

Sanitation and Postharvest Handling Overview

Currently, whole fresh fruits and vegetables are exempt from legally required implementation of GMPs, but the focus on sanitation practices is good for reducing food safety risks in fresh produce operations. Adopting good postharvest practices will not only reduce food safety risks, but also contribute to maintaining produce quality and reducing postharvest decay.

To understand what risks may be present, an assessment of the packing and produce handling area should be completed. Any surface that the produce touches may serve as a source for contamination. Such surfaces include equipment, belts, rollers, brushes, tables, bins, sinks, tools, and even the hands of workers. Surfaces that contact produce must be able to be easily cleaned and preferably, sanitized.

Areas within the packing and handling area can be broken into zones to help determine the likelihood of direct contact with the produce you are handling.

- **Zone 1:** Direct food contact surfaces such as conveyors, belts, brushes, rollers, sorting tables, racks, utensils, harvest/storage bins, and worker hands. This zone is the biggest concern because it has direct contact with the produce and if contaminated, could result in contamination of the entire crop.
- **Zone 2:** Non-food contact surfaces that are in close proximity to the product, such as internal and external parts of washing or processing equipment such as sidewalls, housing, framework, or spray nozzles.
- **Zone 3:** Areas inside of the packing area such as trash cans, cull piles, floors, drains, restrooms, forklifts, phones, and catwalks or storage areas above packing areas.
- **Zone 4:** Areas outside of or adjacent to the the packing area such as loading docks, warehouses, manure or compost piles, and livestock operations.

To prioritize resources and address the most likely risks of contamination, begin addressing risks in Zone 1 since these are direct food contact areas, then proceed to Zones 2, 3, and 4. To help identify the zones in your packing area, diagram the flow of produce through the packinghouse and add zone numbers to each area.

The cleaning and sanitizing process includes four steps:

- **Step 1:** The surface should be rinsed so any obvious dirt and debris are removed.
- **Step 2:** Apply an appropriate detergent and scrub the surface.
- **Step 3:** Rinse the surface with water that is the microbial equivalent of drinking water (potable).
- **Step 4:** Apply an appropriate sanitizer. If the sanitizer requires a final rinse, this will require an extra step. Let the surface air dry.

Writing **Standard Operating Procedures** (SOPs) will help outline what areas need to be cleaned, how often, what detergents and sanitizers to use, how to clean and/or sanitize the surface, and who is responsible for completing the task.

Different challenges may exist depending on the type of structure where fruits and vegetables are packed and handled. Whether packing in an open tent or enclosed packinghouse, it is important to assess risks and minimize them. Pests are one obvious risk of contamination to fresh produce. Birds, rodents, and insects should be deterred or removed from all packing and produce handling areas using the best available methods such as setting traps, installing fencing and netting, closing doors, and repairing any holes in windows. It is critical that packing and sorting areas be cleaned of debris after each day to prevent attracting pests, such as rodents. A pest control program, including SOPs for monitoring and correcting any pest problems, is a valuable part to any food safety program.

