Quaker Oats Cedar Rapids

Heat Treatments: Past, Present and Future

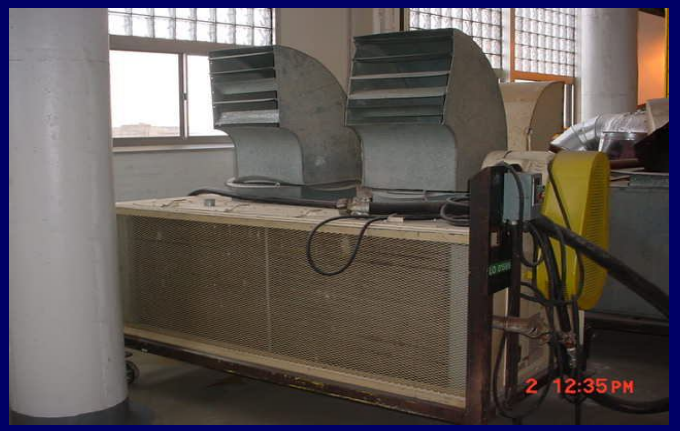
KSU Heat Treatment Workshop 2009

Summary

- Heat Treatment / Remediation
  - Evolution – Long History
  - Current Challenges
  - Future State
- Flood of ’08
  - The event and recovery - Heats
  - Challenges / Learnings

QO Cedar Rapids Heat History

- Cedar began use of heat in the mid-1960s
  - Used everything else prior (methyl, malathion, etc.)
  - Lots of makes/sizes of heaters over time
- Systems run off of steam
  - Readily available from Alliant energy
  - Simple technology / milling and extrusion
- Temperature / time requirements
  - “Art vs. Science”
  - Lots of history in heating



Temperature – Time Requirements

The Response of stored-product insects to temperature*

Zone	Temp (˚F)	Effect
Lethal	122 - 140	Death in minutes
	113 - 121	Death in hours
Suboptimum	96 - 112	Development stops
	91 - 95	Development slows
Optimum	77 - 94	Maximum rate of development
Suboptimum	55 - 76	Development slows
	55 - 68	Development stops
Lethal	41	Death in days (unacclimated), movement stops
	14 - 23	Death in weeks to months (acclimated)
	-13 - 5	Death in minutes, insects freeze

*Species, stage of development and moisture content of food will influence the response to temperature

(Fields, P.G. (1992) The Control of Stored-Product Insects and Mites with Extreme Temperatures. *J. stored Prod. Res.* 28, 90)

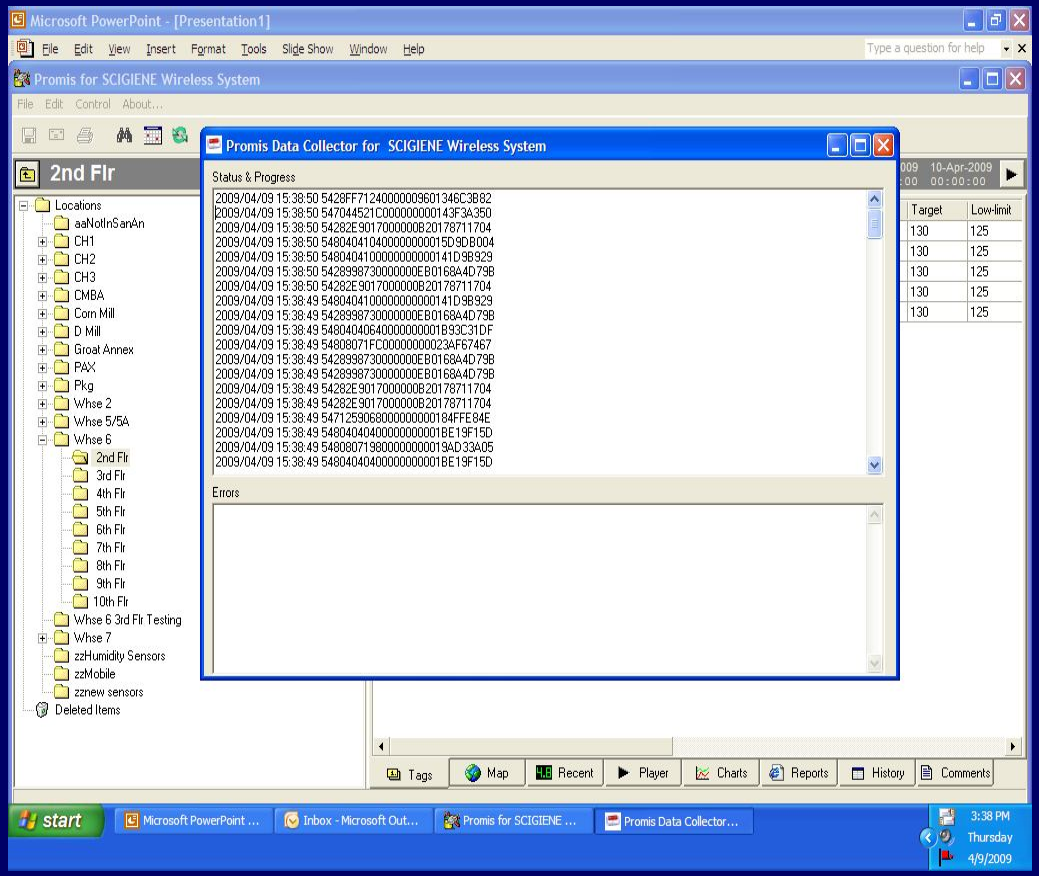
Heat Evolution

- Staffing changes / monitoring electronically vs. manual
- Entire plant vs. selective areas – “Big/Small” heats
- Several things prompted:
  - Costs – labor at the time
  - Flexibility – run adjacent areas
  - Improved monitoring for activity / spraying selected areas / other treatment options
  - IPM policy / development of trigger levels

