Steve Rockhold
Director, Brewing Materials Procurement

“Sourcing Brewing Materials for High Quality Beer”
Presentation Overview:

- Department function
- Procurement Philosophy
- Barley program development, 4 key components
- Facilities & Staffing
- Traceability example
- Questions
The Brewing Materials Department at MillerCoors procures and sells:

- Barley
- Malt
- Hops
- Liquid Adjunct – Dextrose/Maltose
- Wheat
- Oats
- Spices
- Flavorings, Colorings, Special ingredients
- Diatomaceous Earth
- Enzymes
- Filter Clothes/Aids
- Malt Sales
- Sales of Co-Products
- Energy
Fundamental Procurement Philosophies

- **Safety** First (we have 4 OSHA VPP Star Facilities)
- **Quality** of our products is inviolable
- Our **Suppliers** are our partners
- We seek to provide the best **total cost value** to the MillerCoors Supply Chain

Based on these philosophies, let’s see how they answer the conference goals:

1. Why adopt traceability?
2. What are the risks and/or rewards of traceability?
3. What factors (standards, legislative actions) will affect my business?
4. What tools are available to assist me in meeting traceability goals?
We focus on quality because:

- Downtime/delays due to lack of material availability
- Scrap
- High inventories
- Increased freight costs to expedite shipments
- Poor ingredients usually result in having to use more material
- Poor quality can have traceability issues

These practices are much in line with another quality guru; William Edwards Deming

Deming is widely credited with improving production in the United States during World War II, although he is perhaps best known for his work in Japan. There, from 1950 onward he taught top management how to improve design (and thus service), product quality, testing and sales (the last through global markets) through various methods, including the application of statistical methods.

In the 1970s, Dr. Deming's philosophy was summarized by some of his Japanese proponents with the following 'a'-versus-'b' comparison:
(a) When people and organizations focus primarily on quality, defined by the following ratio, quality tends to increase and costs fall over time.
(b) However, when people and organizations focus primarily on costs, costs tend to rise and quality declines over time.
Supplier Management

We seek well maintained relationships with reliable, high quality suppliers that are key to our quality, service, and overall success. Our relationships built with barley growers are a fine example, and those techniques are leveraged across other supply categories.
Barley
What is value in our supply chain?

For MillerCoors, it starts with barley. We have to have a high quality, safe, identity preserved, supply of barley to make high quality malt. That in turn is used to make our unique Rocky Mountain style beers.

“I really think, my dear friends, that one of the reasons that we have prevailed and so many breweries haven’t, is that we focused our full efforts and our full intentions on producing a quality product. I think some of you have heard me say this before, that barley is to beer as grapes are to wine. You cannot make a good wine out of bad grapes and you can’t make a good beer out of bad barley. You can make a terrible beer out of good barley, that’s easy to do. But at least start right.” – Bill Coors (2004 Center, Colorado, Barley Field Days)
The MillerCoors Barley Program

*From a handful of barley seeds...*

The starting seeds for the Coors malt barley program came from Moravia. Due to an excellent supply and favorable economy, Coors purchased a quantity of malt from R. Karsten Ltd. In Prague, Czechoslovakia. Contained in one of the letters from R. Karsten Ltd. was a small sample of that seasons Moravian barley crop.
The Coors Barley Program

*From a handful of barley seeds...*(cont.)

John Ulrich, a Loveland, CO farmer, planted those seeds in his father's garden in 1939. Coors officials approved seed increases over the next 5 years until enough of the crop was ready for malting. Results of those malt trials were favorable, and in 1945, the first Coors beer was brewed with local malt. By 1946, other farmers were recruited and the Coors Barley Program was born.
The MillerCoors Barley Program

- Today, MillerCoors direct contracts with approximately 800 growers in Colorado, Wyoming, Montana and Idaho.

- In 2008 MillerCoors will direct farmer contract almost 800 million pounds of malt barley.

- MillerCoors owns 6 main elevators with over 25 million bushels of storage capacity.
The MillerCoors Barley Program

Several key factors in the MillerCoors Barley Program have been recognized as contributing to the success of the company and the program for the past 60+ years. They are:

- Specific Growing Areas for barley with favorable environmental conditions
- Two-Row Barley
- Internal Barley Breeding Program
- Agronomist/Farmer Relationship
- Annual contractual commitments
- Barley Elevator Facilities and People
The MillerCoors Barley Program

Barley Breeding Program

MillerCoors operates research facilities in Burley, Idaho and Center, Colorado and continues to make advances in barley genetics. Recent varieties have been bred to include such traits as:

• Resistance to stress including: Lodging (plant falling over), protein response, thinning of kernels, disease, and even pests such as the Russian Wheat Aphid.