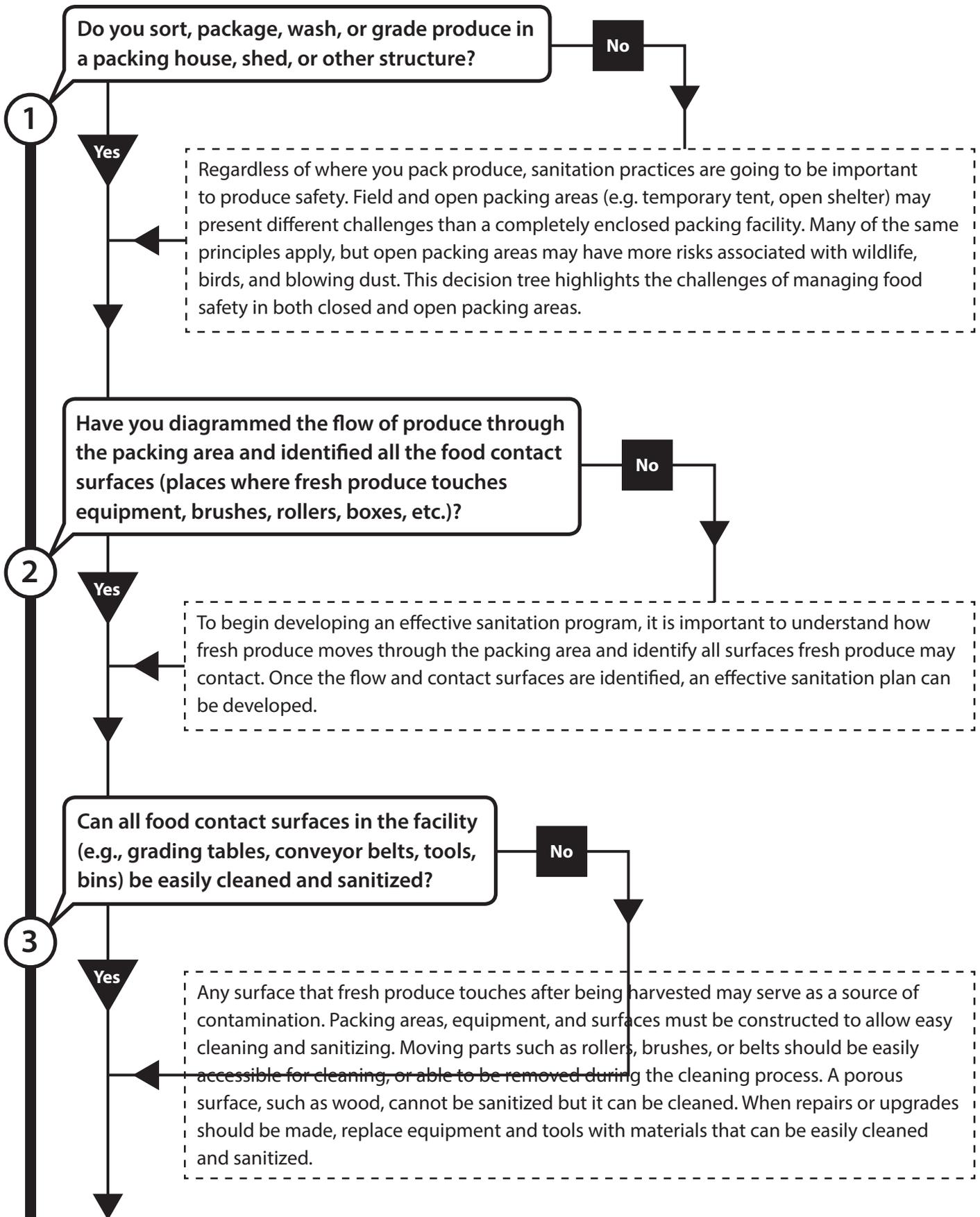
In addition to keeping buildings, equipment, and surfaces clean, worker education and training will reduce the risk of postharvest contamination. Training should include any glove/apron policies, proper handwashing and bathroom use, cleaning and sanitizing tasks, and eating and drinking policies. Trained workers are a valuable resource to identify factors that increase fruit damage. Damaged or cut fruit can harbor human pathogens and decay organisms as well as provide a growth medium for pathogens on food contact surfaces. Workers may also be able to identify other food safety risks while they are working, including animal fecal contamination or other visible contamination of the crop being handled. All company food safety policies should be outlined in your farm food safety plan with SOPs to guide training and the implementation of practices to reduce risks.

