



FLOUR-RELATED FOOD SAFETY RISKS

Understanding the Milling Process, Risk
Factors and Potential Solutions

PRESENTERS



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VP, Research, Quality and Technical



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- Less than 3 years old
- Formed by merging ConAgra Mills and Horizon Milling
- 42 Mills, blending facilities and one bakery
- Headquarters in Denver, CO including Ardent Mills Innovation Center
- Ownership: 44% Conagra Brands, 44% Cargill, 12% Cenex Harvest States (CHS)



VISION AND VALUES

OUR VISION:

Ardent Mills is the **TRUSTED** partner in nurturing our customers, consumers and communities through innovative and nutritious grain-based solutions.

OUR VALUES:

We will make a positive impact with our employees, customers, communities and partners by:

OUR MISSION:

Enhancing the quality of life and standard of health.





The Conagra Way: Vision, Mission & Values



Vision

Conagra has the most-energized,
highest-impact culture in food.

Our people persistently challenge and disrupt
marketplace/business conventions and we are
respected for our great brands, great food, great
margins and consistent results.

Mission

Conagra has the most-energized,
highest-impact culture in food.

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marketplace/business conventions and we are
respected for our great brands, great food, great
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Values

Integrity – doing the right things and doing
things right

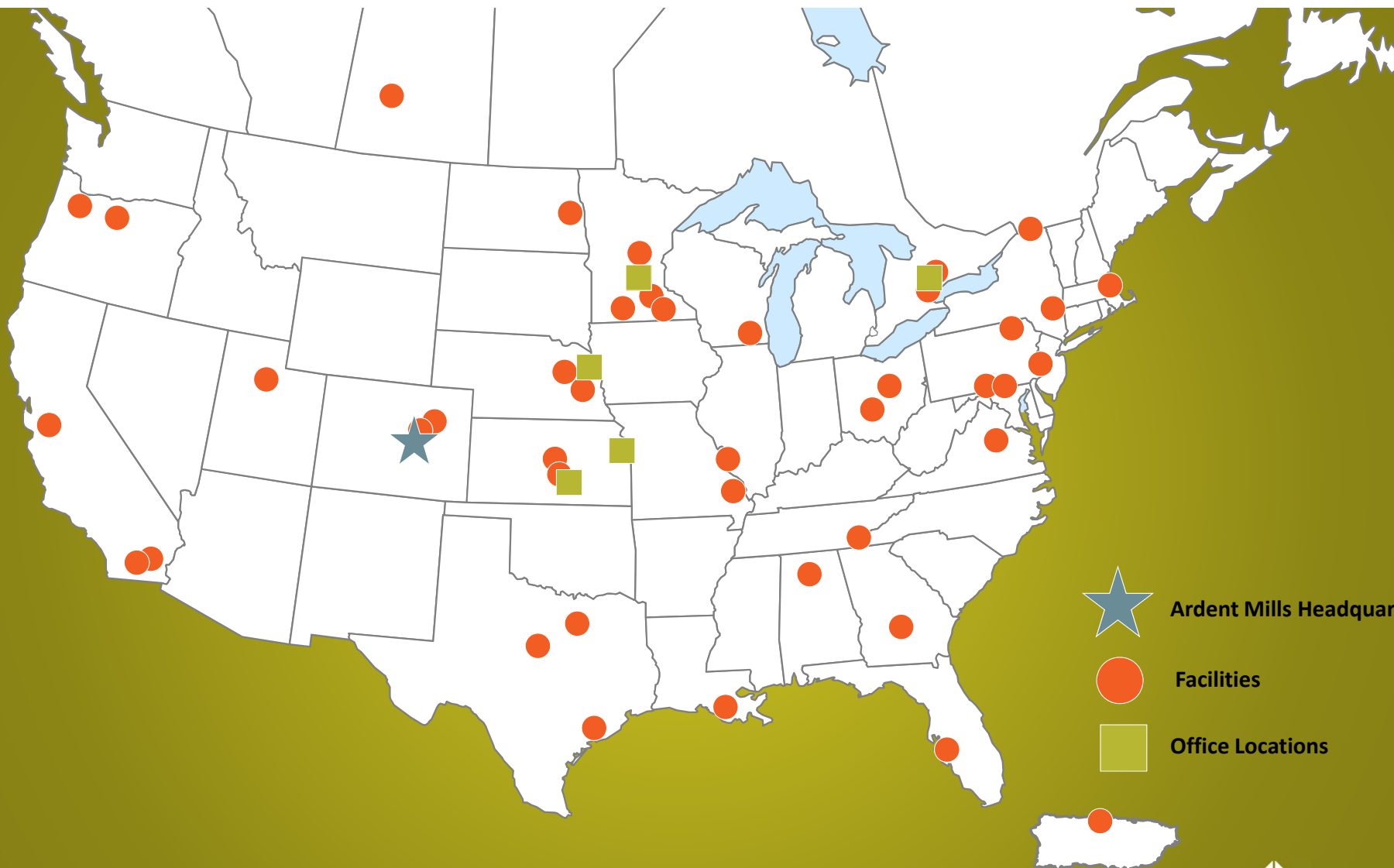
External Focus – centering on the consumer,
customer, competitor, and investor

