;
- (3) Provides technical training, investigation, and problem solving assistance, as requested by the Quality Coordinator or field office managers;
- (4) Maintains and supports anchor agreements with QAS;
- (5) Ensures and demonstrates stable alignment with accepted standards;
- (6) Provides advance information on crop quality and potential grading problems to the inspection system;



- (7) Develops new and improved inspection methodology and QA\QC tools, and maintains proven processes to assure the integrity of BAR results; and
  - (8) Maintains the master IMP data base and performs all necessary statistical analyses.
- e. Field Office Managers.
- (1) Oversee the day-to day operation of the local QA\QC program in the field office circuit;
  - (2) Initiate and direct the resolution of local QA\QC problems;
  - (3) Ensure that the QAS is in line with the BAR;
  - (4) Ensure that ACGs and LIs are properly trained and local QA\QC programs are developed and implemented; and
  - (5) Liaison with OAMs to ensure compliance with national and local QA\QC programs.

## **1.8 ANCHOR AGREEMENTS**

- a. Anchor agreements establish the protocol between the BAR and an FGIS field office, or between an FGIS field office and an official agency, for the purpose of maintaining alignment on interpretive factors and/or subfactors.
- b. FGIS field offices must have written anchor agreements (see attachment 1) with the BAR. Official agencies must have written anchor agreements (see attachment 2) with the local FGIS field office.

c. The agreements must:

- ★ Identify the individuals designated by the field office/agency as the QAS/AQAS, as well as any and all “back up” or assistant QAS/AQAS;
- ★ Specify the QA\QC tools that will be used to monitor the grading accuracy of the field office/agency--including participation in national/local SIMS;
- ★ Establish the policy on attending BAR/field office quality meetings (e.g., each AQAS must attend an annual field office meeting and is encouraged to attend as many quarterly meetings as possible);
- ★ Identify CCPs (Field Office/BAR agreements must also include STEP sample submission rates); and
- ★ Outline the internal processes that will be used for assuring interpretive alignment between the respective offices.

**NOTE:** Anchor agreements merely document local policies, the importance of certain grading factors, and the frequency that particular kinds of separations/samples are to be forwarded to the BAR or field office. Consequently, they should be reviewed and updated, as situations change.

**EXAMPLE - FIELD OFFICE/BAR ANCHOR AGREEMENT**

**ANCHOR AGREEMENT BETWEEN THE FARMLAND FIELD OFFICE  
AND THE BOARD OF APPEALS AND REVIEW**

To ensure that the Farmland Field Office, Quality Assurance Specialist's (QAS) subjective interpretations are properly and consistently aligned with the Board of Appeal and Review (BAR) and that such interpretations are efficiently and effectively disseminated and monitored throughout the circuit, we agree to comply with the following Quality Action Plan.

**General Information**

The Farmland Field Office oversees inspections provided by 6 private/state agencies, who employ a total of 50 inspectors. The grain/commodities inspected at one or more of these locations include corn, wheat (HRS, HRW, and Durum), soybeans, sorghum, and edible beans (pea beans, pintos, kidneys, and great northern).

The Farmland Field Office's QAS is John Homes, the Back-up QAS is Mike Freeman.

The subjective factors/subfactors routinely seen in this market and which we consider to be critically important from a quality control standpoint, hereafter referred to as critical control points (CCPs) are :

Corn	germ and mold damage.
Wheat	germ, mold, and scab damage; DHV, HVAC, and WOCL.
Soybeans	damage-by-heat and heat damage.
Sorghum	germ and mold damage.
Edible Beans	dirt/grime, machine damage, water blistered, and frost damage.

Less frequently seen factors/subfactors that when present also challenge the inspection system's ability to uniformly and consistently apply the correct interpretation include:

Corn	blight and frost damage.
Wheat	sprout damage.
Sorghum	sprout damage and class.

### **QAS Responsibilities**

- ✓ Submit a minimum of one separation per month for each primary CCP listed to the BAR for review. Submissions will represent market channel samples and challenge the QAS' ability to apply the correct interpretation. Depending on market/crop conditions, CCPs are subject to change.
- ✓ Submit, on a bimonthly basis, separations representing those factors/subfactors that are infrequently seen in the marketplace. To maintain proficiency, a minimum of two separations for each factor/subfactor listed will be forwarded to the BAR during each six month period.
- ✓ Controversial samples/separations in which the QAS' interpretation is challenged by a line inspector will be forwarded to the BAR for opinion and final decision.
- ✓ The QAS will maintain a routine separation exchange program (minimum - one sample per week) with all supporting QC personnel (i.e., back-up QAS and ACGs) to ensure consistent interpretations.
- ✓ When necessary, to ensure timely and proper adjustments are made in the QAS' interpretation, the QAS will review returned BAR separations, consider any verbal or written explanations offered, and, to confirm their understanding of the correction/explanation, resubmit a separation for review.
- ✓ The QAS will immediately inform, personally or through recognized QA\QC personnel, all inspectors of any adjustment in interpretation and conduct necessary follow-up to ensure proper understanding and maintain control of the change.
- ✓ The QAS will maintain an awareness of current market/crop conditions and alert inspectors within their circuit, known intermittent or destination inspection points, and the BAR of any potential grading problems. Upon request, separations or type samples illustrating the condition present will be prepared and distributed.
- ✓ The QAS or the Back-up QAS will, at least monthly, collect and analyze monitoring data to detect possible inspector or system related weaknesses. The QAS will openly discuss grading problems with their regional contract person and keep them apprised of future developments.

## BAR Responsibilities

- ✓ The BAR will provide the QAS with timely and specific feedback concerning the accuracy of their separations.
- ✓ At least monthly, or upon request, the BAR will generate a comparison summary of the submitted separations. Included in the report will be graphs that will assist QC personnel in detecting undesirable trends or tracking the progress of any improvement efforts.
- ✓ Periodically, the BAR will forward survey/referee samples to randomly selected inspectors to gauge the circuit's understanding of specific factors/subfactors. The information will be shared with the field office and, when combined with local data, will be useful in identifying training needs and provide feedback on continuous improvement efforts.
- ✓ The BAR will provide necessary reference materials to assist inspection personnel in understanding and consistently applying the correct subjective interpretations (i.e., interpretative line slides and interpretative line prints) or varietal/seed identification (e.g., wheat classification handbook, variety type samples, and minor oilseed reference guide). The BAR will also maintain an inventory of grain/commodity training samples for use in local seminars, survey/referee samples, collaboratives, etc.
- ✓ The BAR will, upon request, assist the QAS in identifying the source(s) of a grading problem and developing a workable action plan to resolve the problem or minimize the impact through better management practices.
- ✓ Upon request, or as necessary, a BAR member will be dispatched to assist the QAS, including directing and controlling changes in interpretations.

Signed: \_\_\_\_\_  
Chairman, BAR

\_\_\_\_\_  
Field Office Manager



**EXAMPLE - OFFICIAL AGENCY/FIELD OFFICE ANCHOR AGREEMENT**

**ANCHOR AGREEMENT BETWEEN THE CENTERVILLE GRAIN INSPECTION AGENCY  
AND THE FARMLAND FIELD OFFICE**

To ensure that the Centerville Grain Inspection Agency, Agency Quality Assurance Specialist's (AQAS) subjective interpretations are properly and consistently aligned with the Farmland Field Office (FO) and that such interpretations are efficiently and effectively disseminated and monitored throughout the circuit, we agree to comply with the following Quality Action Plan.

**General Information**

The Centerville Grain Inspection Agency provides official inspection services at 4 specified services points located in the Tri-County area. The agency employs 12 inspectors, 1 weigher, and 6 samplers. The grains inspected at one or more of the specified service points include corn, Hard Red Winter wheat, and soybeans.

The Centerville Grain Inspection Agency's AQAS for all service points is Larry Black.

The subjective factors/subfactors routinely seen in this agency's circuit and which we consider to be critically important from a quality control standpoint (i.e., CCPs) are:

Corn	germ and mold damage.
Wheat	germ, mold, and scab damage.
Soybeans	damage-by-heat and heat damage.

Less frequently seen factors/subfactors that when present also challenge the inspection system's ability to uniformly and consistently apply the correct interpretation include:

Corn	blight and frost damage.
Wheat	sprout damage.
Soybeans	green damage.