References

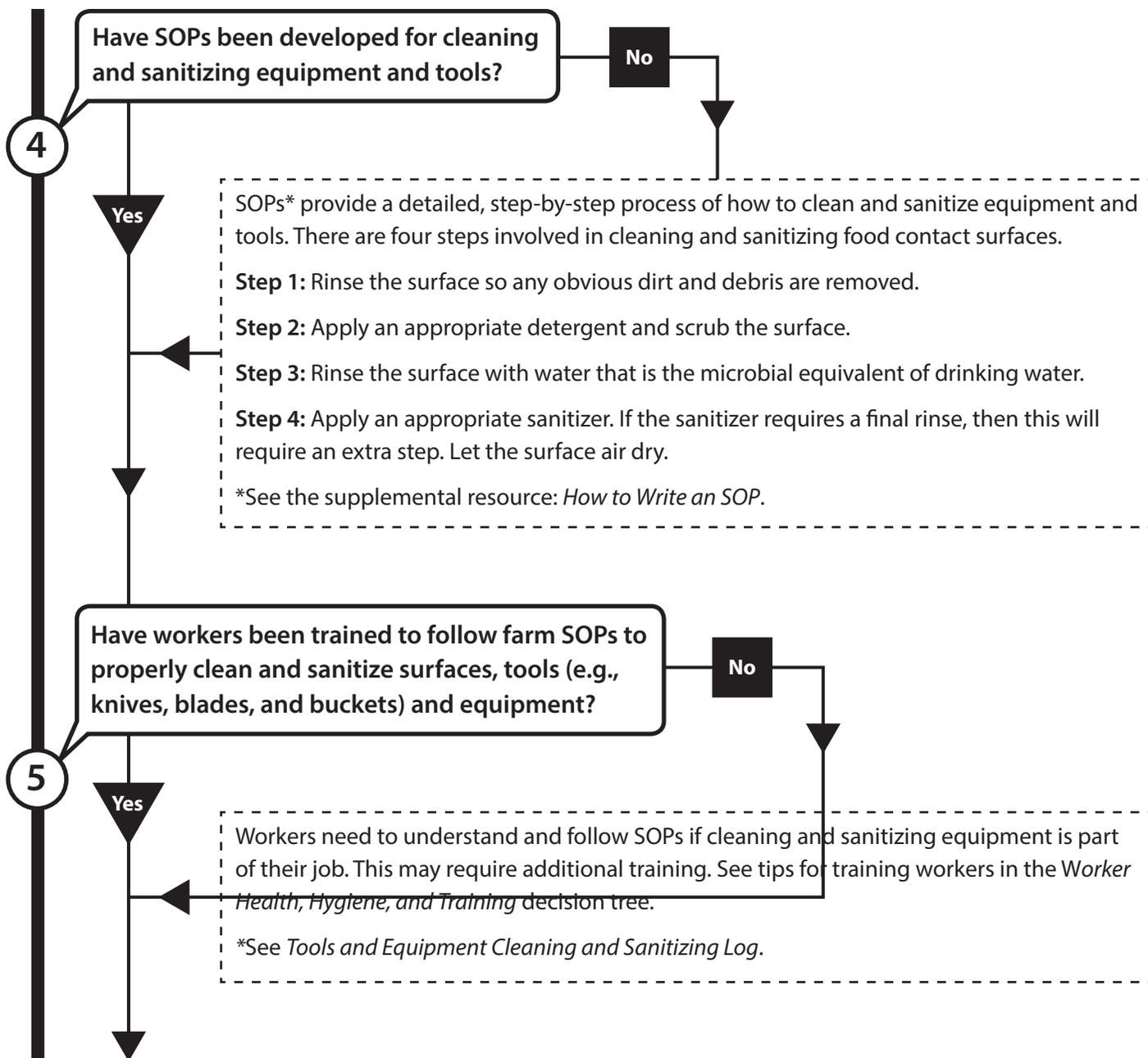
1. Iowa State University Extension. 2011. *On-farm Food Safety: Cleaning and Sanitizing Guide*. Publication 1974c. <http://www.extension.iastate.edu/Publications/PM1974C.pdf>
2. Schlimme, D. "Cleaning and Sanitizing Fresh Produce and Fresh Produce Handling Equipment, Utensils and Sales Areas". Fact Sheet 715. University of Maryland Cooperative Extension, College Park, MD.
3. Kitinoja, L., Kader, A. (2002). *Small-Scale Postharvest Handling Practices: A Manual for Horticultural Crops* (4th Edition). University of California, Davis: Postharvest Technology Research and Information Center. <http://ucce.ucdavis.edu/files/datastore/234-1450.pdf>
4. Suslow, T., Harris, L. (2000). "Guidelines for Controlling *Listeria monocytogenes* in Small- to Medium-Scale Packing and Fresh-Cut Operations". University of California Division of Agriculture and Natural Resources, Publication 8015. <http://anrcatalog.ucdavis.edu/pdf/8015.pdf>

The information in the template food safety plan, SOPs, and recordkeeping logs are examples you can use. They are not intended to be used directly. Tailor each to fit your farm operation and practices. These documents are guidance for risk reduction and for educational use only. These documents are not regulatory and are not intended to be used as audit metrics. These documents are subject to change without notice based on the best available science.