• Physical Characteristics including malt extract yield, malting time, bushel/acre increase, and specialized trait breeding.
The MillerCoors Barley Program

Agronomist/Farmer Relationship

• Six expert agronomists consult with over 800 growers on barley best management practices.

• Search for the WIN / WIN
• Barley must compete for highly productive irrigated acres
• Leverage our relationship to get acres, manage the cost, maximize quality, long term sustainability, and traceability
• Scorecarding (Quality & Delivery) over 5 Year period optimizes grower base quality
PURCHASE AGREEMENT
(Grower)

This Purchase Agreement ("Agreement") is effective as of __________, 20___, (the "Effective Date") by and between __________________________, a ________________ and ____________________, a _________________ corporation (together, Grower), and MillerCoors LLC, a Delaware limited liability company (MillerCoors). MillerCoors and Grower may be referred to individually as a "Party" or collectively as the "Parties."

ARTICLE 1.
TERM

Unless earlier terminated as provided herein, this Agreement will be effective as of the Effective Date for an initial term of one (1) crop year which term the Parties may extend for additional successive one (1) crop years by the mutual execution of updated Exhibits A [C], such Exhibits will have been renegotiated and revised as necessary prior to the expiration of this Agreement (the initial term, as extended, is referred to as the "Term").

ARTICLE 2.
PRODUCT OBLIGATIONS

2.1 Specifications. Grower agrees to sell to MillerCoors and MillerCoors agrees to purchase from Grower, the commodity described on Exhibits A [C] attached hereto (the "Crop"), in the quantity specified therein. The Crop must comply with the representations and warranties set forth below and conform to the specifications described on Exhibits A, [C, E], D, F attached hereto (the "Specifications"), as tested by MillerCoors.
ARTICLE 1.

REPRESENTATIONS, WARRANTIES AND COVENANTS

Grower hereby represents and hereby warrants to MillerCoors that:

a. All Crops delivered under this Agreement will be grown from seed purchased from MillerCoors or as directed by MillerCoors;

b. In addition to meeting the required Specifications set forth in this Agreement, Grower is aware of the uses to which MillerCoors intends to put the Crop and accordingly the Crop is sufficient for those intended uses;

c. Grower will convey good merchantable title to the Crop, free of any lien or encumbrance other than those referenced on Exhibits A [C];

d. The Crop will be delivered free from defects;

e. Grower will produce and deliver the quality of Crop required hereunder and as specified in Exhibits A, [C, E], free of all pesticides other than as described on Exhibit D, and with verification of pesticide application as described in Exhibit F;

f. The Crop will conform to the Specifications and to such standards of quality that MillerCoors may apply in its reasonable discretion;

g. The Crop will be free of any chemical or residues of chemicals in excess of the permissible tolerance, if any, under any law or regulation of the Environmental Protection Agency (EPA), the Federal Food & Drug Administration (FDA), the U.S. Department of Agriculture (USDA), or any other local, state or federal governmental body having jurisdiction over agricultural commodities for foods and beverages for human consumption and that the Crop delivered hereunder will be free of all materials, substances or chemicals for which no tolerances have been established or permitted; will be of good quality and fit for the ordinary purpose, and adequately contained, packaged and labeled; and

h. The Crop will be planted, grown, treated, harvested and transported in accordance with all applicable local, state, and federal laws and regulations, including but not limited to, any and all rotational crop restrictions, and treated only with chemicals approved by MillerCoors (the term “chemicals” as used herein will include, but not be limited to, all pesticides, such as fungicides, rodenticides and herbicides, as well as preservatives and other chemical substances).
**ARTICLE 1.**  
**STATUS OF PARTIES**

5.1  **Independent Contractor.** Grower is acting as an independent contractor unrelated to MillerCoors or any of its subsidiaries or affiliated companies. Nothing in this Agreement is intended to create a relationship, express or implied, of employer-employee, principal-agent, or partnership between MillerCoors and Grower or between MillerCoors and any individual employed by Grower.

5.2  **Expenses.** Except as otherwise expressly provided herein, all expenses incurred by Grower in connection with this Agreement and the production and delivery of the Crop will be the sole responsibility of Grower. In the event Grower makes unauthorized representations or incurs unauthorized expenses resulting in the assertion of a claim against MillerCoors, Grower will indemnify and hold harmless MillerCoors against all such claims.