### **AQAS Responsibilities**

- ✓ Submit a minimum of one separation per month for each CCP listed to the field office for review. Submissions will represent market channel samples and challenge the AQAS' ability to apply the correct interpretation.
- ✓ Submit, on a daily basis, SIMS select samples.
- ✓ Forward controversial samples/separations to the field office for opinion.
- ✓ Maintain a routine separation exchange program with all supporting personnel (i.e., back-up AQAS) to ensure consistent interpretations.
- ✓ Immediately inform all of the agency's licensed inspectors of any necessary adjustment in interpretation and conduct necessary follow-up to ensure proper understanding and maintain control of the change.
- ✓ Openly discuss grading problems with the field office QAS and keep him/her apprised of future developments.

### **Field Office Responsibilities**

- ✓ Provide the AQAS with timely and specific feedback concerning the accuracy of his/her separations.
- ✓ Periodically, forward survey/referee samples to randomly selected inspectors to gauge the agency's understanding of specific factors/subfactors. The information will be shared with the AQAS.
- ✓ Assist the AQAS in identifying the source(s) of a grading problem and developing a workable action plan to resolve the problem or minimize the impact through better management practices.

Signed: \_\_\_\_\_  
Field Office Manager

\_\_\_\_\_  
Official Agency Manager



CHAPTER 2

**SAMPLE INSPECTION AND MONITORING SYSTEM**

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Attachment, "Charts and Graphs"



## 2.1 INTRODUCTION

The Sample Inspection and Monitoring System (SIMS) is an automated information system which documents the results of monitoring (supervision) inspections.

- SIMS is a tool that is designed to help managers promptly detect developing problems.
- SIMS collects information (comparative inspection results) that describe current inspection performance. The results are automatically processed and then subjected to standard statistical tests that can signal a real or potential grading problem.
- SIMS provides a representative historical database of inspection information for use in standards/CUSUM tolerance analysis, economic impact analysis, and other special studies.

## 2.2 SAMPLE SELECTION

- a. National Program. FGIS field office and official agency participation in the national SIMS program is mandatory.
  - (1) Only randomly-selected samples representing **original** official sample-lot (white certificate), warehouseman's sample-lot (yellow certificate), or submitted sample (pink certificate) inspections may be selected for inclusion into the national SIMS program.
  - (2) Reinspections, appeal inspections, official commercial inspections, referee/survey samples, opinion samples, component (ship) samples, and supplemental/local monitoring sample inspection results **shall not** be included in the national SIMS program.

**NOTE:** **Appeal inspections must be included in the local SIMS program.**

(3) The SIMS sample selection process is specified service point oriented. That is, the number of samples selected will depend on the volume of inspections performed at each specified service point.

(4) **The national SIMS selection rate is as follows:**

For barge-, truck-, and railcar-lots, and submitted samples, the rate is 1.0 percent.

For ship-sublot samples, the rate is 5.0 percent.

(5) File samples must be selected every workday. Only those samples **certificated** (i.e., the ‘date prepared’) the preceding workday shall be eligible for selection. On Monday, the samples certificated on the preceding Friday, Saturday, and Sunday shall be eligible for selection.

(a) Use the QA\QC computer to generate random numbers for selection purposes.

1. For single-lots and submitted samples, generate one number between 00 and 99, inclusive.

2. For ship-sublot samples, generate one number between 1 and 20, inclusive. If the lot has more than 20 sublots, develop additional numbers by incrementally adding 20 to the random number; e.g., the random number initially selected is 7 and the ship has 49 sublots. Add 20 to 7, which yields 27. Then, add 20 to 27, which yields 47. As a result, the random numbers for the ship will now be: 7, 27, and 47.

(b) Notify the field office and/or official agency SIMS contact persons of that day’s random number(s).

(c) The contact persons shall select file samples by using completed pan tickets, sample tickets, ship logs, certificates, or other locally agreed-upon work records, as deemed most appropriate.

(d) The collection system used may vary from service point to service point, and circuit to circuit.

**NOTE: 'Unnumbered' pan tickets or certificates may be used for selections provided they are manually assigned an ascending (001, 002, etc.) three-digit number before making a selection.**

1. Collect all completed work records, logs, or certificates pertaining to the samples eligible for selection.
2. Select the work records/certificates whose last digits match that day's random number. Obtain the samples that correspond to the selected work records/certificates.

**NOTE: If a combined lot (unit train-lot, round-lot, or warehouse-lot) is selected, then randomly select one of the sublots in the lot for national SIMS purposes.**

- (6) Specified service points shall submit selected file samples with a completed work record, including proper identification as to carrier, grade, and all determined factors, to the appropriate FGIS field office contact. Mark the front of the work record, **N-SIMS**.
- b. Local Programs. In almost all cases, the national SIMS program--alone--will not provide enough information about locally-important factors and key (or problem) service points. For this reason, most FOMs will find it necessary to develop a local SIMS program. Specific program features, such as sample selection rate, may be determined by the field office based on the unique needs/abilities of the field office circuit. **When a local SIMS program is developed, participation in the program is mandatory for all affected parties.**
- (1) Local SIMS samples may be randomly selected or targeted by location, inspector, factor results (e.g., all corn samples over 3.0 % DKT), or other criteria, as deemed necessary by the FOM.

- (2) To obtain local SIMS samples, field offices may use either a **simple selection system** wherein a fixed percentage of all samples are selected for monitoring purposes; a **non-random selection system** in which certain service points, individuals, or kinds of samples are targeted for selection; a **stratified selection system** that divides the sample population into distinct, identifiable groups (U.S. No. 1 group, U.S. Nos. 2 and 3 group, etc.); or a combination of several systems.
- (3) Reinspections, official commercial inspections, referee/survey samples, and opinion samples may be considered as “supplemental monitoring samples” and the results included in the local SIMS program. **Appeal inspections must be included in the local SIMS program.**

**NOTE:** **FGIS field offices should be aware that efficiencies can often be obtained by targeting the most information-rich samples for selection (i.e., those that are challenging), rather than simply increasing the overall selection rate.**

- (4) Specified service points shall submit selected file samples with a completed work record, including proper identification as to carrier, grade, and all determined factors, to the appropriate FGIS field office contact. Mark the front of the work record, **L-SIMS**.

## **2.3 SAMPLE ANALYSIS**

- a. For the national SIMS program, file samples selected shall be graded without knowing the original inspection results. All **subjective** factors (i.e., non-equipment dependent), which were determined on the original inspection, must be determined on the review inspection. Other factors may be determined, at the discretion of the FOM
- b. For local SIMS, file samples selected may be graded with or without knowledge of the original inspection results, at the discretion of the FOM, and the FOM shall decide which factors will be determined.

**NOTE:** **The FOM may also direct that all grading factors (DKT, HT, FM, etc.) be determined on some or all SIMS samples. For example, if LIs at certain specified service points routinely grade inbound lots on the basis of test weight and moisture only, the FOM may elect to also determine all other potential grading factors on local SIMS samples submitted from those points.**

- c. Factor determinations shall be based on standard portion sizes as specified in the FGIS Grain Grading Procedures Handbook, Rice Inspection Handbook, Bean Inspection Handbook, and Pea and Lentil Inspection Handbook, as appropriate. (If official commercial inspections are selected for inclusion into the local program, factor determinations shall be based on the same portion size as used in the original determination.)
- d. After completing the review inspection, record the results on a form FGIS-920 (or like form) and then enter the information into the QA\QC system database for processing and analysis.
- e. To facilitate the FOM Select Program (see section 3.4) and Factor Separation Reviews (see section 5.2), maintain all factor separations on SIMS inspections.

## 2.4 STATISTICAL ANALYSIS

- a. When deemed necessary, complete a statistical analysis on the SIMS inspections performed at each specified service point and/or official agency. Such analyses should be performed more often, when deemed necessary, and may be more narrowly directed (e.g., individual inspectors) or broadened to encompass entire areas, circuits, or regions.

**NOTE:** For field office analysis purposes, all SIMS results may be evaluated together, or the results in the national or local SIMS databases, may be evaluated alone.

- b. See Attachment, *Charts and Graphs*, for additional information concerning the development and interpretation of control charts.

**NOTE:** Initially, the tolerances used by the SIMS program to determine whether inspectors are operating at an acceptable level of accuracy will be the same as those that were used by the GIMS program. These tolerances will be updated as additional data is collected.

