Certification and Source Verification in the Grain Handling Industry

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# Important Concepts

<table>
<thead>
<tr>
<th>Source verification</th>
<th>Tracing identity of raw materials into products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity preservation (e.g. Organic Vinton Soybeans)</td>
<td>Physical separation of raw materials by production unit.</td>
</tr>
<tr>
<td>Specification marketing (e.g. non-GM soybeans)</td>
<td>Raw materials by some attribute but not to the extent of individual production units.</td>
</tr>
<tr>
<td>Certification</td>
<td>Audited verification of claims, processing</td>
</tr>
</tbody>
</table>
Quality Management Systems

- QMS are disciplined structures for organizing management of production operations.
- QMS are structures/formats for documenting production activity.
- QMS require record keeping sufficient to track raw materials through to products.
- QMS are NOT standards or procedures for how to produce things.
- QMS do not say what to do.
All QMS have essentially the same objective.
Specific formats of documentation, records will vary.
Service providers sell forms, training, sometimes auditing.
Why Would Agriculture Use QMS?

• If required for specialized production,
  – Safety concerns
  – Customer demands
  – Regulations
  – Credibility

• To be competitive in specialized markets
  – Access
  – Premium

• Capture operating efficiency and cost savings
  – Major short term reason
QMS Criteria

- Recognition in markets served.
- Third Party Audit/Certification.
- Statistical process control.
- Provider/trainer has understandable formats; avoids “big picture” discussion.
- Provider can “speak the language” of your industry.
- ABSOLUTE INTEGRITY.
Farmers Cooperative Elevator
Farmers Cooperative Trade Area

130 Miles

150 Miles
Farmers Cooperative Company

- Northwest Iowa Company
- 1st Site: Odebolt, Iowa
- Learn How and Replicate at 32 Other Locations
Organization Selection

- ISO 9000
- American Institute of Baking (AIB)
  - QSE
<table>
<thead>
<tr>
<th>Category</th>
<th>Ideal</th>
<th>Exemplary</th>
<th>Marginal</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Raw Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0 Process Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 Process Verification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 Finished Product Acceptability Attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 Storage/Shipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 Instrumentation/Analytical Calibration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.0 Plant Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.0 Quality Policy Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% by Category</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Name of Company: _________________________________

Date: _________________________________

Auditor: _________________________________
### Process Verification

<table>
<thead>
<tr>
<th>Process Verification</th>
<th>Who is responsible</th>
<th>Review Date</th>
<th>Review Goal</th>
<th>Date Completed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Sampling procedures defined and identified throughout process. <em>(Documented)</em></td>
<td>Mike/Dean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2 Analytical procedures established. <em>(Documented)</em></td>
<td>Charlie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3 Analytical procedures calibrated.</td>
<td>Charlie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.4 Analytical methodology identified and documented.</td>
<td>Charlie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 Technician Training Program established. <em>(Documented)</em></td>
<td>Mike/Tim/Lou Schaal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.6 Procedure for handling out-of-specification product defined and utilized. <em>(Documented)</em></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Personnel Resources

- Management
- Regional Superintendent & Location Manager
- Elevator Superintendent and Hourly Employees
- Grain Accounting, MIS, Programmers
- Iowa State University
Loadout Sampling and Grading Process

- Prepare Bottom Side of Cars for Loading
- Assist with vehicular traffic control
- Record Car Data
- Prepare Bottom Side of Cars for Loading
- Monitor grade information received from official grader
- Determine if grade meets contract specifications
- Take appropriate action as determined by loading specifications
- Communicate appropriate information to blending and loading personnel
- Continue sampling and grading process until all cars are loaded
- Bill Train
PROCEDURE: Probing and Sampling Inbound or Outbound Loads

Background: Samples are taken on all inbound and outbound trucks and wagons using a mechanical truck probe. It is critical that the sample collected be representative of the load from which it is taken. Following established patterns and methods assures that the sample will be representative.

Objective: The truck probe will be operated using methods that assure collecting a sample that is representative of the contents of the load.

Procedure for Probing and Sampling Inbound and Outbound Loads:

1. Collect samples from each hopper (if vehicle has multiple hoppers).
2. Take a minimum of two probes per vehicle:
   a. One probe near center of load.
   b. One probe no further than 2 feet from outside box.
3. Insert the full length of the probe into the grain, or as much of the probe as box depth allows.
4. Accumulate a minimum of 500 grams of representative grain for grading.