Broad-mindedness – rejecting silos and embracing
disciplined curiosity

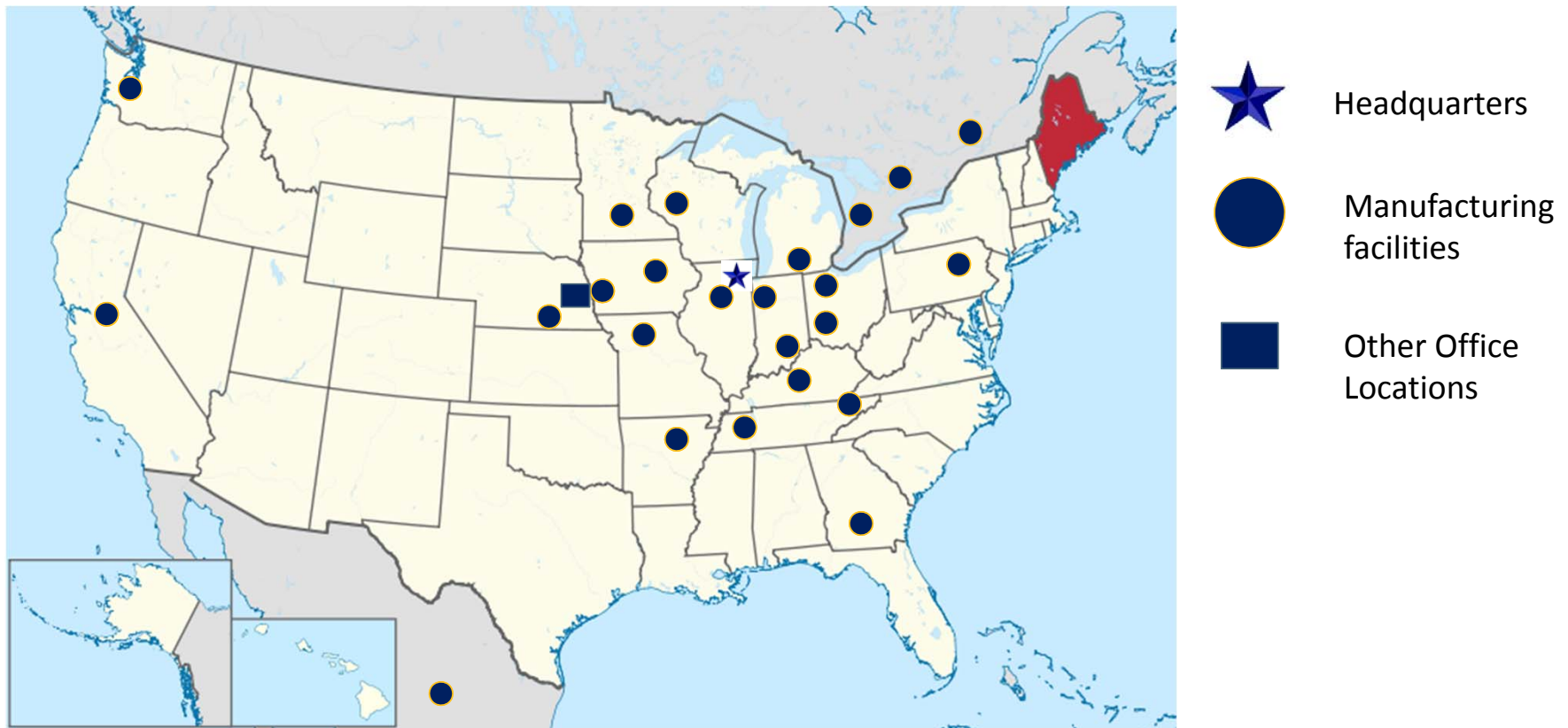
Agility – converting insights into action with the speed
of an entrepreneur