## 2.5 FOLLOW UP ACTION

- a. When it has been determined that a service point or inspector is “out of tolerance,” the FOM shall initiate prompt problem-solving action to find and correct the cause of the problem. Actions should be related to the causes of the problems:

X	Materials	X	Methods
X	Equipment	X	Environment
X	Personnel	X	Sampling
X	Chance	X	Unknown Factors

- b. The BAR may advise and, if requested, assist the field office in addressing specific problems. However, primary responsibility for ensuring that problems are resolved and that inspections are performed in a consistent and accurate manner rests with the FOM--**not the BAR.**
- c. There is no one “perfect way” to fix any grading problem. If your assessment of a rule violation indicates a problem with interpretive factors, the use of increased over-the-shoulder supervision and the grading of the separations returned with corrections may help correct the problem. Sometimes, simply telling an inspector that he or she appears to be grading too loose or too tough, and reviewing the ILS with them is enough to bring them back into alignment.
- d. Factors involving mechanical determination may require additional equipment testing, sieve replacement, or a possible procedural change.

**NOTE:** SIMS enables the FOM/OA to readily “see” unusual/problem situations. But, it cannot be expected to solve grading problems alone. The FOM/OA must first locate the cause of the problem (e.g., lack of training or inattention) and then make the necessary adjustments to the process (e.g., training inspectors, increased over-the-shoulder supervision, fixing equipment, or recommending punitive action). SIMS will provide a good indication of whether the adjustments were effective.



## CHARTS AND GRAPHS

*THIS SECTION IS DESIGNED TO COMPLIMENT THE MATERIAL COVERED IN THE QA\QC TRAINING SEMINARS HELD AT THE FGIS TECH CENTER IN KANSAS CITY. PLEASE REFER TO THE QA\QC USER'S GUIDE AND QA\QC TRAINING MANUAL FOR ADDITIONAL INFORMATION.*

### INTRODUCTION

A major indicator of the “goodness” of a grain, rice, or pulse inspection is the comparison of the original inspection result to the supervision inspection result. These results do not agree all the time due to the presence of sampling, interpretation, and other sources of variation. Therefore, we usually have a scatter of data points that form a recognizable linear pattern, but falling short of the ideal straight line. This straight-line relationship may be described mathematically as:

$$\text{ORIGINAL} = a + b * (\text{SUPERVISION})$$

Where  $a$  is known as the intercept and  $b$  the slope. When  $a=0$  and  $b=1$ , the ORIGINAL result agrees exactly with the SUPERVISION result. Otherwise, the relationship between ORIGINAL and SUPERVISION results is less than ideal. For example, when  $b=0$ , the presence of  $a$  represents a constant bias (e.g.,  $a=0.5$  implies that the ORIGINAL result is always 0.5 percent lower than the SUPERVISION result). When  $a=0$ ,  $b$  represents a relative bias (e.g.,  $b=0.8$  implies the ORIGINAL result is always 80 percent of the SUPERVISION result). When both  $a$  and  $b$  differ from the ideal values of 0 and 1, the relationship is more complicated but not impossible to explain or understand.

In practice, we do not know the values of  $a$  and  $b$ . Statisticians collect data to try to estimate these values. To avoid misleading conclusions, the data must be meaningful, representative of the realistic situation, and not contain subjective influences. This is why so much emphasis had been placed on the random and proper selection of samples.

Statisticians also recognize that some random variations or errors are always present. Therefore, a realistic statistical regression model for analysis becomes:

$$\text{ORIGINAL} = a + b * (\text{SUPERVISION}) + \text{ERROR}$$

## **DEFINITIONS**

Bias. Average difference between the original and supervision results. Ideal is zero (0). Bias may also be defined as a deviation of the expected value of a statistical estimate from the quantity it estimates. Tending to yield one outcome more frequently than others.

Intercept. An indicator of general bias. The distance from the origin to a point where a graph crosses a coordinate axis. On FGIS scatter plots, the intercept value shown in the second line of the chart equals the left end point of the regression line. The ideal intercept value is 0.

Regression. Statistically fitting a straight line to the observed values. Comparing the y-intercept, slope, and Root Mean Square Error.

Regression Line. A line of predication. A regression line can be drawn to predict one variable from another.

Root Mean Square (or Standard Error of Estimate). The estimated standard deviation of the error. A value of 0 for the root mean square indicates a perfect fit of the data points to the regression line. By mathematical definition, the root mean square cannot be a negative value. A positive value indicates a less than perfect fit.

A small root mean square value is obviously desirable, but there is no natural guide on what the value should be. A large amount of comparable historical data is usually needed to establish a reasonable value for a stable process.

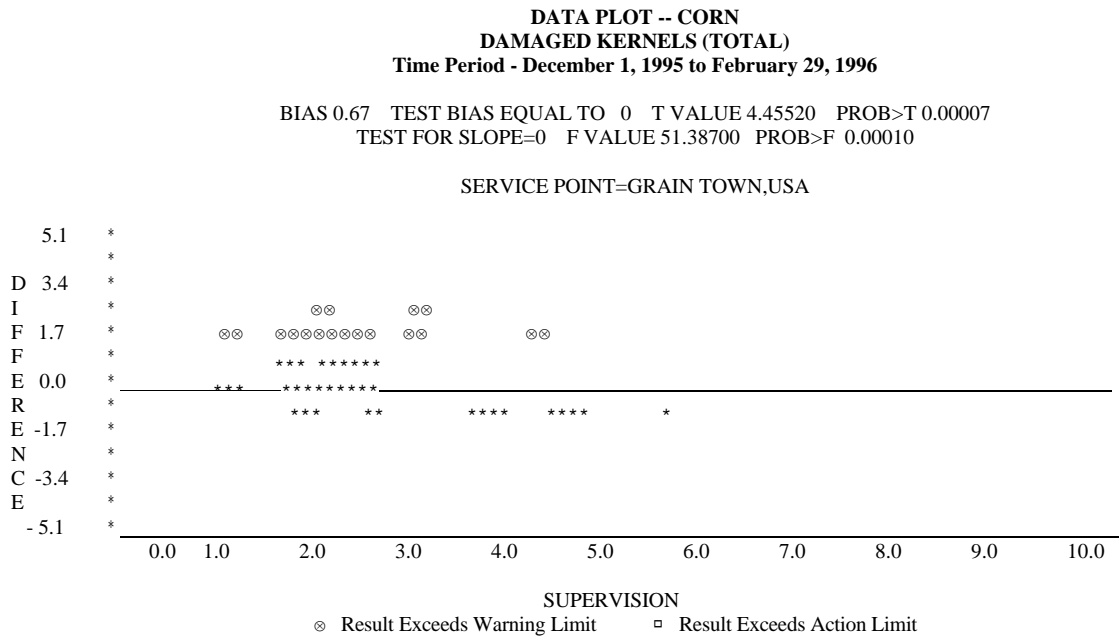
Slope. The tangent of the angle made by a straight line with the x-axis. The average change in Y (ORIGINAL) corresponding to 1 unit of change in X (SUPERVISION).

