Instructors Guide

Sulfur Dust Stewardship and Safety

- **Learning Objectives**

On completing this module, participants will understand:

1. Why sulfur dust drift is an important issue
2. What are sulfur-sensitive areas
3. How to avoid sulfur drift to sensitive areas and public complaints
4. How to safely handle and apply sulfur dust
5. The safe operation of dusting equipment.

- **Equipment and Props for Hands-On Training**
  - Display with charts of sulfur drift incidents
  - Schematics of vineyards near sensitive areas (e.g., school, houses, busy road)
  - Wind gauge
  - Long-sleeved shirts
  - Long pants
  - Waterproof gloves
  - Shoes plus socks
  - Protective eyewear
  - Display with photos of old and new dusting equipment

- **Handouts**
  - *Best Management Practices for Sulfur in Winegrapes* **(**California Winegrape Pest Management Alliance)
  - *Sulfur Best Application Practices* (Coalition for Urban/Rural Environmental Stewardship)
  - Product Label and Material Safety Data Sheet for sulfur dust
  - Photos of safety stickers on dusters
  - Photos showing don’ts like putting bare hand into hopper with no shields

1. Introduction (2 minutes)

Introduce yourself and tell students the learning objectives:

- To understand why sulfur dust drift is an important issue
- To identify sulfur-sensitive areas and ways to avoid sulfur drift and public complaints
- To review the safe handling and application of sulfur dust and safe operation of dusting equipment.

Explain that the format here differs from other sessions in that various aspects of sulfur dust use and safety will be covered – stewardship, personal protective equipment (PPE), human and environmental hazards, and loading and applying.

2. Sulfur Dust Drift is an Important Issue (5 minutes)

Discussion – Drift Incidents: Show the display with charts from *Best Management Practices for Sulfur in Winegrapes*. Tell students that information is for incidents of sulfur drift in California during 1997-1999. Ask what the important points are:

- Most incidents of sulfur drift resulted from applications to grapes
- Sulfur drift incidents occur all over California (it's a statewide problem).

Emphasize that sulfur drift incidents have increased and that 80% are for dust. Ask why incidents have increased and so many involve dust.

- Less distance between farms and urban areas, leading to more drift complaints
- Cheap and effective sulfur dust is the most widely used fungicide on grapes (controls powdery mildew, the most important grape pest)
- Sulfur dust is easily visible and very susceptible to drift

Emphasize that sulfur dust drift is the #1 pesticide complaint and that incidents must be reduced. If not, sulfur products (especially dust) could be further regulated or banned.

3. Minimizing Drift and Public Complaints (20 minutes)

Discussion – Identify Sensitive Areas: Emphasize that it is important to first identify areas near fields where drift could cause complaints. It is important to be especially careful in managing sulfur dust near these areas. Ask students to list some "sensitive areas" and describe what makes them sensitive (human activity).

• Schools • Bus stops • Busy roadways • Homes or occupied buildings

Note that sulfur-sensitive areas include nearby susceptible crops and waterways.

Discussion – Stewardship: Ask students what factors can be managed to minimize sulfur drift and public complaints. Discuss the following 10 factors from *Best Management Practices for Sulfur in Winegrapes*. Emphasize factors that students can influence.

- **Being a good neighbor.** Be aware of neighbor concerns and improve communications and understandings with them. Ask students how to deal with an angry neighbor about sulfur drift (stop the application and call the boss).

- **Canopy management.** By properly managing and thinning the canopy, it may be possible to use lower rates and fewer applications.

- **Monitoring mildew development.** Using the powdery mildew index to help time applications may reduce the frequency of applications (briefly explain the index).

- **Establishing buffers.** Set buffers to prevent sulfur drift to sensitive areas.

- **Dealing with extra-sensitive areas.** Consider applying sprays in these situations.

- **Selecting rates.** Use lowest effective rates based on vine growth.

- **Equipment operation.** Maintain and calibrate equipment to deliver the intended rate accurately and quietly. Shutoff dusting equipment at row ends if possible.

- **Weather monitoring.** Monitor weather before and during applications. Do not apply sulfur when winds exceed 10 miles per hour, although a minimum air movement of 2 miles per hour is recommended. Avoid applications when winds are blowing towards sensitive areas.

- **Timing applications.** Decrease public visibility by making applications at night or during other periods of minimal human activity.