Leadership – simplifying, making decisions, inspiring
others, and acting like
an owner

Results – leveraging a “refuse-to-lose” obsession with
impact and
value creation



Conagra Manufacturing Facilities



Ardent Mills Innovation Center



Flour Research



Bake Lab



Analytical Lab



Culinary Center



R&D Lab

CHEMICAL

RADIOLOGICAL

All
agricultural food ingredients
carry food safety risks
that need to be understood
and mitigated.

PHYSICAL

BIOLOGICAL

HAZARD TYPES

HAZARD ANALYSIS RISK BASED PREVENTIVE CONTROL

Physical

- Foreign Material
- Wood
- Plastic
- Cob
- Metal

Biological

- Parasites
- Insects
- Rodents
- Mold

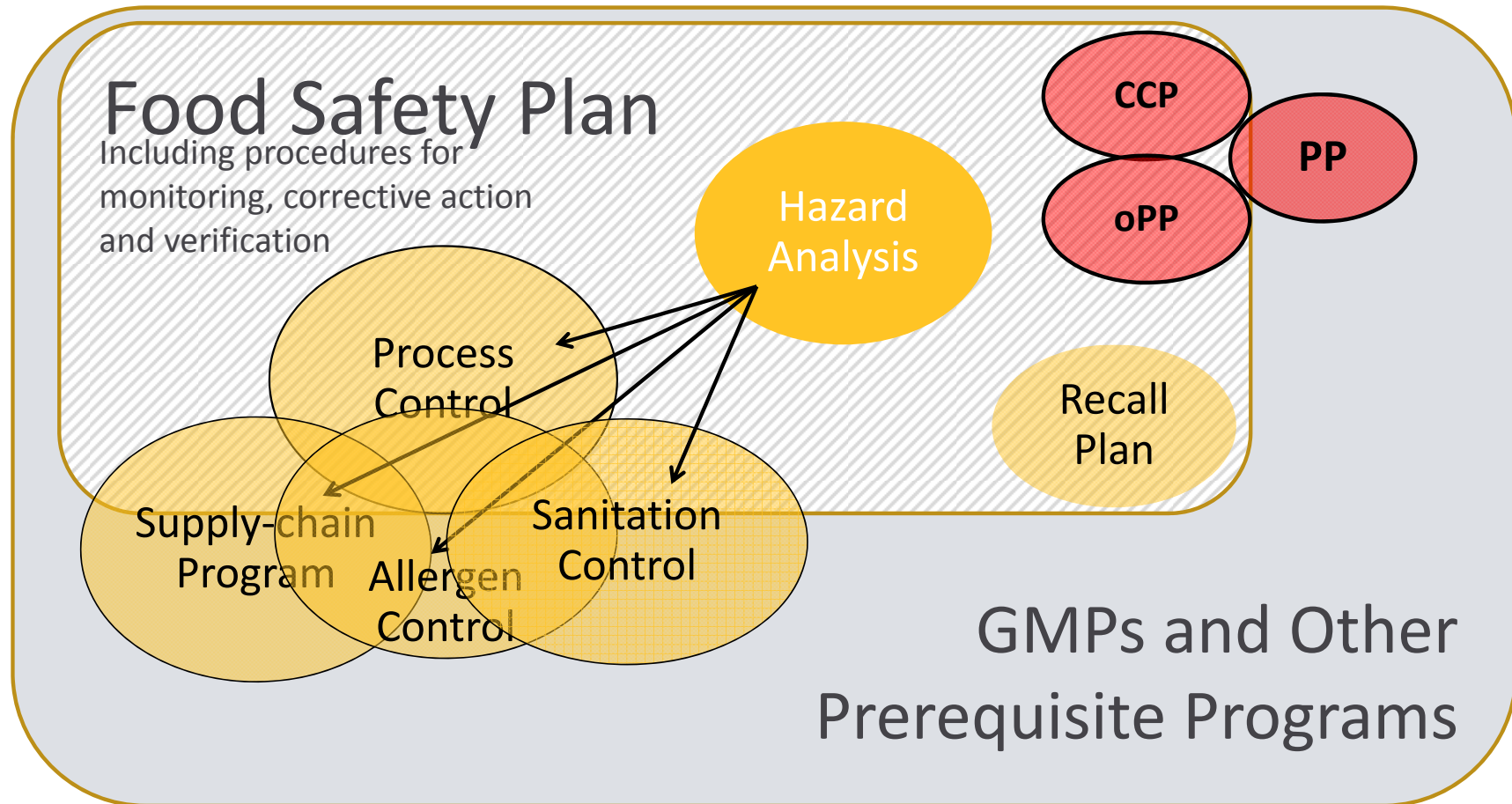
Chemical

- Pesticides
- Allergens
- Mycotoxins
- Herbicides

Other

- Radiological
- Intentional
- Economically Motivated Adulteration (EMA)

FDA's PCs vs Conagra's Food Safety Plan



Auditing

Good Manufacturing Processes

Food Safety

Handwashing

EE Training

MILLING IS FOOD MANUFACTURING

Water Testing

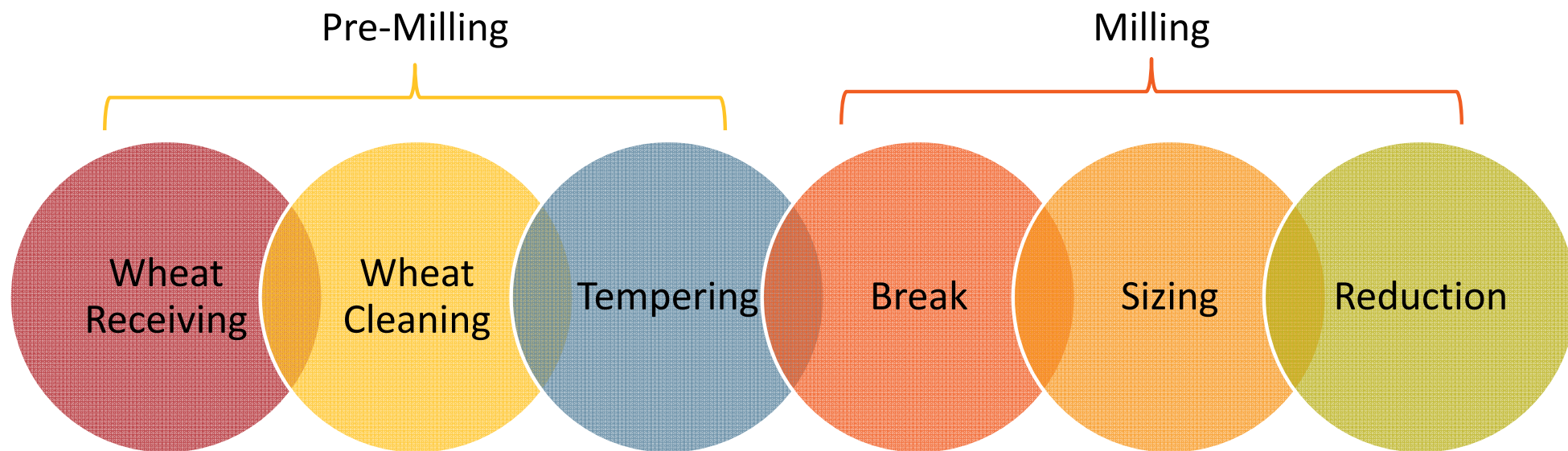
Hair & Beard Nets

Environmental Monitoring Program (EMP)

