Seed Treatment Safety and Regulations – Crop Protection Perspective

Chip Witcher / Staff Industrial Hygienist / Syngenta Crop Protection
Objectives

The objectives of this presentation are to...

- Describe seed care product health hazards and exposure pathways

- Help you understand how these hazards are communicated and managed

- Review recommended engineering controls, work practices and personal protective equipment
Treating Equipment
Bagging Equipment
Possible Seed Care Products Health Effects

- Skin and eye irritation
- Skin sensitization
- Toxic effects (nervous system, other organs).
Chemical Exposure Pathways

- Inhalation of dust or mists
- Skin absorption
- Ingestion
Sources of Hazard Information

- Material Safety Data Sheets (MSDSs)
- Product Labels
Material Safety Data Sheets

- Detailed hazard information document
- Used for many purposes – worker protection, emergency medical response, spill cleanup, transportation, disposal
- Intended audience - manufacturing and formulation sites, emergency responders, HSE personnel
Product Labels

- Signal word and warning language dictated by EPA risk assessment
- Simplified instructions, minimal detail
- Intended audience - end users of the product (seed treatment applicators in this case)
EPA Risk Assessment Concepts

- Label PPE requirements are based on risk assessment models (toxicity, physical/chemical properties, use patterns)

- Philosophy --- Rely primarily on PPE, with limited engineering controls (“closed system” concept)

- Typically overprotective, to account for variable effectiveness of PPE

- Rules apply to entire industry regardless of specific exposure conditions

- End result: conservative control requirements that are relatively simple, but inflexible.
Example: EPA Label PPE Requirements for Avicta® Duo Corn

- Seed Treatment Chemical Operators
  - Long sleeves and long pants, shoes and socks
  - Gloves
  - Dust respirator (dust mask or cartridge mask)

- Baggers and Sewers
  - Long sleeves and long pants, shoes and socks
  - Dust respirator (dust mask or cartridge mask)

- Loader / Operators and Planters
  - Long sleeves and long pants, shoes and socks
  - Gloves
Syngenta Guidelines for Airborne Exposure

- Syngenta Occupational Exposure Limits (OELs), set to protect workers for a lifetime of exposure (8 hrs/day, 40 days/week)

- We share OELs with downstream handlers as stewardship best practice guidance (via MSDSs)

- Example: Abamectin OEL = 0.02 mg/m³ (8-hour average level in air) to prevent long term nervous system effects.
Measuring Treatment Chemical Air Levels

Standard Air Monitoring Procedure

- Personal air monitoring for total dust (includes target chemical, seed dust, other treatments)

- Chemical analysis for the target chemical fraction of the total dust captured

- HSE provides technical support for customer air quality monitoring.
Managing Exposure – 4 Elements

- ENGINEERING controls prevent chemical release – protection is built into the process

- WORK PRACTICES are procedures taken to minimize chemical contamination during normal work tasks

- PERSONAL HYGIENE controls are steps to reduce accidental transfer of hazardous materials to personnel, food, clothing, vehicles, etc

- PERSONAL PROTECTIVE EQUIPMENT is worn as an additional protective measure to minimize exposure – accidental or routine.
1. Engineering – Chemical Mixing & Treater Operation

- Maintain “Closed” chemical transfer system
- Keep treater closed to prevent mist or dust escape
- Immediately address leaks or spills to minimize clean-up.
“Closed System” Treatment Concept
Engineering – Dust Control

- Effective dust control requires containment and local exhaust ventilation

- Dust reduction is the primary goal in managing seed treatment exposure
  - Treater
  - Conveyor transfer points, belts, screens
  - Bagging stations
  - Dumping back treated seed
Manual Bagging – Typical Arrangement

- Hood attached to bagger, or suspended alongside bagger
Recommended Manual Bagging Ventilation

Good pick-up and work practices required for control below some OELs (e.g. abamectin)
Automatic Bagging Systems

- Preferred for high production operations, containment minimizes worker exposure and work area contamination issues

- Enclose bagger

- Fit with local exhaust ventilation
Manual Dumping Treated Seed

- Potential high dust operation
- Exhaust ventilation necessary at dump station
- Good work practices control dust and minimize clean-up
Automatic Bag Breaking

- Preferred method for high volume re-work
- Reduces dust exposure and ergonomic issues associated with manual dumping
Automatic Bag Breaking

- Preferred method for high volume re-work
- Reduces dust exposure and ergonomic issues associated with manual dumping

Exhaust hood
Automatic Bag Breaking

- Preferred method for high volume re-work
- Reduces dust exposure and ergonomic issues associated with manual dumping

Exhaust hood
Inclined conveyor
Automatic Bag Breaking

- Preferred method for high volume re-work
- Reduces dust exposure and ergonomic issues associated with manual dumping

Exhaust hood
Inclined conveyor
Automatic bag handling
Dust Collection System Design

- Construct collection systems according to established design principles
- Select an efficient baghouse or cartridge filter dust collector
- Discharge exhaust outside building
- Obtain required air permit approvals
- Routinely inspect and maintain system to optimum performance
Air Emissions Controls

- Local permit rules may vary – consult with specific state agencies for permit requirements
Air Emissions Controls

- Discharge filtered air outdoors
- Recirculation is NOT recommended
2. Work Practices

Operating Treaters

- Keep equipment closed when operating to prevent splashes
- Use care in opening / observing operations
- Wear proper PPE to protect eyes and body
- Clean up spills promptly to minimize dust contamination
- Clean tools after use to prevent transfer of treatment residues to other equipment
Work Practices

Handling freshly treated seed

- Damp, freshly treated seed presents a minimal exposure hazard
- Wear PPE according to the label
- Identify leaks in transfer equipment and repair them promptly
- Clean up spilled seed promptly to minimize slipping hazards and work area contamination
Work Practices

Bagging / dumping back treated seed

- Dumping back dry treated seed requires careful work practices to control exposure

- Handle empty bags carefully and place them in disposal bags immediately after emptying

- Wear respirator and protective clothing as required by the label
Work Practices

Maintenance (repair and adjustments to equipment)

- Minimize use of compressed air to clean equipment and dislodge seed – compressed air spreads dust

- Minimize sweeping – it spreads dust too

- Use HEPA filter vacuum cleaning equipment as much as possible

- Clean tools immediately after use to prevent contamination of other equipment and transfer to hands, etc.

- Wear appropriate personal equipment – follow the label
3. Personal Hygiene

- Restrict eating, drinking and smoking
- Provide suitable washing and clean-up facilities
- Require workers to clean up before leaving work
- Work clothes or uniforms
- Dedicated work shoes
- Don’t take chemicals home!
4. Personal Protective Equipment

- Conduct a risk assessment to determine PPE requirements
- Follow EPA label precautions at a minimum
- Train workers how to use and maintain PPE
- Site respirator programs must meet OSHA standards (including: written program, medical certification, training, fit testing)
- Review program effectiveness
Summary

- Good chemical management practices are recommended for all seed care products

- Investments in worker safety will ensure protection and provide confidence for handling a wide range of products
  - Increased worker awareness
  - Tighter workplace exposure controls
  - Improved enforcement of PPE and personal hygiene rules
Any Questions ?
Thanks!

M. R. (Chip) Witcher, CIH

Staff Industrial Hygienist

Syngenta Crop Protection, Inc.

Tel. 336-632-6437

chip.witcher@syngenta.com