5.3  **No Subcontractors.** Grower recognizes MillerCoors has chosen it to perform the obligations of this Agreement because of the expertise of Grower and its employees and therefore Grower’s obligations under this Agreement cannot be subcontracted.
1. MillerCoors LLC, a Delaware limited liability company with a principal place of business in Golden, Colorado, herein called "MillerCoors," agrees to purchase, and the undersigned grower herein called "Grower" agrees to sell ____ lbs. of ___________ malting barley, herein called "barley," to be delivered at harvest or at MillerCoors’ election at a later date as determined by MillerCoors in which case the barley shall be properly stored in storage bins approved by MillerCoors. Title to the barley shall pass to MillerCoors upon delivery and acceptance at MillerCoors’ designated facility. Barley purchased hereunder shall be grown from seed purchased by the Grower from MillerCoors, or MillerCoors’ designated reseller, and shall meet the following standards at time of delivery to MillerCoors as tested by MillerCoors:
   A. The moisture content of the barley sampled shall not exceed 13%.
   B. The barley so sampled must have a minimum of 70% plump kernels (kernels that remain on top of a 6/64 " by 3/4 " screen).
   C. The protein content of the barley sampled shall contain a minimum of 7.5% and a maximum of 14.0% (dry matter basis).
   D. Barley exhibiting the following conditions will require barley to be farm stored in MillerCoors approved storage for additional testing.
      1) Barley showing microflora (mold).
      2) Barley with 1% or less frost damage.
   E. All farm stored barley must be germination tested and must have a minimum of 97% germination capacity at 72 hours and not show excessive microflora (mold) growth.
   F. The barley so sampled must not contain more than 3 % by weight skinned and broken kernels.
   G. The barley so sampled must not contain more than .5 % by weight foreign kernels.
   H. The barley so sampled must not contain more than 2 % by weight immature kernels.
   I. The barley so sampled must not contain more than 5.0 % by weight damaged and diseased kernels.
   J. The barley so sampled must not contain more than 0.1 % by weight of ergot kernels.
   K. Barley shall not contain more than 2.5% wild oats by weight in an un-cleaned sample.
   L. Barley must be free of, but not limited to, weed seed, weed residue, un-threshed barley heads, barley awns, straw, undesirable or musty odors and/or live stored grain insects.
   M. Blending of rejected barley is not permitted.
   N. Cleaning and/or sizing of farm stored barley are permitted with prior approval of equipment by authorized MillerCoors personnel.
   O. Barley with detectable sprout damage will be rejected.
   P. Barley with detectable frost damage greater than 1% will be rejected.
   Q. Barley must be free of detectable levels of Deoxynivalenol (vomitoxin).
All barley shall be treated only with chemicals specifically approved by MillerCoors LLC for application and which appear on this attachment. The term ‘chemicals’ as used herein shall include, but not be limited to, all pesticides, such as fungicides, rodenticides, and herbicides, as well as preservatives and other chemical substances.

Proper use of pesticides in the agricultural industry is very important to you as growers and to MillerCoors LLC as the end user of your products. The EPA is continuing to make it more difficult to register new pesticides and re-registering of existing pesticides. It is also imperative that those growers who use crop rotation practices; i.e., potatoes to barley, beets to barley, and apply any pesticide to non-barley crops must follow all label instructions concerning crop rotations back to barley. Always read and follow label directions on all pesticides.

The use of any specially labeled chemicals i.e., Section 18 or 24, will require Brewing Materials Department review and approval before application.