FARM TO FLOUR

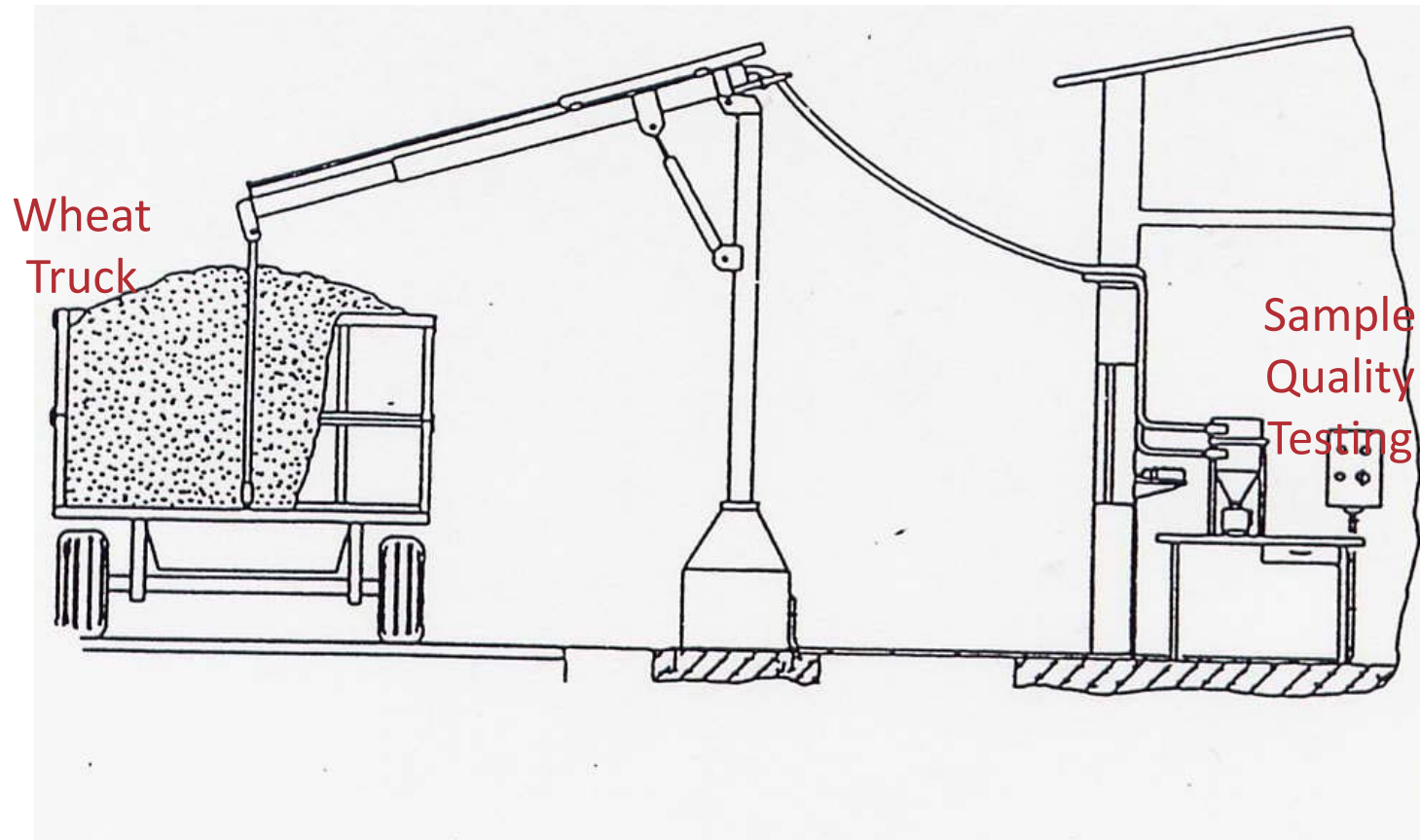
Control Physical Hazards

THE MILLING PROCESS SIMPLIFIED



PRE-MILLING: WHEAT RECEIVING

QUALITY CHECK: MECHANICAL PROBING



PRE-MILLING: WHEAT CLEANING

ELIMINATING UNWANTED MATERIAL

- Magnetic Properties
- Size and Dimensions
- Shape
- Specific Gravity
- Behavior in Air Currents
- Electrostatic Properties
- Surface Friction
- Friability
- Color Differences