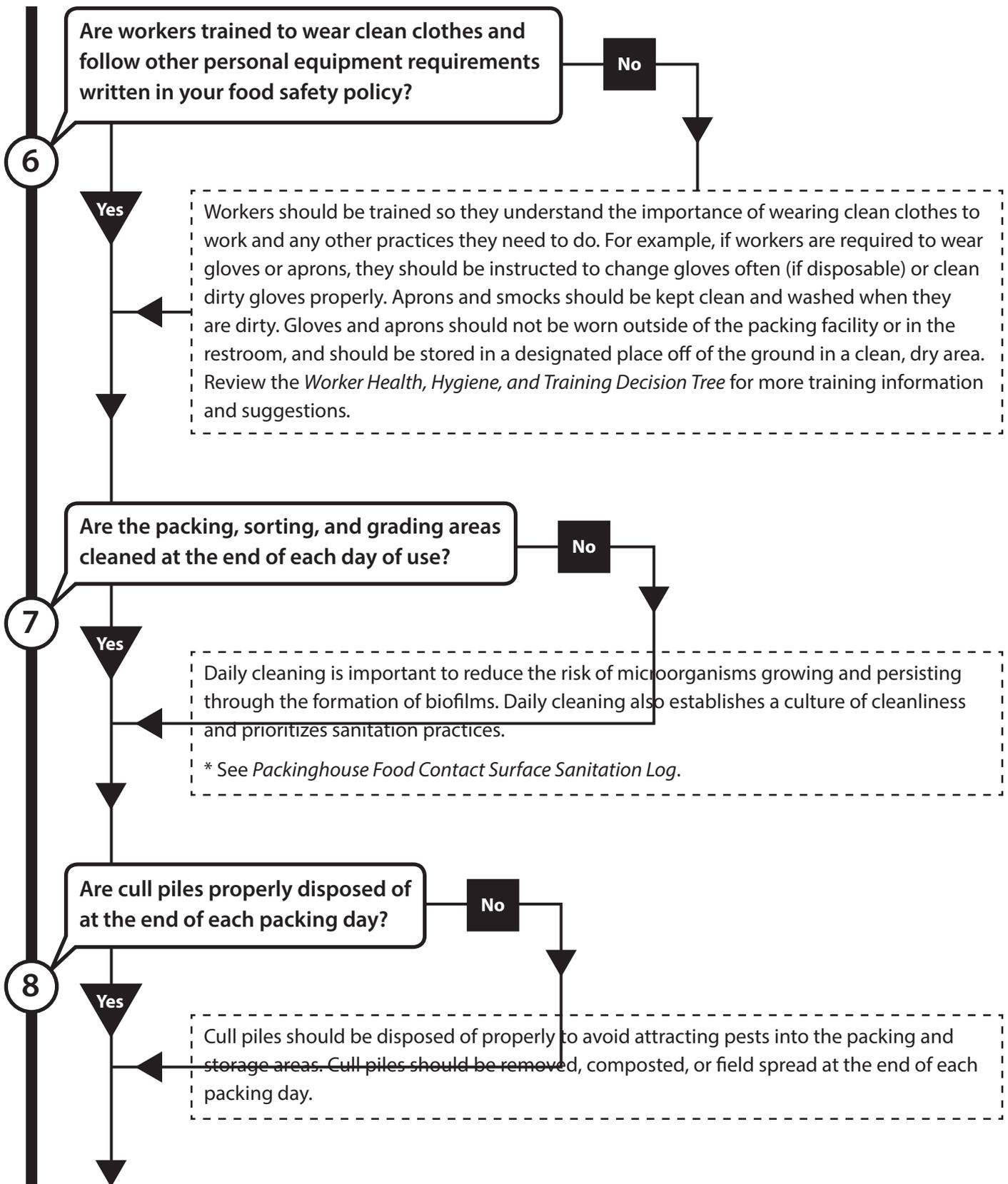
Sanitation and Postharvest Handling Decision Tree



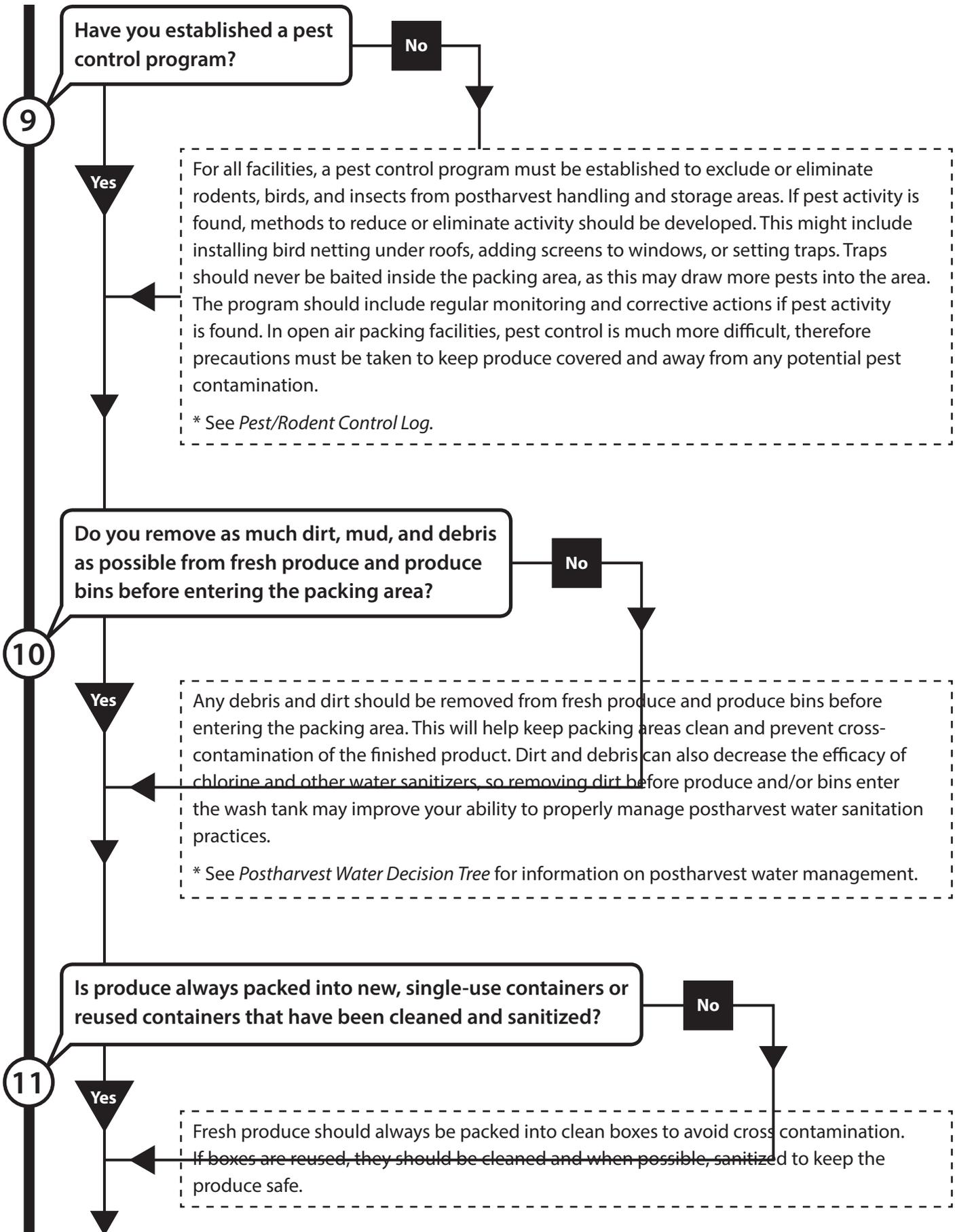
Sanitation and Postharvest Handling Decision Tree