**HERBICIDES**

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromoxynil</td>
<td>Various Bromoxynil Labels</td>
</tr>
<tr>
<td>Broxoxynil + MCPA</td>
<td>Various Bromoxynil Labels</td>
</tr>
<tr>
<td>Clopyralid + 2, 4-D</td>
<td>Curtail</td>
</tr>
<tr>
<td>Clopyralid + MCPA</td>
<td>Curtail M</td>
</tr>
<tr>
<td>Dicamba</td>
<td>Various Dicamba Labels</td>
</tr>
<tr>
<td>Diclofop-methyl</td>
<td>Hoelon</td>
</tr>
<tr>
<td>Difenoxyquin methyl sulfate</td>
<td>Avenge</td>
</tr>
<tr>
<td>MCPA amine</td>
<td>Various MCPA Labels</td>
</tr>
<tr>
<td>MCPA ester</td>
<td>Various MCPA Labels</td>
</tr>
<tr>
<td>MCPA sodium salts</td>
<td>Various MCPA Labels</td>
</tr>
<tr>
<td>Thifensulfuron-methyl</td>
<td>Harmony Extra / Affinity</td>
</tr>
<tr>
<td>Thifensulfuron-methyl</td>
<td>Harmony GT</td>
</tr>
<tr>
<td>Tribenuron-methyl</td>
<td>Express</td>
</tr>
<tr>
<td>Imazamethabenz</td>
<td>Assert</td>
</tr>
<tr>
<td>Triallate</td>
<td>Far-Go</td>
</tr>
<tr>
<td>2, 4-D Acid, amine, ester</td>
<td>Various 2, 4-D labels</td>
</tr>
<tr>
<td>Tralkoxydim</td>
<td>Achieve</td>
</tr>
<tr>
<td>Fluoroxypr-methyl</td>
<td>Starane</td>
</tr>
<tr>
<td>Fenoxaprop-p-ethyl</td>
<td>Puma</td>
</tr>
<tr>
<td>Garfentrazone – Ethyl</td>
<td>Aim</td>
</tr>
<tr>
<td>Pinoxaden</td>
<td>Axial</td>
</tr>
<tr>
<td>Pyrasulfotole</td>
<td>Huskie</td>
</tr>
<tr>
<td>Flurasulam + MCPA</td>
<td>Orion</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>Various Trifluralin Labels</td>
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**INSECTICIDES**

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazinon</td>
<td>Dryston (Limited formulations of granular)</td>
</tr>
<tr>
<td>Triarsuluron</td>
<td>Ally (Rotational restrictions apply)</td>
</tr>
<tr>
<td>Triarsuluron + Amber</td>
<td>(Rotational restrictions apply)</td>
</tr>
<tr>
<td>Proarsuluron</td>
<td>Peak (Rotational restrictions apply)</td>
</tr>
<tr>
<td>Dicamba &amp; Triarsuluron</td>
<td>Rave (Rotational restrictions apply)</td>
</tr>
</tbody>
</table>

**FUNGICIDES**

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propiconazole</td>
<td>Nufn</td>
</tr>
<tr>
<td>Azoxystrobin</td>
<td>Quadris</td>
</tr>
<tr>
<td>Pyraclostrobin</td>
<td>Headline</td>
</tr>
<tr>
<td>Copper Hydroxide</td>
<td>Various Copper Hydroxide Labels</td>
</tr>
<tr>
<td>Prothioconazole</td>
<td>Proline</td>
</tr>
<tr>
<td>Pyraclostrobin + metconazole</td>
<td>Twinline</td>
</tr>
<tr>
<td>Prothioconazole + ethanol</td>
<td>Prosoar</td>
</tr>
<tr>
<td>Propiconazole + Trifluroxystrobin</td>
<td>Stratego</td>
</tr>
</tbody>
</table>

**GROWTH REGULATORS**

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethephon</td>
<td>Cerone &amp; Various Labels</td>
</tr>
</tbody>
</table>

**GRAIN BIN TREATMENTS**

These are to be applied to empty grain bins only. Do not apply any product directly to the barley.

**STORED GRAIN TREATMENTS**

<table>
<thead>
<tr>
<th>Common Chemical Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diatomaceous Earth</td>
<td>Various Labels</td>
</tr>
<tr>
<td>Aluminum Phosphide</td>
<td>Fumitoxin, Phostoxin</td>
</tr>
</tbody>
</table>

**SEED TREATMENTS**

Most of our seed will not be treated. We do recommend that you treat your seed before planting. Any seed treatment that is labeled for use on spring barley is fine to use. We recommend that you contact your chemical dealer in advance to see what they will have available.

Reviewed by:
Brewing Materials & Corporate EH&S - Company Sanitarian Manager
March 25, 2009
All requested information must be accurately detailed and provided to MillerCoors LLC prior to purchase of malting barley as defined in Exhibit A, sections 1, 2 and 3.

Grower Name: __________________________
Grower No: ______________                Allotment: __________________

<table>
<thead>
<tr>
<th>Example</th>
<th>Field 1</th>
<th>Field 2</th>
<th>Field 3</th>
<th>Field 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and/or Location of field</td>
<td>Smith 40</td>
<td>Across from house NE corner Rd23 &amp; River Rd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acres</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Crop</td>
<td>Beets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed Lbs/Ac</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planting Date</td>
<td>4/2/03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer Applied</td>
<td>100-30-20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicides/ rates</td>
<td>Achieve bx/40 A Starane/ 6 oz Bronate/ 1 pt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date(s) Applied / Crop Stage</td>
<td>5/10 4 leaf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecticide and rate</td>
<td>Warrior - 2.56 oz Lannate – 1 pt.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Date(s) Applied</td>
<td>5/15 7/11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGR/Rate</td>
<td>Cerone/.5 pt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date Applied</td>
<td>6/10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fungicides/Rates</td>
<td>Headline/ 6.0 oz. Quadris/ 3.2oz.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date(s) Applied</td>
<td>5/10-7/1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I, _______________________, certify that these records are correct. Sign: ________________________ Date: ______________