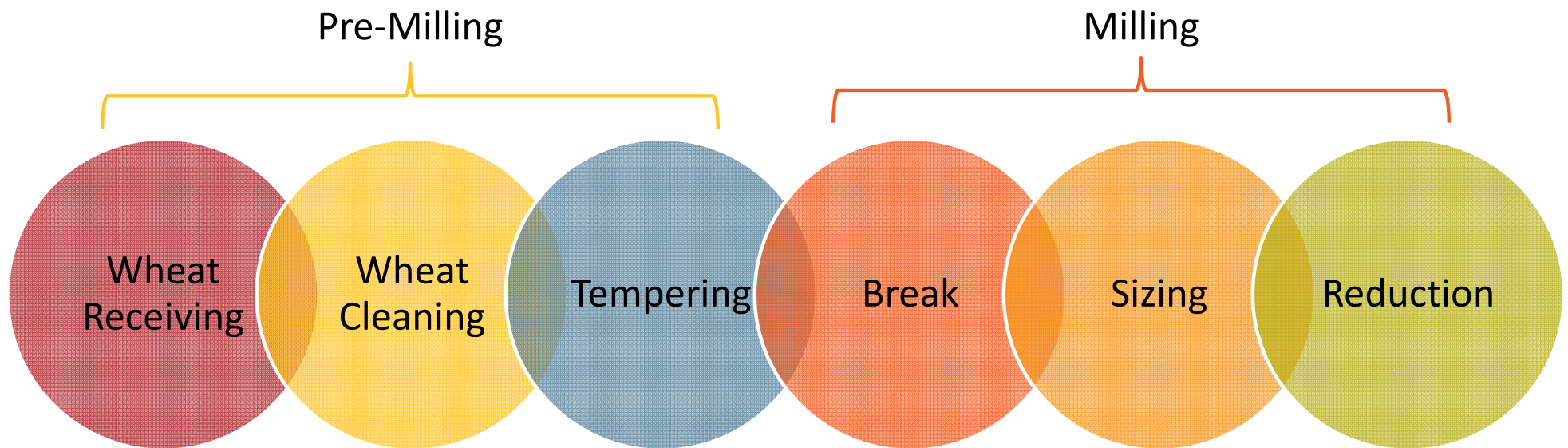
FARM TO FLOUR

Control of Some Biological Hazards

BIOLOGICAL HAZARDS CONTROLLED

- Pest via Integrated Pest Management programs
- Proper grain storage programs
 - Infrastructure
 - Aeration
 - Rotation
 - Avoiding ground storage