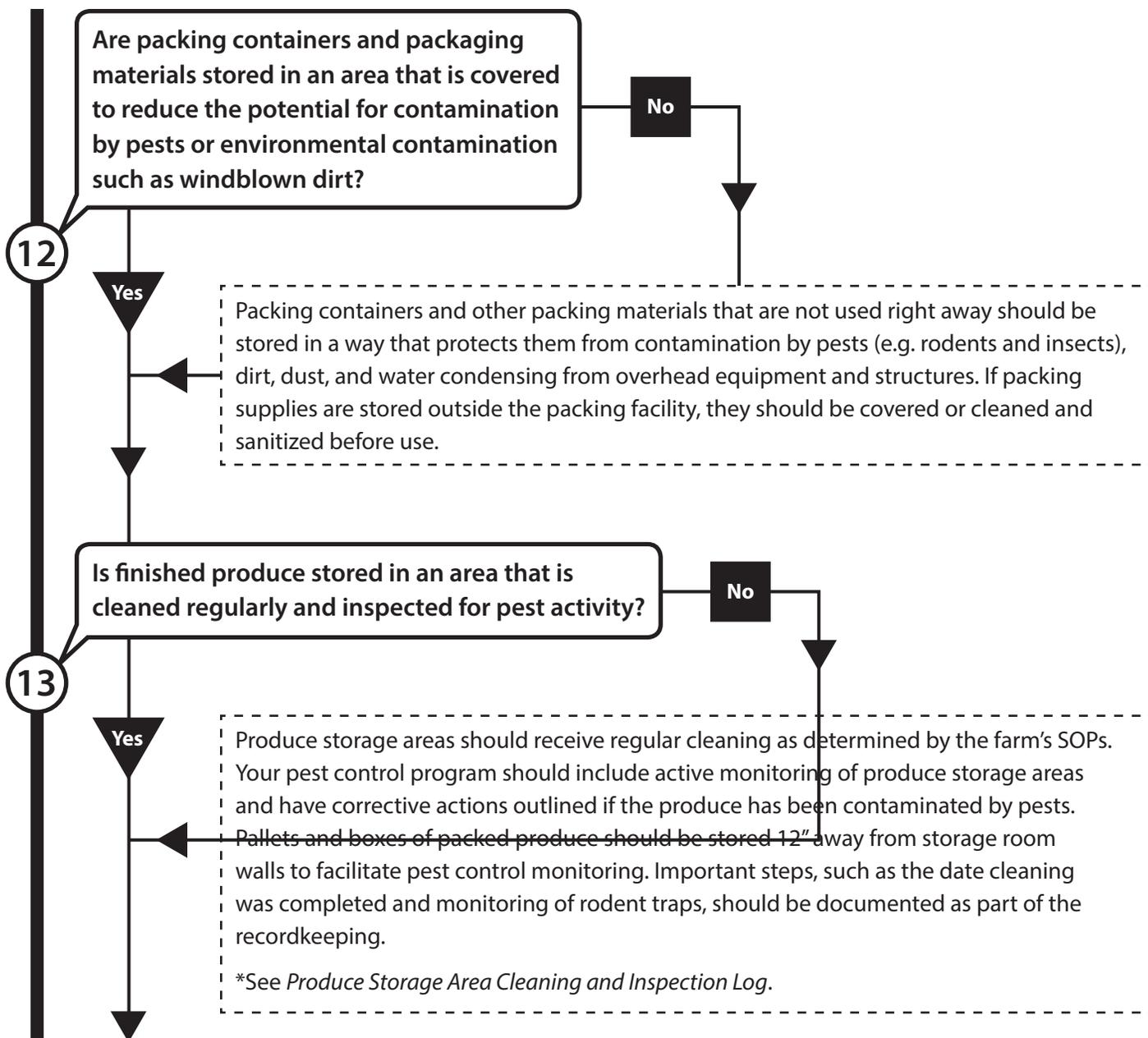
Sanitation and Postharvest Handling Decision Tree