Reviewed by: _______________________ Date: ______________
The MillerCoors Barley Program

**MillerCoors Barley Elevators**

- Capacities matched to receive barley at harvest
- Aeration, temperature control conditioning
- Cleaning on receiving and shipping
The MillerCoors Barley Program

High Expectations

MillerCoors has the highest standards in the industry which the barley must meet in order to be purchased. The 5 major standards are:

- Plumpness
- Color
- Protein
- Moisture
- Damaged and Diseased Kernels
• Each truckload is weighed, tested, and either accepted or rejected.

• If accepted, a sample is retained from the truck.

• Grain data is collected and entered into database.

• Daily, weekly, and harvest composites are retained as well at the grain elevator.

• A grower composite is retained too.
The MillerCoors Barley Program

MillerCoors Barley Stocks

Once the barley is harvested and stored, it must go through a “dormancy” period before it will germinate. This period can be from 1-8 months. Coors targets a 12 to 14 month supply of barley at all times. This is in place to provide safety stocks in the event of a crop failure, quality/contamination issue, increased beer sales, or to lessen the effects of barley going out of condition.
Barley Field Days
We educate and reward our barley growers annually. This is also our opportunity to show the company commitment to the business and growers.
**Brewing Materials Barley Field Staff**

**Idaho**
- Lbs processed: 300,000,000
- Acres: 50,000
- # Growers: 250
- 160 Miles across Region

**Montana / Wyoming**
- Lbs processed: 225,000,000
- Acres: 40,000
- # Growers: 250
- 335 Miles between areas in MT
- 130 Miles between areas in WY

**Northern Colorado**
- Lbs processed: 70,000,000
- Acres: 12,000
- # Growers: 120
- 250 Miles between areas in Region

**Southern Colorado**
- Lbs processed: 200,000,000
- Acres: 35,000
- # Growers: 160
- 120 Miles across Region

- **25 people operate 6 grain elevators in 6 different locations**
- **4 Regional Managers support both elevator operations and agronomists**
- **15 Operational personnel that operate the facilities on a regular basis**
- **6 Technical Agronomist that contract, advise, purchase annual barley needs**
Hop Selection Team

Each batch of hops used in Coors family brands are hand selected to assure that only the choicest hops meeting the specifications are purchased and used to make our beers.
Direct from the Grower

We recognize and reward our top hop growers annually.
So, does it work?

Quality Issue Example

1. Our Golden, CO malthouse discovered a problem with barley that made sub standard malt.
2. Our Internal Barley quality lab determined the barley had low germination.
3. Quality Dept. traced retained barley sample back to McIntyre grain silo (Golden, CO).
4. McIntyre traced barley shipment from Longmont, CO that filled the McIntyre grain silo.
5. Longmont grain elevator traced to the day and spot in the grain bin where barley was shipped from to McIntyre.
6. Longmont traced to the day that the Longmont bin area was filled at harvest.
7. Longmont traced that days delivery sample and data to growers delivering that day.
8. Longmont traced to specific grower retained samples.
9. Laboratory analysis of the grower samples pinpointed the issue to one grower.
10. Root Cause Analysis performed and documented with specific procedures designed to eliminate the problem from re-occurrence.
Keys to success:

- Hire the best people you can find
  - Best and brightest, treat them well
- Get to know your suppliers
  - Long term mutually beneficial relationships
  - Supplier visits/audits
  - Clear visibility to sub suppliers
- Contract language
  - Even in the best relationships, protect yourself legally
- Practice a recall event, map the process, trouble shoot problem areas
  - The time to practice traceability is not through a real event
  - Utilize the practice to identify gaps, close those gaps
  - Your people closest to the process are your best allies
1. **Why adopt traceability?** Imperative in our business, our consumers expect a safe, dependable product.

2. **What are the risks and/or rewards of traceability?** Risk is loss of consumer confidence in your product, liability claims, loss of productivity, lost sales.

3. **What factors (standards, legislative actions) will affect my business?** Homeland Security Acts, FDA regulations, consumer expectations.

4. **What tools are available to assist me in meeting traceability goals?** Good people that believe in good documented process, electronic tools (RFID, computer tracking programs, GPS, etc.), utilizing best practices from all industries.

**Questions?**