## THINGS TO CONSIDER ABOUT PLOTS

Plots provide an easy, visual look at possible trends and patterns. But, looks can also be deceiving, watch out for statistical fallacies. Before making plots:

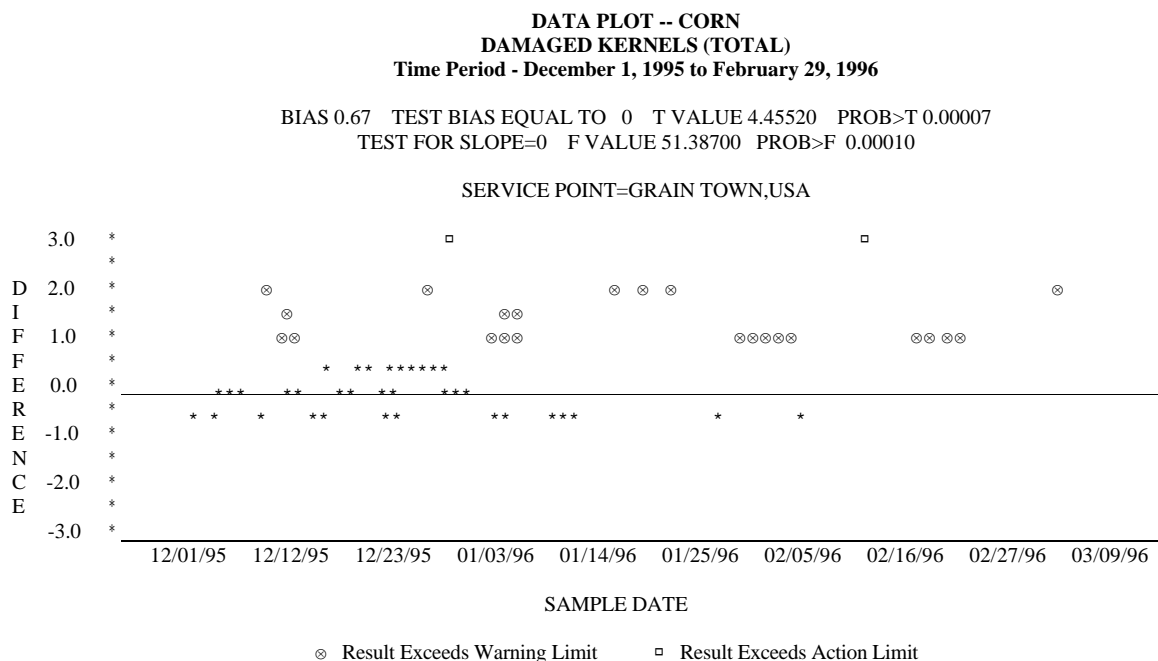
- ✓ Decide who, what, when, and why you are creating the plot.
- ✓ Consider the ideal or desirable results and compare with the observed results.
- ✓ Consider the limitations.
  - Is the sample size sufficiently large (enough to say something)?
  - Is the selection of samples proper (probabilistic or statistical)?
  - Is there good coverage of sample results?
  - Are the scales (range of values) of the plot misleading?
  - Are we drawing the right conclusions from the plots?
- ✓ Consider the common measures used to detect problems.
  - Large deviation from expected results; e.g., exceeding action limits is usually considered a “large” deviation.
  - Consistent “runs”.
  - Other unusual trends and patterns. When many samples exceed the warning limits the chance that something is wrong becomes very high and must not be ignored.

**DIFFERENCE PLOT**



A Difference Plot compares the difference between the original result and the supervision result to the supervision results. The difference between the two results should be “reasonably close” to zero relative to the supervision result all of the time.

## TIME PLOT

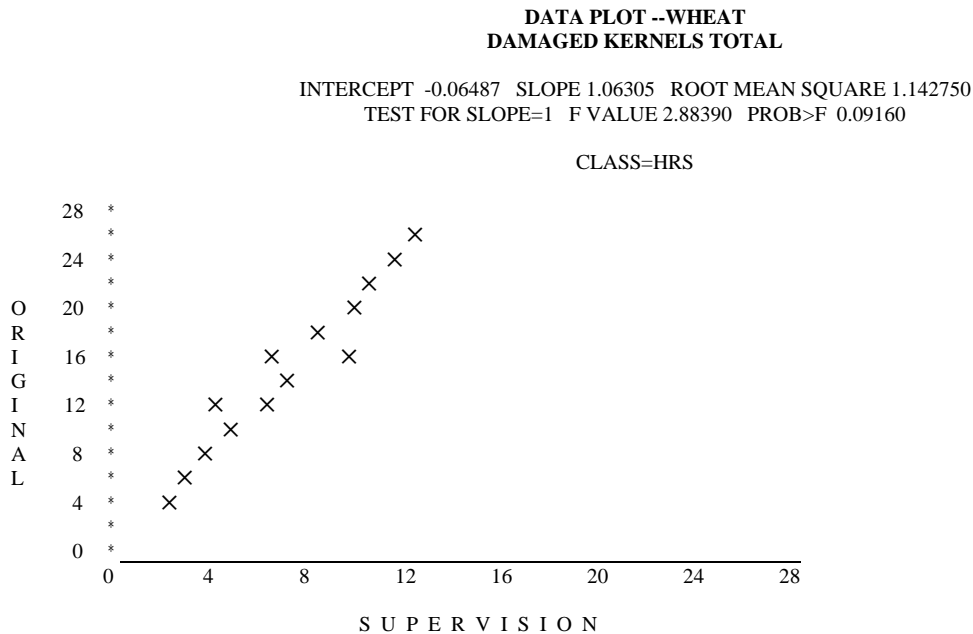


A Time Plot compares the difference between the original result and the supervision result over time. The difference between the two results should be “reasonably close” to zero at any point in time.

An official agency or field office is deemed not to be operating at an acceptable level of accuracy (not reasonably close) when any of the following rules are violated during a specific period:

1. Warning Rule. (Trouble may be here!) Two out of three consecutive results outside the tolerance limits.
2. Action Line Rule. (Trouble is here!) One result outside the action limits.
3. Run Rule. Eight consecutive positive or negative results.

## SCATTER PLOT



A scatter chart simply compares the original results to the supervision results. The two results should be “reasonably close” to each other.

## REGRESSION

A line of predication, called a regression line, can be drawn to predict one variable from another. But predication can be tricky. The reason is that the phenomenon of variability must be taken into account. Hence, a measure of the variability of prediction must be made in order to assess the validity of the prediction result.

The root mean square or standard error of estimate of the regression line is the standard deviation of the predicted Y values versus the actual Y values.

1. The first line on the graph tells us the equation of the regression line and gives us some information on the variability.

$$\text{Slope} = 1.06305 \quad \text{Intercept} = - 0.06487 \quad \text{Root Mean Square} = 1.42750$$

The equation of a regression line is:  $T = \text{Intercept} + (\text{Slope} * X)$   
This equation can be used to estimate a value of Y for a known X.

For example: We can predict a HRS DKT result from one of Grain Town's ACGs once we know the QAS' result.

$$\begin{aligned} Y \{ \text{ACG result} \} &= \text{Intercept} + (\text{Slope} * X \{ \text{QAS' results} \}) \\ &= - 0.06487 + (1.06305 * 8.0) \\ &= 8.44 \end{aligned}$$

From the root mean square, we can be 99 percent sure that the ACG's result on that sample would be  $8.44 \pm (3 * 1.42750)$  or anywhere between 4.16 and 12.72.

2. The second line on the graph tells us whether the two 'populations' are statistically the same or only have random variation working on the system.

$$\text{Test for Slope} = 1 \quad \text{F Value} = 2.88390 \quad \text{Prob>F} = 0.09160$$

The above information means that the program was tested for a slope of 1 (perfect correlation). A statistical test called the 'F-test' was performed and received a value of 2.88390. The 'Prob>F' value is 0.09160 which means that the two populations are essentially the same.

If the Prob>F is between 0.10 and 1.00, then the two populations {X and Y} are the same, and any differences are due to random variation or chance.

If the Prob>F is between 0.01 and 0.10, then the two populations may or may not be similar, and differences may be due to random variation or non-random variation.

If the Prob>F is between 0.00 and 0.01, then the two populations are not similar, and differences may be due to non-random variation; i.e., interpretation differences or instrument problems. These will need to be investigated further and corrected.

In addition to these simple tests, there are many other statistical tools available for our use, such as regression coefficient, coefficient of variation, coefficient of determination, and others.

**NOTE:** No single statistic will give a perfect measure of the quality of the inspection. However, it should be clear that the objective of quality assurance and quality control activities is to make:

**For Scatter Plots--**

**Y-intercept** = 0  
**Slope** = 1  
**Root Mean Square** = 0

**For Difference/Time Plots--**

**Y-intercept** = 0  
**Slope** = 0  
**Root Mean Square** = 0



CHAPTER 3

**SUBJECTIVE TESTING AND EVALUATION PROCESS**

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3.2	CRITICAL CONTROL POINTS.....	3-1
3.3	BAR/QAS STEP PROGRAM.....	3-2
3.4	LOCAL STEP PROGRAMS.....	3-3
3.5	FOM SELECT PROGRAM.....	3-4



### 3.1 INTRODUCTION

The Subjective Testing and Evaluation Process (STEP) is a critical *foundation* process used to ensure that the QAS' line on interpretive factors conforms with the BAR's line and that the AQAS' line conforms with the QAS'.