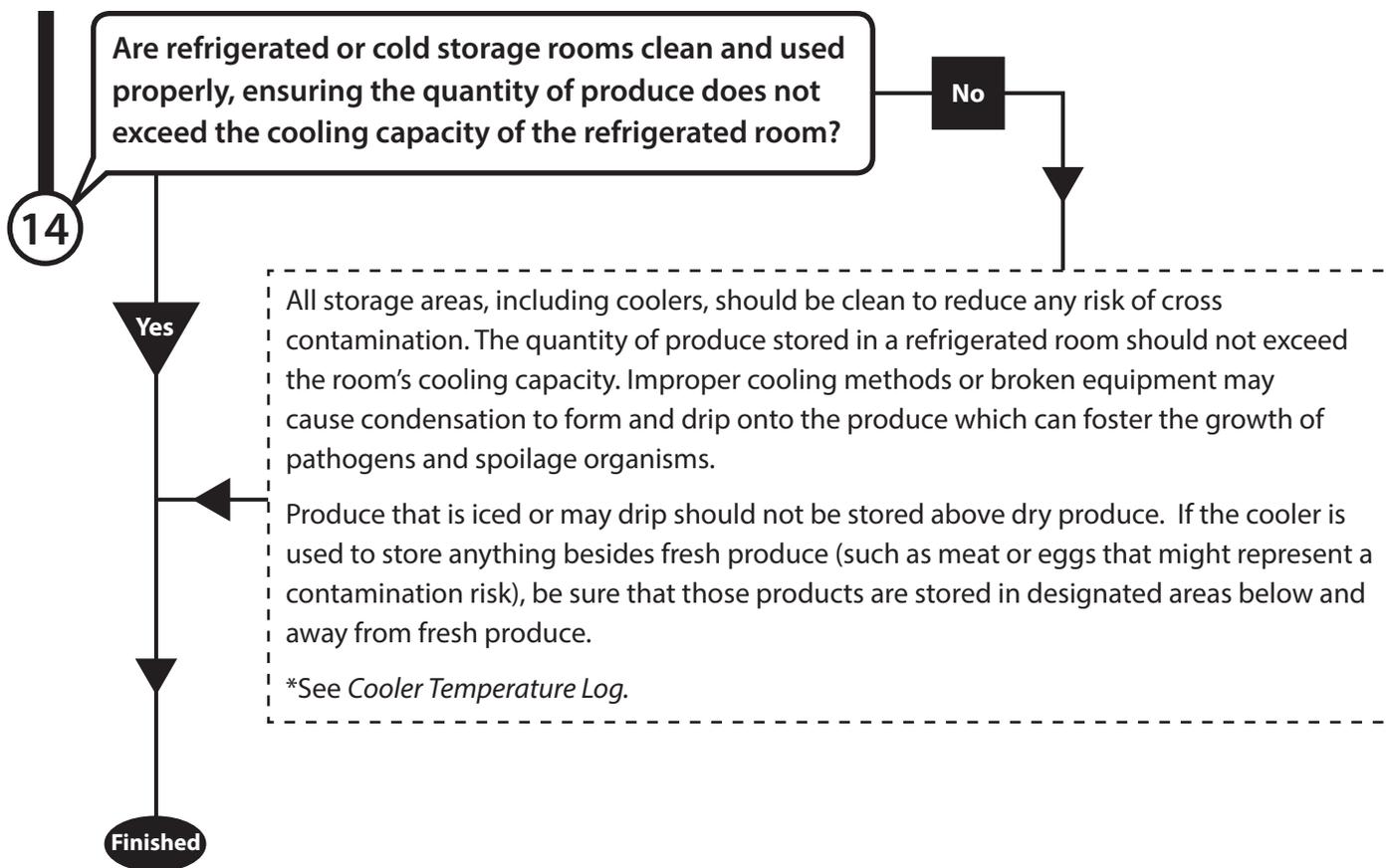
Sanitation and Postharvest Handling Decision Tree



Sanitation and Postharvest Handling Decision Tree



Sanitation and Postharvest Handling Decision Tree



Sample SOP: Cleaning and Sanitizing Surfaces, Tools, and Equipment

Revision: 1.0

Date: 07/22/2014

1—Purpose

Describes how food contact surfaces, tools, and equipment are to be cleaned and sanitized.

