Iowa Grain Quality Initiative
Advisory Committee Meeting
January 11, 2008
Agenda

• Updates and This Year’s Plan
• Technical Reports plus discussion
  – Ethanol and Soy Processing
  – Grain Storage
  – Traceability
• LUNCH!
• Current Issues in Biofuels
• Discussion, future plans, directions, scheduling
2008 Project Plan

- Testing program for public trials
- Tracking program for incompletely approved GM products
- Weed management for resistance and specialty grains
- Grain storage and biosecurity training
- Rapid testing of new grain traits
- Processing uses inventory, mapping
- Caloric, nutrient inventory for food and fuel
- Biomass quality
Traceability Projects

• Why?
• Bulk grain tracking
• Data management to aid in tracking
• Starting in the field
• QMS – operational practice
• Standards development
• International connection
Traceability

Ability to trace the history, application or location of an entity by means of recorded identifications. (EU 1830)

- Respond to security threats
- Respond to food safety problems
- Document chain-of-custody
- Document production practices (eg. organic)
- Meet consumer desires or social preferences
- Provide safety/quality assurance
- Protect integrity of brand name
- Authenticate claims (eg. Regional foods)
- **Regulatory compliance** – FDA Bioterror Rules
- Analyze logistics and production costs
Example 1: Common Storage Silo for An Ingredient (e.g., Flour)

Source A
Source B
Source C
Common Storage Silo
Manufacturing Plant
Cookies

Information reasonably available is the identity of all potential sources of the flour for each finished product.
Mass recall of dog and cat food after pets die

FDA Announces New Chemical Found in Recalled Pet Food

Breaking News From FDA Confirms ASPCA's Suspicions on Pet Food Toxin

Presence of Melamine Identified in Contaminated Food
## Mycotoxins

**FDA action levels/recommendations for some mycotoxins.**

<table>
<thead>
<tr>
<th>Mycotoxin</th>
<th>FDA Tolerance</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aflatoxin</td>
<td>0.5 ppb (parts/billion)</td>
<td>milk</td>
</tr>
<tr>
<td></td>
<td>0.0 ppb</td>
<td>dairy rations</td>
</tr>
<tr>
<td></td>
<td>100 ppb</td>
<td>mature breeding cattle, swine, and poultry</td>
</tr>
<tr>
<td></td>
<td>200 ppb</td>
<td>finishing swine</td>
</tr>
<tr>
<td></td>
<td>300 ppb</td>
<td>finishing beef</td>
</tr>
<tr>
<td></td>
<td><strong>20 ppb</strong></td>
<td><strong>General commerce action</strong></td>
</tr>
<tr>
<td>Fumonisin</td>
<td>5 ppm (parts/million)</td>
<td>horses</td>
</tr>
<tr>
<td></td>
<td>10 ppm</td>
<td>swine</td>
</tr>
<tr>
<td></td>
<td>50 ppm</td>
<td>cattle</td>
</tr>
<tr>
<td>Vomitoxin</td>
<td>1 ppm</td>
<td>human</td>
</tr>
<tr>
<td></td>
<td>5 ppm</td>
<td>swine</td>
</tr>
<tr>
<td></td>
<td>10 ppm</td>
<td>cattle, chickens</td>
</tr>
</tbody>
</table>

[http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=319](http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=319)
Grain Elevator Mock Recalls

• Approx. 90 percent of locations within 24 hr. window, ¼ within 3 hrs.
• Locations without QMS implementation lacked traceability abilities
Grain Elevator Mock Recalls

<table>
<thead>
<tr>
<th>Locations</th>
<th>First Set</th>
<th>Second Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locations</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Complete Data</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>

Tracking Index

<table>
<thead>
<tr>
<th>Average</th>
<th>374</th>
<th>227</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>942</td>
<td>945</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

- Tracking index improving over time
- Locations with high traceability index lacked QM systems
- Low index values at manageable levels
Simulink Model

\[ \frac{1}{s} x' = x'' \]

\[ 2c'x/m1 \]

\[ -K \]

\[ \frac{1}{s} \]

\[ \frac{1}{s} \]

\[ \frac{1}{s} \]

\[ m1 \]

\[ m2' \]

\[ Ro*A \]

\[ m2 \]

\[ \frac{1}{s} \]

\[ \frac{1}{s} \]

\[ K \]

\[ C \]

\[ 10 \]

\[ 0.3 \]

\[ m1 \]

\[ c1 \]

\[ c2 \]

\[ \text{Scope} \]

\[ \text{Scope} \]

\[ \text{Scope} \]

\[ \text{To Workspace} \]
Simulation Results

\[ m_1 = 2000 \text{ bu}, \ m_2 = 2000 \text{ bu} \]
Elevator Grain Traceability Scenario

- Microsoft Access can be used
- Primary Key: Scale ticket (Date and time stamp)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Date/Time</td>
<td>Activity date</td>
</tr>
<tr>
<td>Bin</td>
<td>Number</td>
<td>Bin number</td>
</tr>
<tr>
<td>Scale ticket</td>
<td>Number</td>
<td>Ticket number</td>
</tr>
<tr>
<td>Grain</td>
<td>Text</td>
<td>Grain type- corn/soybean</td>
</tr>
<tr>
<td>Transferred Bu</td>
<td>Number</td>
<td>Bushels transferred to or from bin</td>
</tr>
<tr>
<td>To</td>
<td>Text</td>
<td>Destination of outbound grain</td>
</tr>
<tr>
<td>From</td>
<td>Text</td>
<td>Origin of inbound grain</td>
</tr>
</tbody>
</table>
Grain Traceability: Relationships

**[Origin : Table]**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>Text</td>
<td>Origin of inbound grain</td>
</tr>
<tr>
<td>Transferred Bu</td>
<td>Number</td>
<td>Bushels transferred</td>
</tr>
<tr>
<td>Scale ticket</td>
<td>Number</td>
<td>Inbound scale ticket</td>
</tr>
</tbody>
</table>

**[Destination : Table]**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>To</td>
<td>Text</td>
<td>Destination of outbound grain</td>
</tr>
<tr>
<td>Transferred Bu</td>
<td>Number</td>
<td>Bushels transferred</td>
</tr>
<tr>
<td>Scale ticket</td>
<td>Number</td>
<td>Outbound scale ticket</td>
</tr>
</tbody>
</table>

**[Relationships]**

- **GrainTrace**:
  - Date
  - Bin
  - Scale ticket
  - Grain
  - Transferred Bu
  - To
  - From

- **Destination**:
  - To
  - Transferred Bu
  - Scale ticket

- **Origin**:
  - From
  - Transferred Bu
  - Scale ticket
GPS Component
Telegeomatic application for agriculture

Wireless range Expander
Satellite reception and Wireless access point
WIFI
INTERNET
GPS

Sending geographical map spreading in farm
Sending land surveying in farm

Data exchange (Internet) grund taking map and data
Relates for each object and feature class tables
Using editing tool for the creation of new lots
ISO Standards

- ISO 9000-2000 QMS Design
- ISO 22000 Food Safety Series
  - 22005 Traceability
    - TC34/WG9
  - 22006 Production Agriculture
    - TC34/WG12
Where to Find Us:

www.iowagrain.org