- a. The objective of the STEP program is to control and minimize interpretive variability encountered with subjective factor determinations in all graded commodities (grain, rice, and pulses).
- b. The STEP program, which functions like onsite monitoring/over-the-shoulder supervision, involves the BAR reviewing and adjusting the QAS' factor separations; and the QAS reviewing/adjusting the AQAS' separations.

### 3.2 CRITICAL CONTROL POINTS

- a. Critical Control Points (CCPs) are subjective factors or sub-factors (e.g., green damage in soybeans) that are of importance to a specific area or circuit.
- b. Reference Material. All official inspection personnel--ACGs and LIs alike--must have routine access to FGIS-approved interpretive line slides/prints (ILS/ILP) and type samples for pertinent CCPs .

**NOTE:** Each FGIS field office and official agency must have at least one set of locally-pertinent ILS/ILPs. Several sets may be required for offices/agencies that maintain two or more geographically-separated specified service points.

### 3.3 BAR/QAS STEP PROGRAM

All FGIS QAS' (primaries and secondaries) must participate in the national STEP program.

a. Sample Selection and Submission.

- (1) Each QAS shall routinely select "challenging" samples and make an analysis for one or more CCP factors/subfactors. Selected samples must grade U.S. No. 2 or lower, and the factors chosen for analysis must be important to the field office circuit.
- (2) To facilitate the STEP program, each FOM should ensure that the Anchor Agreement between the field office and the BAR:
  - (a) Identifies CCPs--factors and subfactors of circuit-wide concern,
  - (b) Categorizes CCPs as either common (routine/wide spread) or not common (infrequently seen, only affect minor crops, or not a problem in most crop years), and
  - (c) Establishes a STEP sample submission rate.
- (3) The QAS shall submit the agreed upon CCP separations to the BAR, at the agreed upon interval, with a completed pan/sample ticket; e.g., form FGIS-920.

b. Review, Processing, and Reporting.

- (1) The BAR shall review the QAS' separations, and either agree or disagree with the QAS' decision on each kernel/bean.
- (2) Upon request of the QAS or when deemed necessary by the BAR, the corrected separations shall be returned to the QAS for study; i.e., interpretation adjustment.
- (3) The BAR shall not score the QAS' separations, other than to identify the percent of kernels/beans that were added to (+) or taken away (-) from the QAS' separations.
- (4) The BAR shall also input all STEP results into a dedicated database for further evaluation/analysis.

- (5) Once a month, the BAR shall prepare a summary report of all STEP separation reviews performed during the previous month. The report shall be electronically distributed to the appropriate FOMs and the Quality Coordinator.

### 3.4 LOCAL STEP PROGRAMS

A local STEP program should be established and, at the discretion of the FOM, the QAS may direct that all or selected AQAS, ACGs, and/or LIs participate in the program.

a. Sample Selection and Submission.

- (1) Participating inspectors shall routinely select “challenging” samples and make an analysis for one or more CCP factors/subfactors.
- (2) To facilitate the STEP program, the FOM should initiate an Anchor Agreement with each official agency (or a like agreement with ACGs) that:
  - (a) Identifies CCPs--factors and subfactors of circuit-wide concern,
  - (b) Categorizes CCPs as either common (routine/wide spread) or not common (infrequently seen, only affect minor crops, or not a problem in most crop years), and
  - (c) Establishes a STEP sample submission rate.
- (3) Participating inspectors shall submit the agreed upon CCP separations to the QAS, at the agreed upon interval, with a completed pan/sample ticket; e.g., form FGIS-920.

b. Review, Processing, and Reporting.

- (1) The QAS shall review the participant’s separations, and either agree or disagree with their decision on each kernel/bean.

- (2) Upon request or when deemed necessary, corrected separations shall be returned to the participants.
- (3) The QAS may score (e.g., calculate their percent of correct/incorrect) the participant's separation and/or identify the percent of kernels/beans that were added to (+) or taken away (-) from the separations.
- (4) The QAS shall also input all local STEP results into a dedicated database for further evaluation/analysis.
- (5) Once a month, the QAS shall prepare a summary report of all STEP separation reviews performed during the previous month. The report shall be distributed to the appropriate OAMs.

### 3.5 FOM SELECT PROGRAM

- a. This is a mandatory program designed to monitor the interpretive performance of the QAS'.
- b. Once a week, the FOM shall select--usually at random--factor separations made by the QAS' on monitoring samples that have not already been sent to the BAR.
- c. The FOM shall mark each selected separation, **FOM SELECT**, and send it to the BAR.
- d. The BAR shall review the separation following the same procedures as STEP samples and return the results to the FOM. The results shall also be placed in a database by the BAR for further evaluation/analysis.
- e. Once a month, the BAR shall prepare a summary report of all FOM selects performed during the previous month. The report shall be electronically distributed to the appropriate FOMs and the Quality Coordinator.

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Grain Inspection, Packers and Stockyards Administration  
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QUALITY HANDBOOK  
Chapter 4  
Referee/Survey  
10/1/96

CHAPTER 4

**REFEREE/SURVEY SAMPLE EXCHANGE PROGRAMS**

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4.3	SURVEY SAMPLE EXCHANGE PROGRAMS .....	4-3





#### 4.1 INTRODUCTION

- a. Referee and survey sample exchange programs are an integral component in the national program and often play a key role in local programs, as well. They provide a ready means for predicting weaknesses and directing needed preparation and improvement efforts. Like STEP, referee/survey sample programs focus on ability, not performance.
- b. Information gained from SIMS, the intermarket monitoring program, new crop/early alert reports, industry contacts, and BAR/QAS/AQAS communications will determine when referee/survey samples should be sent out, to which inspectors, and what factors/subfactors should be evaluated.
- c. Distribution of referee and survey samples may be limited to a single region, market, circuit, or service point.

#### 4.2 REFEREE SAMPLE EXCHANGE PROGRAMS

- a. General.
  - (1) Referee samples are simply work portions that are sent out to a group of inspectors who grade them and then return them to the BAR or QAS, who re-grades them and then compare the two results.
  - (2) Usually, referee samples focus on only one factor/subfactor.
  - (3) Since the same sample (actually a work portion) is graded by both the BAR/QAS and the inspector, the influence of random sample variation is eliminated. Furthermore, by being able to look at the corrected separation and consider the comments offered by the reviewer, the inspector is able to make an informed, controlled adjustment to his/her interpretative line.
  - (4) Because reviewing factor separations can be very time consuming, referee sample exchanges are often initiated after a survey sample exchange has first pointed out which inspectors are potentially weak on a particular factor. But, referees may also be used whenever deemed appropriate.

b. BAR-Initiated Referee Sample Exchange Program.

- (1) Generally, the BAR conducts referee sample exchanges on an *ad hoc* basis, in response to crop quality information or indications of possible wide-spread interpretive problems.
- (2) The BAR usually targets specific inspectors participation in a referee sample exchange program. QAS' and ACGs are included in all exchanges involving their circuit/area. Participants may also be randomly selected. The QAS will receive a list of those selected from their circuit.
- (3) Upon receipt of a referee sample, each QAS/AQAS/ACG/LI must make an independent assessment of the factor in question. Then, return their results and separations to the BAR within two weeks.
- (4) Within 2 weeks of receiving the factor separations, separations will be corrected by a minimum of two BAR members and returned directly to the inspectors with a written assessment.
- (5) The BAR may, when deemed necessary, send out follow-up referee samples.
- (6) Input all referee sample exchange results into a dedicated database for further evaluation/analysis, prepare a summary report of each exchange, and distribute a copy of the report to the affected FOMs, QAS, and OAMs.

c. FOM-Initiated Referee Sample Exchange Program.

- (1) QAS' may conduct referee sample exchanges with all or selected AQAS', LIs, and/or ACGs, when deemed necessary.
- (2) Each participant must make an independent assessment of the factor in question and then return their results and separations to the QAS.
- (3) As soon as possible, the QAS will return the corrected separations directly to the participants.
- (4) Input all referee sample exchange results into a dedicated database for further evaluation/analysis, prepare a summary report of each exchange, and distribute a copy of the report to the affected OAMs.