2—Scope

Applies to farm and packinghouse personnel including farm owners and workers.

3—Responsibility

Workers are responsible for following the SOPs to properly clean and sanitize food contact surfaces. Farm owners and food safety managers are responsible for training the workers on proper technique, providing necessary resources such as tools, detergents and sanitizers, and making sure the cleaning and sanitizing steps are followed correctly.

4—Materials

- Detergent name, brand, and concentration (labeled for use on food contact surfaces) ***[Provide name here]***
- Sanitizer name, brand, and concentration ***[Provide name here]***
- Container(s) as needed for mixing and using detergent(s) and sanitizer(s) or for washing tools
- Brushes, sponges, or towels for scrubbing tools and equipment
- Clean water (microbial equivalent to drinking water)

5— Procedure

1. The surface should be brushed or rinsed to remove visible dirt and debris.
2. Prepare the detergent ***[Add detergent mixing or preparation instructions here]***.
3. Apply the prepared detergent solution and scrub the surfaces moving in the direction top to bottom for large pieces of equipment. Detergent should be mixed according to the product instructions.
4. Rinse the surface with clean water until all soap suds are rinsed away moving in the direction top to bottom for large pieces of equipment.
5. Prepare the sanitizer. ***[Add sanitizer mixing or preparation instructions here]***.
6. Apply the prepared sanitizer solution. Allow it to sit for ***[Enter number of minutes according to product instructions]*** minutes.
7. Rinse with clean water.
8. Let the surface air dry.

Sample SOP: Pest Monitoring, Management, and Corrective Actions Program to Minimize Food Safety Risks in Packing and Postharvest Handling Areas.

Revision: 1.0

Date: 10/4/2013

1—Purpose

Describes how to monitor, manage, and respond to pest activity in fresh fruit and vegetable postharvest handling areas.

2—Scope

Applies to farm and packinghouse workers including farm owners and managers who will need to manage pest control activities on the farm and in the packing area.

3—Responsibility

Farm owners and managers must identify potential food safety hazards associated with pest activity in an effort to prevent the contamination of fresh produce during postharvest handling. Workers are responsible for following the pest control SOPs and for reporting any food safety hazards associated with pests to their supervisors.

4—Materials

- Recordkeeping logs
- Rodent traps (un-baited if inside packinghouse)
- Phone number and contact information for pest control company

5—Procedure

To be completed and reviewed yearly to ensure the pest control program is functioning properly to reduce food safety risks associated with pests in postharvest handling areas.

1. Scout the packing and handling areas for signs of pest activity (e.g. droppings, nests, damaged product) to identify type of pest and extent of activity.
2. If pest activity is found, develop and implement strategies to reduce or eliminate their presence such as using un-baited traps in the packinghouse, installing bird netting, or hiring a pest control specialist.
3. Monitor for pest activity including checking traps and scouting for pest activity in and around the packing facility every **[Add time frame here]**.
4. Document all monitoring and control activities.
5. [Outline corrective actions for immediate food safety threats that may occur from pest activity here such as bird feces found on product, rodent activity in storage areas].

Sample Pest/Rodent Control Log

Name of farm: Pleasant Valley Farm

Please see the food safety plan for Pest/Rodent Control procedures.

Date	Company used* or self	Type of pest	Type of control**	Location of traps	Action taken	Checked by (name)	Disposal means
9-17-13	Self	Mice	Tin cats	Storage area, packinghouse, see map attached to FSP	Traps checked	GLW	One trap full in storage area, disposed of in dumpster

* If using a company for service, attach report or receipt of service for each of their visits.

** List type of control methods used such as exclusion, traps, poison, repellants, etc.

Reviewed by: _____ Title: _____ Date: _____

Sample Food Contact Surface Sanitation Log

Name of farm: Pleasant Valley Farm

C=Cleaned S=Sanitized

Date	Food contact surface cleaning checklist								Corrective actions needed:	Cleaned by (initials):
	Belts		Grading tables		Washing equipment		Rollers/brushes			
	C	S	C	S	C	S	C	S		
9-17-13	x	x	x	x	x	x			Replaced broken belt	GLW

Reviewed by: _____ Title: _____ Date: _____

Sample Tools and Equipment Cleaning and Sanitizing Log

Name of farm: Pleasant Valley Farm

C=Cleaned S=Sanitized

Date	Cleaning List (check each)					Treatment	Cleaned by (initials):
	Knives	Buckets	Gloves/ Aprons	Packaging Containers	Other		
9-17-13	C / S	C		C / S		Washed with dishwashing soap, rinse with tap water, sanitized with 100 ppm chlorine solution dip for 20 seconds.	GLW