THE MILLING PROCESS SIMPLIFIED



MICROBIOLOGICAL RISKS TO WHEAT

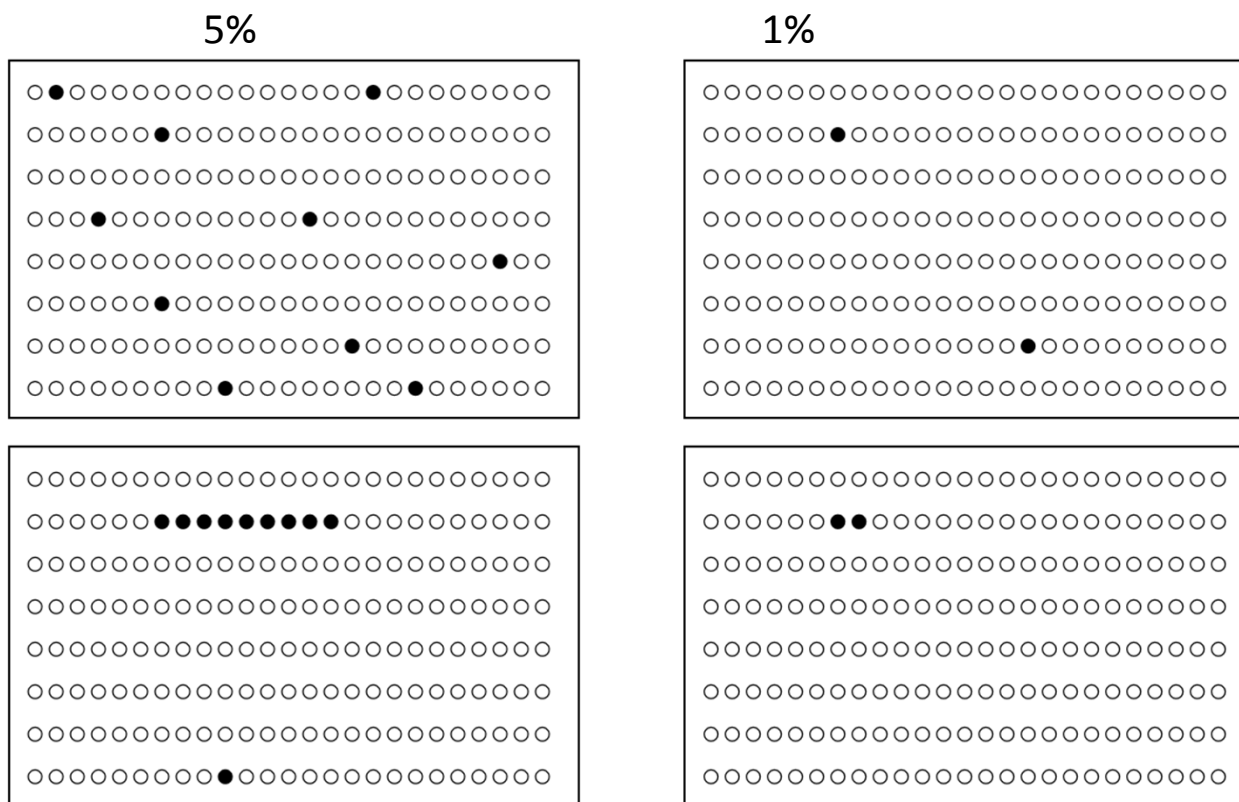
- Wheat is grown in varying conditions and may become contaminated with pathogens.
- The vector of contamination can be surface and potentially internal.

Risk Mitigation

- Risk Assessment of Product
- Intended Use of Product
- Known Use of Product
- Validated lethality treatment
 - Ingredient or Final product?
- Log reduction of pathogens of interest
 - What is appropriate?
- Environmental Monitoring Program
- Hygienic Restoration

Statistics Behind Testing

✗ Assumptions of homogeneity vs. reality



Statistics Behind Testing

- ✗ Probability of acceptance based on incidence rate (2-class sampling plans)

	For lots with $\pi = 0.05$ (5% of samples are contaminated)			For lots with $\pi = 0.01$ (1% of samples are contaminated)	
n	Probability of Acceptance of lot	Probability of Rejection of lot		Probability of Acceptance of lot	Probability of Rejection of lot
1	0.95	0.05		0.99	0.01
5	0.77	0.23		0.95	0.05
15	0.46	0.54		0.86	0.14
30	0.21	0.79		0.74	0.26
60	0.05	0.95		0.55	0.45
300	<.005	>.995		0.05	0.95



HAS YOUR BAKING PROCESS BEEN VALIDATED?

Baking Process Kill Step Calculators available from AIB

SAFEGUARD FOR READY TO EAT APPLICATIONS

- Patented heat treated process
- Up to 4 log reduction
- Supports ready to eat applications



FARM TO FLOUR

Control of Chemical Hazards

Control of Mycotoxins, Pesticides, and Herbicides

Primary mycotoxin of concern in wheat

- Deoxynivalenol (DON or Vomitoxin)