### 4.3 SURVEY SAMPLE PROGRAMS

- a. Survey samples offer the most efficient means of estimating system/inspector capability.
- b. By focusing on ability, rather than performance, survey samples enable the BAR or QAS to quickly predict weaknesses and initiate problem-solving actions in sufficient time to prevent or minimize grading problems. The advantage survey samples offer is that they do not require the BAR/QAS to review all separations, which is very time consuming. The disadvantage of survey samples is that you cannot rely on the “raw data” alone to identify individual weaknesses.
- c. To initiate, select a challenging sample--one that exhibits a current problem or important factor.
  - (1) The sample should be divided into a predetermined number of work portions for a selected factor; e.g., divide a 1,000-gram wheat sample into an appropriate number of 15-gram damaged kernel portions.
  - (2) The BAR or QAS shall evaluate at least eight (8) of the work portions and then calculate the average factor result, this becomes the Target Value. (QAS' may ask the BAR to determine the Target Value for local survey sample exchanges.)
  - (3) Distribute the remaining work portions to all or a select number of AQAS/ACGs/LIs and have them determine the same factor and return their results/separations to the BAR or QAS.
  - (4) Comparing the AQAS/ACG/LI results to the Target Value will readily identify any suspected deficiencies. If the “raw data” suggests a weakness, review the inspectors separations to determine what, if any, influence random variation had on the findings.
  - (5) Input all survey sample results into a dedicated database for further evaluation/analysis, prepare a summary report of each survey, and distribute a copy of the report to the affected FOMs and OAMs.

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QUALITY HANDBOOK  
Chapter 5  
QA/QC Tools  
10/1/96

CHAPTER 5

QA\QC TOOLS

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## 5.1 INTRODUCTION

- a. At the local level, field offices and official agencies may use a variety of QA\QC programs and “tools.” This allows individual offices the flexibility to tailor their local QA\QC systems to address regional quality problems and to monitor the critical control points unique to their area. It also helps ensure that front line inspectors receive the feedback that they need to improve their skills and knowledge.
- b. Managers are encouraged to use the tools described in this chapter when designing their local (QA\QC) programs. They should keep in mind that the system used in one circuit or area will probably vary in the components, application, and effectiveness from the systems used in other areas. What works in one area, may not necessarily work in another. FOM’s should not hesitate to discontinue, modify, or replace local programs and tools that prove to be ineffective in their circuit. The single most important issue is to construct a local program that provides all customers the highest quality service obtainable.

## 5.2 QA/QC TOOLS

In addition to **SIMS, STEP, and Referee/Survey Sample Exchange programs**, there are a number of other tools that may be used to enhance local programs. All of these tools are optional; that is, the tools are not required to be used by all circuits or at fixed intervals.

NOTE: Input all review/monitoring results into a dedicated database for further evaluation/analysis, prepare routine summary reports, and distribute copies of the reports to the affected OAMs.

a. Factor Separation Reviews.

- (1) **Overview.** Factor separation reviews provide valuable feedback to the inspectors (i.e., lets them know how they are doing) and the FOM (e.g., identifies training needs, tracks crop conditions, and monitors market fluctuations).
- (2) **Procedure.** At a predetermined interval, the QAS will require all or a select group of ACGs/LIs to submit at least one interpretive factor separation for review (e.g., once a week, every ACG/LI must give the QAS one of their most recent dark, hard, and vitreous separations). Factors and submission rates may vary, but the separations selected must be “challenging” to be effective.

b. Opinion Samples.

- (1) **Overview.** Opinion samples supplement the local QA\QC process with a quick exchange of interpretations between the QAS and the ACGs/LIs.
- (2) **Procedure.** FOMs should encourage ACGs/LIs to routinely submit challenging/controversial separations/samples to the QAS for review. ACGs/LIs should provide pertinent background information to assist the QAS in making their determination. The QAS should inform the ACGs/LIs of their findings as soon as possible and return the separations/samples if requested.

c. Onsite Monitoring/Over-the-Shoulder Supervision (OTS).

- (1) **Overview.** OTS allows the QAS to observe an inspector’s grading skills and to offer immediate feedback and training.
- (2) **Procedure.** OTS supervision consists of reviewing interpretive factor separations and odor determinations and checking the sample for sample grade and special grade factors.

d. Check Samples.

- (1) **Overview.** Check samples are designed to self-monitor an equipment process or grading procedure for variability. It is particularly valuable where multiple equipment operations and/or several inspectors are involved in “processing“ each sample; e.g., a production-line operation.



- (2) **Procedure.** Randomly select a file sample and then arrange for the specified service point that originally inspected the sample to inspect it again, without knowing the original results (i.e., as a blind sample). The QAS shall compare the results of the two inspections to determine whether the specified service point is providing consistent results.

e. Same Portion Monitoring.

- (1) **Overview.** This tool allows the QAS to monitor an inspector's grading line without the QAS being biased by the original separation. It is most effective when used to evaluate factor determinations that do not harm or destroy the product being examined (e.g., broken kernels in rice, and DHV in wheat).
- (2) **Procedure.** Direct ACGs/LIs to submit recombined work portions (the factor separations have been mixed back into the work portion). The QAS should reevaluate the recombined work portions--without knowing the original results--and then compare their results with the original findings.

f. Site Visits.

- (1) **Overview.** Site visits allow the QAS to gain a better understanding of each ACG/LI, specified service point, and the area/circuit as a whole. It provides an invaluable opportunity to observe inspection activities and determine if ACGs/LIs are performing up to their abilities.
- (2) **Procedure.** Periodically, QAS' should visit each specified service point. While at the point, watch the way the office operates, observe the technicians "breaking down" the samples and performing machine-dependent tests (e.g., shrunken and broken determinations, moisture, and test weight per bushel). Then, perform over-the-shoulder monitoring of each inspector.

g. Reference Samples.

- (1) **Overview.** Reference samples provide a means to measure the consistency of certain equipment, such as the rice sheller, and machine-dependent tests, such as milling yield. They can also be used to measure subjective factor variability.
- (2) **Procedure.** The QAS gathers a quantity of grain, rice, or pulses of a consistent, known quality (e.g., long grain rough rice with a milling yield of 65.5 pounds total/56.5 pounds head rice). Store the sample under controlled conditions, usually refrigeration, to preserve its attributes. Periodically, divide out a portion from the sample and introduce it into the grading process to determine whether the machine/individual is providing consistent results.

h. Other. QAS' are encouraged to be innovative and develop new and better ways to maintain quality.

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QUALITY HANDBOOK  
Chapter 6  
Intermarket Monitoring Program  
10/1/96

## CHAPTER 6

### INTERMARKET MONITORING PROGRAM

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## 6.1 INTRODUCTION

Consistency of inspection results between origin and destination is of utmost importance to our customers. Intermarket consistency represents the direct verification as to whether the inspection system is meeting the customer's expectations. FGIS' Intermarket Monitoring Program (IMP) provides access to information that shows the relationship of origin and destination inspection results, and permits inspectors to rapidly identify problems or potential problems and initiate corrective action(s) with the BAR and the corresponding inspection point.

## 6.2 DATA COLLECTION

The IMP provides valuable information that can be used to evaluate the performance of the national inspection system, particularly for comparing inspection results for origin and destination bulk grain shipments (e.g., barges loaded in Minneapolis that are unloaded in the Port of New Orleans).

- a. Origin Data Collection. Data is collected on barge and rail shipments destined for a particular port; e.g., New Orleans. Those results will then be entered into the database and serve as the basis for comparing the destination results, if available. The IMP database interacts with FGIS' certificate program to locate the corresponding results.

Origin offices must complete a data entry worksheet for official sample-lot and submitted sample inspection services performed in their circuit and forward the worksheet(s) to the destination (port) office.

**NOTE:        Electronic data transfer will be available in the near future.**

- (1) Official Agencies.
  - (a) Record the results for all barges and railcar shipments. This includes barges that are inspected en route and may or may not have been inspected at origin. If a reinspection is performed on the lot, show only those results and not the original results that were superseded.