- **Resistance management.** Consider rotating sulfur with other fungicides.

Problem-Solving Exercise: Show students the schematics of vineyards near sensitive areas. Ask what can be done to minimize sulfur drift and complaints. Or, divide students into groups, give each group one schematic, and have groups discuss and present tactics. (e.g., nighttime applications, monitoring and adjusting for winds, shutting off at row ends, not dusting vines nearest sensitive areas, and using sprays instead of dust)

Discuss ways to estimate wind speed. Display a wind gauge. Note who is responsible for monitoring winds (the applicator is).

4. Worker and Environmental Safety – Sulfur Dust Label (10 minutes)

Emphasize that the label is the legal document for safety and use information. For this section, have students find appropriate information on the label.

Discussion – Signal Word and PPE: Have students identify the signal word and discuss its meaning (CAUTION: slightly toxic or relatively non-toxic, low hazard). Ask students to determine PPE required for handlers and applicators:

- Long-sleeved shirt
- Long pants
- Waterproof gloves
- Shoes plus socks
- Protective eyewear; safety goggles or glasses with side shields and brow protection.

Discussion – Hazards to Humans and Animals: Ask about these hazards:

- Causes moderate eye, skin, and throat irritation
- May cause breathing difficulty
- Harmful if absorbed through skin.

Emphasize the importance of starting each work day with clean PPE and clothing. Remind students to wash before eating, drinking, smoking, or using the toilet.

Discussion – Environmental Hazards: Ask if sulfur dust is a hazard to the environment. (Although not a serious environmental hazard, spills and drift must be avoided.)

Discussion – Physical Hazard: Ask if sulfur dust suspended in air presents risks. (It ignites easily – avoid heat, sparks, or flame. Do not smoke while applying.)

Discussion – Restricted Entry Interval: Ask what the restricted entry interval is. (Do not enter treated areas for 24 hours after application – becomes 3 days for San Joaquin County after May 15, 2001. For earlier entry, appropriate PPE is required.)

Discussion – Application Precautions: Ask:

- Why sulfur should not be applied in the early afternoon during 100^{o}F temperatures? (At high temperatures, sulfur can burn foliage/fruit. Also, sulfur dust is flammable – tractor, hopper, vines could ignite.)
- Why sulfur should not be applied within 2 weeks of an oil spray (burn foliage/fruit)?
- What are some sulfur-sensitive crops and what precautions should be taken when applying sulfur near them (same as that for other sensitive areas)?

Discussion – Storage and Disposal: Ask how and when to dispose of sulfur bags.

- Empty bags can be burned on site. San Joaquin County ordinance states that sulfur bags must be burned on the day emptied. AVOID smoke – it is toxic.
- Empty bags can be taken to an approved waste disposal facility.
- Store dust in original container only and keep sealed. Store in closed storage areas.

5. Worker Safety – Sulfur Dusters (5 minutes)

Discussion – Safe Operation of Dusting Equipment: Present display with photos of old (three-point model) and new (tow-behind model) dusters. Have students discuss important aspects about safety. Discussion can include:

- Proper and improper protective shields for belts, fan, and mixing shaft.
- The importance of safety decals (note the 5 decals on the new duster).
- How to properly remove a bag caught in the mixing shaft (contrast to photo – rubber gloves must be worn and the mixing shaft turned off).
- The importance of shutting off the tractor engine and allowing all movement to stop before leaving the tractor to adjust, lubricate, or unhook the duster.
- Why hands and loose clothing must be kept away from power-driven parts.
- Why all guards should be in good condition and firmly in place.
- The benefits of the step on the side of the new duster (enables easy and safe pouring).
- Where to stand when adding sulfur (to the side with the wind blowing away).
- The benefits of the storage box on the front of the new duster (stores extra bags).
- The benefit of being able to shut off the flow of sulfur while driving the tractor (note sulfur distribution lever on new duster).
- Stopping the application if the applicator is excessively tired or his vision is obscured.
- Use common sense when operating dusters and refer to equipment manuals.

6. Wrap-Up and Conclusion (3 minutes)

Remind students about carefully managing sulfur to prevent drift problems. Ask students if they have questions on sulfur stewardship or worker safety. In conclusion, point out that each person can make a difference with safely using sulfur.