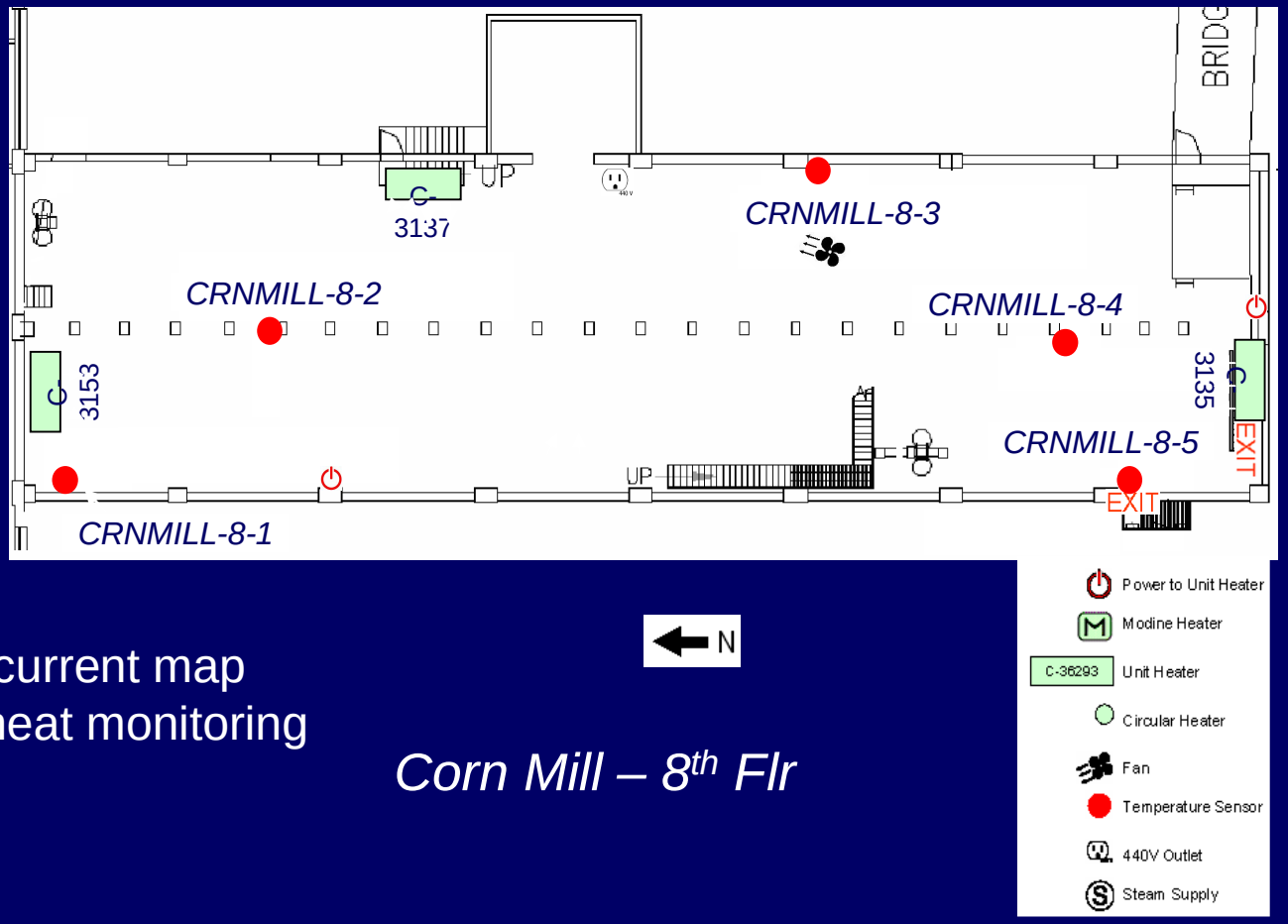
Heat Evolution

- Monitoring methods - Electronic
  - Safety considerations
  - Still need to “adjust” heat for effectiveness
  - Need to walk floor for observing upset conditions due to temp
  - Growing # of options out there (wireless/remote/Hobos/ etc.)

  - Manual Thermometers



Heat Evolution



- Example of current map Used during heat monitoring

Corn Mill – 8th Flr

Challenges

- Scheduling of heat “events” / finding downtime
  - Production / Engineering
- Areas not set-up for heat or adequate capabilities
  - Portables / Spot Treat
- Electronic equipment
  - Start-up curve
- Maintenance support
  - Aging equipment
  - Support during heat start-up
- Safety of employees
  - Cold spots / adjustments
  - Catastrophes
- Monitoring equipment upgrades/changes
  - Changing technology

Heats - Future State

- Focused Improvement
  - Rounds staffing / develop “run rules”
  - Electronic controls vs. manual on heaters
  - Maintain effectiveness + eliminate wasted utilities
- Ability to do specific areas
  - Heaters / fans flexibility and portability
  - Move from heating entire floors to “spot” treatments
  - Add portable heater capabilities
- Time constraints – Minimize line disruption
- Personal safety – Minimize time spent in high temperatures

Flood of June ’08 – Quaker Cedar Rapids – The Event

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Flood of June ’08 – Quaker Cedar Rapids – The Recovery

- Facility Heat capabilities “wiped” out in key 1st/Basement areas
- Warmest part of year
- Recovery process created other issues
- Moisture in basements created need to dry for dual-purposes

Flood of June ’08 – Quaker Cedar Rapids – The Recovery

- Crisis event management
- Big “learning curve” in compressed time frame
- Controlled ramp up of heat to meet Quaker specifications / effective kill
- Large Audience!!

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