Controlled via source testing, acceptance testing

Reduced via cleaning and color sorting

Pesticides and Herbicides

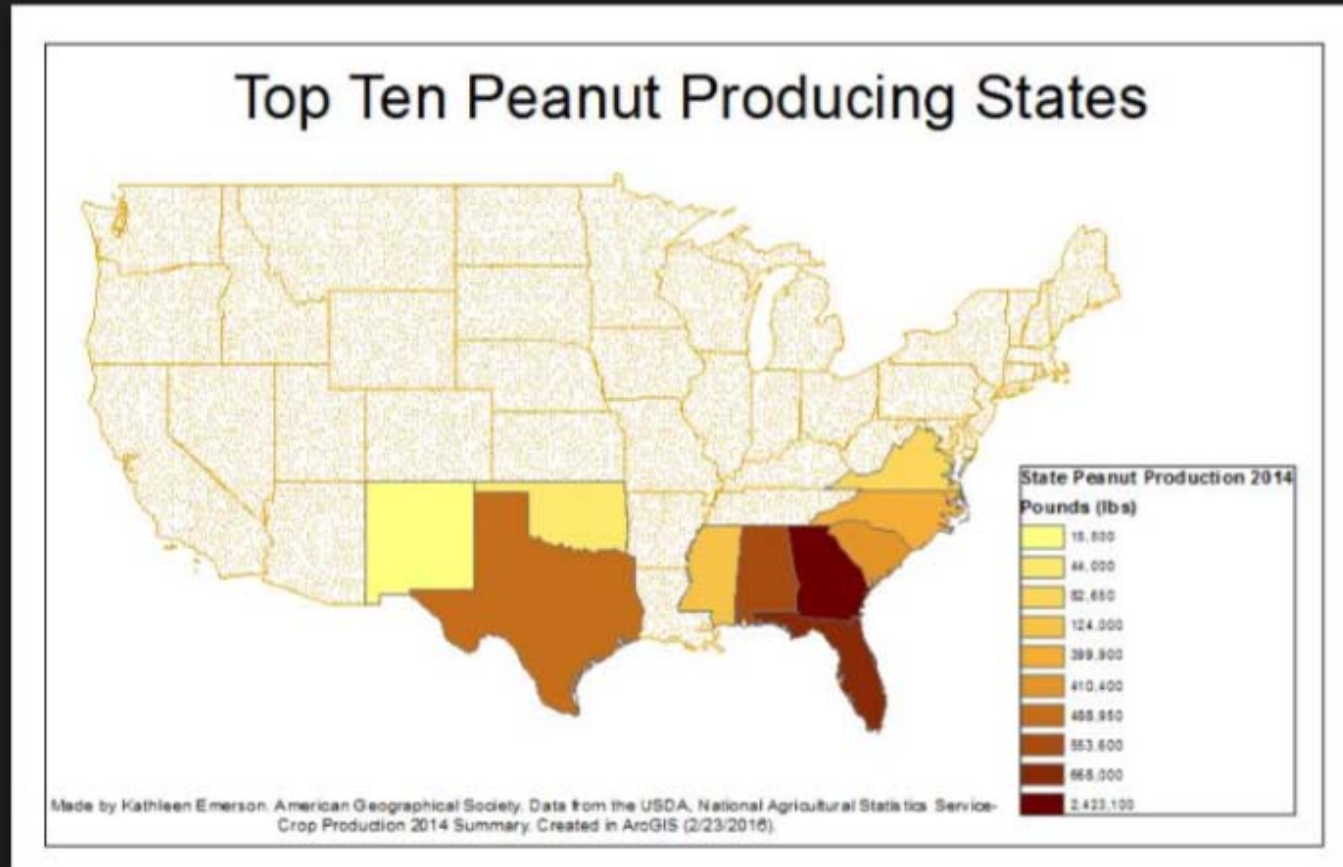
Grain sourced from North American Sources

Highly regulated

Public opinion different than regulations

Allergens

Peanut is focal area for 2016



Broader Scope Focal Areas

- Peanut Oil
- Enzymes
- Derivatives
- Peanut Meal
- Peanut Shells
- Raw Peanuts
- Processed



Ardent Mills
Assembled
Diverse to
Address Industry
Issue

(Note: Ardent
Mills was not
involved in
allergen related
recalls)

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August 8 & 9 Summit

Assembled the following representatives:

- Food Allergen Research and Resource Program (FARRP), University of Nebraska, Lincoln
- Grocery Manufacturing Association and task force members
- North American Milling Association
- International Association of Operative Millers
- Trucking
- Railroads
- Grain origination
- Peanut industry Assoc. Association
- Georgia Department of Agriculture, University of Georgia
- Milling industry equipment providers
- Allergen detection supplier





QUESTIONS?

FLOUR-RELATED
FOOD SAFETY RISKS