- (b) The data entry worksheet(s) for the previous week's inspections shall be faxed or mailed by the close of business (COB) each Monday. Data entry forms must be forwarded to the applicable port office; e.g., the New Orleans Field Office via: 504/764-2084 (FAX); FMDES@.FGIS.USDA.GOV (E-Mail/Internet); or USDA, GIPSA, P.O. Box 640, Destrehan, LA 70047 (mail).
  - (2) Field Offices. Record the results for all barge and railcar appeal and Board appeal inspections on the data entry worksheet and transmit the data to the port office in the same manner as above.
- b. Destination Data Collection. The IMP database software has been installed in the port office and will be used to collect information on all barge and railcar shipments.
- (1) The port office will input all data received. After grading has been completed on inbound barges and railcars, these results will be entered into the IMP database as certificates are prepared.
  - (2) The port office will also work with its customers to collect information on barges and railcars that are not officially inspected during unloading. The customers may collect their own samples during unloading and submit those samples to the port office for inspection. The results shall be put into the database manually and used for comparison purposes when origin results are obtained and entered after backtracking from destination.
  - (3) On each Friday, a summary report of all origin versus destination grade comparisons for that week for each origin SSP shall be prepared and electronically distributed to the appropriate field offices/agencies. The entire week's data will also be transmitted electronically to the BAR and the Quality Coordinator for further evaluation/analysis.

### **6.3 ACTION**

- a. Official Agencies shall be responsible for:
  - (1) Completing the data entry worksheets(s) for all outbound barges and railcars destined for export port areas and submitting them in a timely manner;
  - (2) Reviewing and assessing the field office and BAR reports, when received;

- (3) Initiating internal action, when deemed appropriate; and
  - (4) Participating with the field office and BAR to remedy any intermarket difference.
- b. Field offices shall be responsible for the timely implementation, completion, and compliance of all activities involving the IMP. Those activities include, but are not limited to:
- (1) (Origin) Accurate and legible completion of the data entry worksheets;
  - (2) (Origin) Timely submission of all data entry worksheets;
  - (3) (Origin) Input of data from origin official agencies or another field office;
  - (4) (Origin) Identify loading points for barges and railcars that are not in the system and notify the appropriate field office;
  - (5) (Origin) Assist the official agency, if requested, in seeking origins or destinations for railcars;
  - (6) (Port) Generate weekly origin versus destination summary reports for all IMP activities and distribute them to the appropriate field offices/agencies;
  - (7) (All) Ongoing review of weekly summary reports for the field office/agencies;
  - (8) (All) Initiate immediate action to eliminate intermarket differences, as soon as possible; and
  - (9) (All) Participate jointly with the official agency, BAR, and other field offices in the development and implementation of an action plan to resolve any intermarket differences.

- c. The BAR is the designated central location for maintaining the master IMP database. The BAR's responsibility shall be that of:
- (1) Reviewing all the origin versus destination data in the IMP;
  - (2) Performing all the statistical analyses to assess performance of the national inspection system;
  - (3) Generating graphs and comparison reports for specific locations and nationwide comparisons;
  - (4) Distributing all reports to the field offices;
  - (5) Developing "trigger" points that would require action and identifying these trigger points in the data;
  - (6) Initiating and developing new guidelines, if needed, as the program evolves;
  - (7) Initiating contact and jointly developing an action plan with the affected field office(s) when an intermarket problem is identified;
  - (8) Immediately notifying the Quality Coordinator of any intermarket grading problem, detailing the nature and location of the problem, and recommending an action plan; and
  - (9) Providing all jointly-agreed assistance, e.g., sample and data exchanges, grading factor reviews, training, etc., to the field offices in resolving intermarket differences.



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Chapter 7  
Early Alert Program  
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CHAPTER 7

**EARLY ALERT PROGRAM**

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## 7.1 INTRODUCTION

Conditions can develop in new crop grain, rice, and pulses that may result in grading problems when the commodities are marketed. Quality irregularities can result from extreme environmental conditions (drought, frost, etc.), as well as from inadequate or ineffective storage and handling. Considering the many factors which can possibly contribute to quality irregularities and the corresponding negative effects that grading problems have on the industry, official agencies, and FGIS--**an early alert program is essential.**











## 7.2 INFORMATION COLLECTION

FGIS field office and official agency managers are responsible for collecting, analyzing, and transmitting any available grain, rice, and pulse quality information (e.g., adverse weather, unusual storage, original grades) pertaining to commodities harvested and/or marketed within their area of responsibility. Sources of information include but are not limited to the following:

-  Members of the trade.
-  County extension agents.
-  Local Farm Services Agency representatives.
-  Producers.
-  Recent appeal and supervision samples.
-  Commercial crop publications (e.g., “*Rice World*”).
-  Internet.

### 7.3 REPORTING GRADING PROBLEMS

If grading problems are anticipated or detected based on collected information/reports, the field office or official agency manager shall immediately notify (via telephone) the BAR. When deemed necessary, submit a brief written report to the BAR that summarizes information gathered, including items previously reported by telephone. The report should provide a general summary of potential and known grading problems, and any pertinent information. Pertinent information may include:

-  Local environmental conditions and how they may have affected the crop in question.
-  Timing of harvest (early, late, estimates of percent completed, etc.).
-  Potential or actual yields.
-  Type of storage being utilized (on ground, etc.).
-  Varietal changes.
-  Unusual handling practices.
-  Unusual facilities for handling crop (e.g., coal yards).
-  Types and amounts of damage.
-  Sources of information.
-  Destination of commodity, if known.

#### 7.4 FIELD RESPONSIBILITIES

After notifying the BAR, the field office and/or official agency manager shall initiate steps to ensure that the commodity will be inspected accurately in the area where the problem was found and in all areas where the commodity may be shipped. Some of the types of action that may be taken to prevent or correct grading problems are as follows:

- ✕ Alert official inspection personnel of the problem.
- ✕ Submit opinion samples to the BAR to confirm that the QAS'/AQAS' interpretation of the factor/subfactor in question is consistent with the BAR.
- ✕ Initiate training, if needed.
- ✕ Increase onsite supervision to ensure that grading factors are being interpreted accurately.

#### 7.5 BAR RESPONSIBILITIES

Upon receipt of an early alert report (verbal or written), the BAR shall:

- a. Analyze all pertinent reports and samples submitted.
- b. Assist the field office/official agency in alerting other affected offices, agencies, and industries.
- c. If the problem is national or regional, in scope--coordinate the development of an action plan. If the problem is limited to one or two circuits, work with the local field office and/or official agency manager(s) to develop an action plan.
- d. Notify the Quality Coordinator of potential impact on national inspection system and describe actions that are being taken to protect the system's credibility.



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CHAPTER 8

**CROP QUALITY STUDIES**

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Attachment, "Sample Collection Assignments"





## 8.1 INTRODUCTION

Crop quality studies provide important data on the quality of commodities moving through the inspection channels and provide samples which are essential for calibrating and standardizing instruments used in the inspection process. They provide information on unusual quality conditions that may cause problems during marketing and help identify weaknesses in the inspection system which must be addressed. They also provide the material needed for ongoing training programs and reference samples.

## 8.2 MOISTURE METER CALIBRATION STUDY

The annual Moisture Meter Calibration Study is important to the accuracy of the official inspection system and NTEP-approved moisture meters. FGIS moisture meter calibrations must be verified over specific moisture ranges, significant production areas, and multiple crop years. The moisture survey is performed yearly on samples submitted to the Technical Services Division's Inspection Systems Engineering Branch (ISE) from FGIS field offices and participating State Weights and Measures organizations. After testing, the samples are made available for use in other TSD programs.

- a. Each year a program bulletin is issued detailing the sample collection assignments for the respective offices based on crop production within the geographic areas of responsibility.
- b. The number of samples assigned in each case is proportional to crop production on a sliding scale, thereby obtaining the majority of samples from the major production areas(s), while still retaining some samples from lower production areas. In certain cases, additional assignments in the stable moisture range are given to export locations.
- c. It is understood that requested moisture levels may not all be available in all areas in a given year. Since gathering samples over a wide range of geographic areas is important, field offices should make all reasonable efforts to provide the requested number of samples in each moisture range. However, extraordinary actions are not expected.