Corrective Action:
In the event of mixed grain in collection hopper, moisture in probe tube, probe malfunction, too small of a load, or evidence of spiking, sample load at pit or hand probe.

EMPLOYEE TRAINING RECORD:
Training Approved and Authorized: __________________________ Date: __________
Employee Signature: __________________________ Date: __________
Combining Error Components – Volumetric Measurement of Grain Quantity

<table>
<thead>
<tr>
<th>Source of error</th>
<th>Estimated maximum (± 2SD)</th>
<th>Squared Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stretch of tape (± 1 in/50 ft)</td>
<td>0.2%</td>
<td>0.04</td>
</tr>
<tr>
<td>Level fill depth estimation (± 6 in/50 ft)</td>
<td>1.0%</td>
<td>1.00</td>
</tr>
<tr>
<td>Average test weight (± 1 lb/bu)</td>
<td>2.0%</td>
<td>4.00</td>
</tr>
<tr>
<td>Moisture (± 1% M)</td>
<td>1.2%</td>
<td>1.44</td>
</tr>
<tr>
<td>Pack factor</td>
<td>1.0%</td>
<td>1.00</td>
</tr>
<tr>
<td>Estimated maximum overall error</td>
<td>2.7% (=((7.48)^{1/2}))</td>
<td></td>
</tr>
</tbody>
</table>

Source: Farmers Cooperative Elevator Co., Farnhamville, Iowa
FC House Grades will be as accurate as those of an official inspector, under the same conditions.
Control Chart – Inbound Corn Grading for Moisture

Corn Inbound Moisture
Oct '01 - April '02

Comparison Number

(Source: Farmers Cooperative Elevator Co., Farnhamville, Iowa)

TCS = Official inspection agency
Control Chart – Inbound Corn Grading for Test Weight

Corn Inbound Test Weight
Oct '01 - April '02

(Source: Farmers Cooperative Elevator Co., Farnhamville, Iowa)
TCS = Official inspection agency
Control Chart for Rail Soybean Loading, by Individual Train

Foreign Material Differences
(Odebolt Beans, 11-19-2001)
Benefit: Training

- Written Procedures
- Simple Yet Thorough
- Consistent Procedure
- Supervisor-Employee Communication
Benefit: Documentation
Benefit: Corrective Action

- Understanding of Responsibility
- Assignment of Authority
Benefit: Employee Improvement

- Effective Communication
- Professionalism
- Share Knowledge
- Confidence
Benefit: “Food Grade” Mindset

- Attitude
- Attention to Details
- End user Consideration
Benefit: Regulatory Assurance

- EPA: Dust Abatement Procedures
- Insurance: Hazard Monitoring Assurance
- Upgraded Existing Programs
- Reduced inspection visits?
# Annual Cost-Benefit Summary for QMS

<table>
<thead>
<tr>
<th>Operation</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grading</td>
<td>$1,085</td>
</tr>
<tr>
<td>Inventory Control</td>
<td>10,675</td>
</tr>
<tr>
<td>Operations Efficiency</td>
<td>2,180</td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td>5,300</td>
</tr>
<tr>
<td>Employee Development</td>
<td>3,400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$22,640</strong></td>
</tr>
<tr>
<td>Cost of QMS</td>
<td>$11,250</td>
</tr>
<tr>
<td><strong>Ratio:</strong></td>
<td>2:1</td>
</tr>
</tbody>
</table>

Source: Farmers Cooperative Elevator Co., Farnhamville, Iowa

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## An Example of QMS Format Conversion

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td><strong>No.</strong></td>
</tr>
<tr>
<td>Raw Material specifications developed and current</td>
<td>1.01</td>
</tr>
<tr>
<td>Plant conducts supplier quality audits or has required 3rd party audit program</td>
<td>1.02</td>
</tr>
<tr>
<td>Raw material supplier approval/removal procedure developed and implemented (documented)</td>
<td>1.03</td>
</tr>
</tbody>
</table>
Certification, Source Verification and Identity Preservation Costs
Summary

• Source verification is the ability to track raw materials to finished products
• Audited, certified Quality Management Systems are required
• QMS reduce operating costs, generate profits
Summary

• Source verification/IP costs will increase with decreasing tolerances for cross-mixing
• U.S. grain industry will be healthier with certified QMS in use
Where to Find Us:

Iowa Grain Quality Initiative
www.iowagrain.org

AgMRC
www.AgMRC.org

FC
www.fccoop.com

AIB
Since 1919
www.aibonline.org