Reviewed by: _____

Title: _____

Date: _____

Sample Produce Storage Area Inspection and Cleaning Log

Name of farm: Pleasant Valley Farm

Storage Area Location(s): Cooler #1

Date	Cleaning List (check if completed)				Corrective actions needed:	Cleaned by (initials):
	Sweep floors	Inspect for pests	Check for condensation, water	Check door seals		
9-17-13	x	x	x	x	1. Found mouse poop in corner. Removed poop, set trap and will monitor. 2. Small amount of condensation from cooling unit, discarded wet produce and emptied pan.	GLW

Reviewed by: _____

Title: _____

Date: _____

Sample Cooler Temperature Log

Name of farm: Pleasant Valley Farm

Cooler Number _____ Thermometer number _____

Please see the food safety plan for overall temperature control procedures and thermometer calibration instructions.

Date	Thermometer calibration date	Recorded temperature		Corrective actions if necessary:	Result of corrective actions and date accomplished	Initials
		AM	PM			
9-17-13	8-30-13	38°F	46°F	Double checked door was sealing properly and reminded workers to make sure door is completely sealed after leaving the cooler.	Rechecked cooler before going home and temp was back down to 40°F.	GLW

Reviewed by: _____ Title: _____ Date: _____

Template Food Safety Plan for Sanitation and Postharvest Handling

Risk Assessment

To understand what risks may be present, we conduct an annual assessment of risk in the packing, storage, and produce handling areas. Any surface that the produce touches may serve as a source of contamination. We have identified food contact surfaces that come into direct contact with produce such as equipment, belts, rollers, brushes, tables, bins, sinks, tools, and even the hands of our workers. A flow diagram of produce traveling through the packing area is included in this farm food safety plan.

Areas within the packing and handling area are broken into four zones (outlined below) to help determine the likelihood of direct contact with the produce we handle. We prioritize reducing risks in Zone 1 and Zone 2 first.

Zone 1: Direct food contact surfaces such as conveyors, belts, brushes, rollers, sorting tables, racks, utensils, harvest/storage bins, and worker hands. This zone is the biggest concern because it has direct contact with the produce and if contaminated, could result in contamination of the entire crop.

Zone 2: Non-food contact surfaces but in close proximity to the produce, such as internal and external parts of washing or processing equipment, sidewalls, housing, framework, or spray nozzles.

Zone 3: Areas inside the packing area such as trash cans, cull containers, floors, drains, restrooms, forklifts, phones, and catwalks or storage areas above packing areas.

Zone 4: Areas outside or adjacent to the packing area such as loading docks, warehouses, manure or compost piles, and livestock operations.

Actions to Reduce Risks

The flow of produce through the packing and storage areas is designed to minimize contact between incoming and outgoing produce. Any stored produce follows a “first in, first out” policy which we maintain through labeling. In addition, we monitor and control for hazards such as standing water and dripping condensation in storage areas and coolers.

Surfaces that directly contact produce are properly constructed, cleaned, and sanitized according to their individual SOPs. When packing and washing equipment is broken or in disrepair, we evaluate whether repairs or retrofitting may introduce new hazards and determine whether investing in new equipment, designed with sanitation in mind, is feasible.

All workers who handle produce or work in the packing area are provided detailed SOPs and trained to properly clean and sanitize all food contact surfaces including tools, equipment, and containers that may contact the produce. Training also includes general cleaning schedules (sweeping, trash removal), glove/apron policies, proper handwashing and bathroom use, cleaning and sanitizing tasks, and eating and drinking policies (see *Worker Health, Hygiene, and Training* section).

A written record of packing area cleaning and sanitizing activities, monitoring, and corrective actions are kept on file at **[enter location here]** for **[enter amount of time records are kept]**.

The cleaning and sanitizing process includes four steps:

- Step 1:** Rinse the surface so any obvious dirt and debris are removed.
- Step 2:** Apply an appropriate detergent and scrub the surface.
- Step 3:** Rinse the surface with water that is the microbial equivalent of drinking water (potable).
- Step 4:** Apply an appropriate sanitizer. Let the surface air dry.

We also have an active pest control program. We use un-baited traps in the packing areas, bird netting to prevent roosting, and remove culls and trash at the end of each day. Traps are checked **[enter frequency]**. **[Alternatively, enter pest management information or contact information if you hire a company]**. Records are kept to indicate when traps are emptied or replaced along with any corrective actions to prevent or minimize pest problems. These logs are kept on file at **[enter location here]** for **[enter amount of time records are kept]**.