### 8.3 NEW CROP QUALITY STUDY

- a. Overview. The purpose of the New Crop Quality Study is to obtain representative samples of newly harvested crops from the entire nation. The study is conducted yearly on samples submitted to the BAR from field offices and official agencies. In addition to providing FGIS, official agencies, and industry with new crop quality information, the sample collected serves several other important purposes, such as:
- ✓ Early alert of unusual new crop quality conditions,
  - ✓ Maintaining stocks of training material,
  - ✓ Providing material for instrument calibration, sloping, and reference samples, and
  - ✓ Providing material for monthly and quarterly check sample surveys.
- b. Responsibilities and Assignments.
- (1) The collection and submission of samples for the annual new crop survey are considered regular duties of the selected official agencies and field offices.
  - (2) The indicated number of samples listed in the attached table must be collected and submitted directly to the BAR. If official service is not being provided in major production areas within the field office/agency circuit, local elevators/handlers may be contacted directly to obtain samples.
- c. Sample Selection and Submission.
- (1) Samples can be selected as soon as the local harvest begins and should be submitted by the end of harvest. Although it is important to have each office fulfill its quota, do not submit extra samples unless requested or adjust any samples by adding or deleting material, unless specifically directed to do so.
  - (2) The preferred source of samples is trucklots (official or submitted), since they have the greatest potential for variety. Rail- and barge-lots should be avoided since they often are comprised of blended grain.

- (3) Each sample should be 1000 - 1500 grams in size (file samples are ideal). Seal the sample in a polyethylene bag and insert it into a canvas mailing bag. If the sample was official inspected, insert a copy of the work record (make sure that it shows the name of the service point where the sample originated, the date of inspection, and the results of the inspection) into the canvas bag with the sample. If the sample represents an unusual quality condition, indicate on the work record the approximate percent of the local crop which is affected by the condition.
- (4) The BAR will provide special mailing tags to be used when submitting new crop samples.
- (5) Send samples to:

USDA, FGIS Technical Center  
Board of Appeals and Review  
10383 N. Executive Hills Blvd.  
Kansas City, Missouri 64153-1394

- d. BAR Analysis. Samples will be analyzed for official criteria, such as hardness, protein, and/or oil, when appropriate. A subset of the original samples may be tested for mycotoxin content or other end-use quality factors, as needed. Furthermore, the Subjective Analysis Group (SAG-BAR) will review incoming samples for unusual conditions that may present a challenge to the national system and alert the appropriate field locations, when such conditions are found.
- e. Reporting Results. The BAR will notify the appropriate field offices (early alert) of any unusual crop conditions detected during the study. At the conclusion of the study, the BAR will issue a report which summarizes the quality of the crop. The report will include detailed information on any unusual quality conditions in the new crop.

## 8.4 EXPORT QUALITY STUDY

a. Overview. The purpose of the Export Quality Study is to monitor subplot samples from randomly selected export cargo lots. The study is an ongoing review of export cargo samples submitted to the BAR from field offices. In addition to providing FGIS, official agencies, and industry with information about the quality of grain, rice, and pulses being exported, the samples and data collected serve several other purposes. Uses for the export samples/data include the following:

- ✓ Verification that commodities are being uniformly graded at export ports,
- ✓ Providing data on cargo variability,
- ✓ Providing material for end-use quality testing, and
- ✓ Providing material for training foreign buyers.

b. Responsibilities.

- (1) The collection and submission of samples for the export survey are considered regular duties of the selected field offices. All associated time will be charged to the field office's standardization management code.
- (2) The BAR will establish a procedure for randomly selecting export cargos to be included in the study.

c. Sample Selection and Submission.

- (1) All subplot and material portion file samples from selected cargos must be submitted.
- (2) Seal each sample in a polyethylene bag; insert it in a canvas mailing bag.
- (3) The individual samples should then be placed in a box for shipment. Include a copy of the inspection log with the samples. Mark on the sides of the shipping box, **BAR EXPORT STUDY**.
- (4) Send samples to:

USDA, FGIS Technical Center  
Board of Appeals and Review  
10383 N. Executive Hills Blvd.  
Kansas City, Missouri 64153-1394

- d. BAR Analysis. The BAR will analyze the samples for all factors including hardness, protein, and/or oil, when appropriate. In addition, a composite of the subplot samples may be tested for mycotoxin content or other end-use quality factors, as needed.
  
- e. Reporting Results. The BAR will notify the appropriate field offices immediately of any grading problems detected during the study. Each calendar year, the BAR will issue a report which summarizes the quality of the commodities exported the previous year. The report will include information on any end-use quality tests conducted.

## **8.5 SPECIAL PURPOSE INSPECTION QUALITY REVIEW**

- a. Overview. The purpose of the Special Purpose Inspection Quality Review is to monitor the quality of original inspections performed when unusual grain quality conditions are known to exist in the marketplace or to further investigate inspection quality weaknesses previously identified by other monitoring programs. The need for a Special Purpose Inspection Quality Review will normally be determined by the Chairman-BAR, but may also be conducted at the request of the Director-FMD or the Deputy Administrator. The review will be based on the BAR supervision of file samples submitted by the field.
  
- b. Responsibilities.
  - (1) The BAR is responsible for determining the scope (service points included and number of samples) of a Special Purpose Inspection Quality Review.
  
  - (2) The field offices and/or official agencies are responsible for the collection and submission of sample identified by the BAR for a Special Purpose Inspection Quality Review.

c. Sample Selection and Submission.

- (1) Selected file samples should be sealed in a polyethylene bag and inserted into a canvas mailing bag. Insert a work record including the name of the service point where the sample originated, date of inspection, and the results of the inspection.
- (3) Mark on the back of a mailing tag, **BAR SPECIAL**, and attach the tag to the canvas mailing bag.
- (4) Send samples to:

USDA, FGIS Technical Center  
Board of Appeals and Review  
10383 N. Executive Hills Blvd.  
Kansas City, Missouri 64153-1394

- d. BAR Analysis. The BAR will analyze the samples for all factors including hardness, protein, oil, and mycotoxins, when appropriate.
- e. Reporting Results. The BAR will notify the appropriate field offices immediately of any unusual inspection discrepancies detected during the review. At the conclusion of the review, the BAR will issue a report which summarizes its findings. The report will include detailed information on any inspection discrepancies found.

**TABLE - SAMPLE COLLECTION ASSIGNMENTS**

Office/Agency	Barley	Corn	Sorghum	Soybean	Sunflower
Portland Field Office	15				
Toledo Field Office				50	
California Dept. Of Ag.	10				
Georgia Dept. Of Ag.				100	
Kansas State Grain Insp.		25		100	20
Louisiana Dept. Of Ag.				25	
Minnesota Dept. Of Ag.	50				
Missouri Dept. Of Ag.		125		100	
Montana Dept. Of Ag.	60				
N. Carolina Dept. Of Ag.				50	
Oregon Dept. Of Ag.	15				
Utah Dept. Of Ag.	10				
Washington Dept. Of Ag.	25				
Wisconsin Dept. Of Ag.	10				
Aberdeen Grain Inspection	25				20
Alton Grain Inspection		50			
Amarillo Grain Exchange				50	
J.W. Barton Grain Insp.		25			
Cairo Grain Inspection		50			
Central Illinois Grain Insp.				75	
Central Iowa Grain Insp.				75	

**TABLE Continued**

Office/Agency	Barley	Corn	Sorghum	Soybean	Sunflower
Champaign-Danville		25			
Columbus Grain Insp.		25			
Decatur Grain Insp.		25			
Denver Grain Insp.	10				
East Indiana Grain Insp.				50	
Eastern Iowa Grain Insp.		100			
Enid Grain Insp.				50	
Fostoria Grain Insp.		25			
Frankfort Grain Insp.		25			
Fremont Grain Insp.		50			
Grain Ins. Inc.(Jamestown)	50				20
Grand Forks Grain Insp.	50				20
Hastings Grain Insp.		50		50	
Idaho Grain Insp.	35				
Kankakee Grain Insp.		25			
Keokuk Grain Insp.		50			
Lewiston Grain Insp.	25				
Lima Grain Insp.		25			
Lincoln Inspection Service		50			
Little Rock Grain Exch.				25	
John R. McCrea Agency		25			
Michigan Grain Insp.	10				
Mid-Iowa Grain Insp.				75	



**TABLE Continued**

Office/Agency	Barley	Corn	Sorghum	Soybean	Sunflower
Minot Grain Insp.	50				
N. Dakota Grain Insp.	50				20
Ohio Valley Grain Insp.		25			
Omaha Grain Insp.		50			
Plainview Grain Insp.				50	
D. R. Schaal Agency		50			
Schneider Inspection Serv.		25			
Sioux City Inspection		50			
Sothern Illinois Grain Insp.				100	
Springfield Grain Insp.		25			
A. V. Tisher & Son				75	
Titus Grain Insp.				100	
Tri-State Grain Inspection		25			



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