



2024 CA LGMA Amendment Process Report – Harvesting Equipment

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Topic Discussed in this report:

Harvesting Equipment

Prepared by:

Western Growers

for the California Leafy Green Marketing Agreement

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Background

Since the inception of California’s Leafy Green Handlers Marketing Agreement (CA LGMA), Western Growers (WG) has facilitated a systematic amendment process to update the CA LGMA-approved guidelines (also known as the LGMA metrics).

LGMA 2024 Amendment Process Summary (Harvesting Equipment Sanitation)

Priority Setting: starts with the CA LGMA confirming members of a priority-setting committee for the priority-setting process. The goal of the priority-setting process was to have a transparent selection of the topic(s) to be evaluated during the 2024 amendment process. A series of meetings were conducted for the priority-setting committee to build consensus on the priorities to be evaluated throughout the process.

Working Group: Following the priority-setting process, the CA LGMA confirms subject matter experts, and industry representatives to be part of working groups for each priority. The working group meets for a series of meetings to develop recommendations in the form of a draft of proposed changes to the CA LGMA.

Open Comment Period: Following the working group process, a 30-day comment period is opened for external parties to submit comments on the language proposed by the working group and/or propose changes to that language. These proposals and supporting documentation are made publicly available on the www.leafygreenguideance.com website.

Webinar: Approximately a week after the comment period closes, WG hosts a webinar. During the webinar, the process is reviewed, the LGMA presents the working group’s proposed changes, and Western Growers shares comment(s) submitted during the comment period. An opportunity for additional remarks from those who submitted comments is also provided.

Working group final proposal development: This year, an enhancement to the process was incorporated. Following the webinar the working group met to discuss the comments submitted during the comment period and update the proposal/review plan to incorporate the comments submitted.

Reporting: Following the webinar, WG submits this report to the CA LGMA capturing the original proposal, public comments and revisions, and feedback during the webinar.

Selected Priorities from the Priority Setting Process

The following priorities were selected by the priority-setting committee to be considered for the 2024 CA LGMA amendment process.

- a. Ag Water Standards
 - 1. Review of Type B to A water standards
 - 2. Review variable water quality and sampling standards as they relate to generic *E. coli*.
- b. Harvesting Equipment Sanitation
 - 1. Harvest Equipment Sanitation – propose key changes. (initial process as part of a long-term effort)

A full report and supplemental material for the priority-setting process are available on the www.leafygreenguideance.com website ([access the report](#), access the [supplemental materials](#))

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Working Group Process – Harvesting Equipment Sanitation

Working Group Members - Harvesting Equipment Sanitation

Three working groups were created to address the three priority areas identified above. The process started on April 5th, 2024, with a meeting that included all working group members to review logistics and timelines. Following the initial meeting, the three working groups met independently. Table 1 list the composition of the Harvesting Equipment Working Grouping.

Table 1. Harvesting Equipment Working Group Members

Harvesting Equipment Sanitation Working Group	
Working group member	Affiliation
Michelle Danyluk	University of Florida
Justin Kerr	Factor IV Solutions
Tony Banegas	Bonduelle Fresh Americas
Jake Odello	The Nunes Company
Megan Chedwick	Church Brothers
Felice Arboisiere	Dole Fresh Vegetables
Marcus Shebl	Taylor Farms

In addition to the members in the working group, CA and AZ LGMA staff and Western Growers staff participated in the process. Table 2 below lists the participants from these organizations and their roles.

Table 2. Harvesting Equipment Working Group members (staff)

Harvesting Equipment Sanitation Working Group	
Working group member (Staff)	Affiliation and Role
Greg Komar	CA LGMA - CA LGMA staff
Connie Quinlan	CA LGMA - CA LGMA staff
Teressa Lopez	AZ LGMA – AZ LGMA staff
Kami Van Horn	AZ LGMA – AZ LGMA staff
Susan Leaman	iDecisionSciences, LLC – Drafting support
Gustavo Reyes	Western Growers – Drafting and facilitation

Process Summary – Harvesting Equipment Sanitation

Following the initial meeting, the Harvesting Equipment Sanitation Working Group held 9 meetings on 4/9/2024, 4/16/2024, 4/24/2024, 4/29/2024, 5/8/2024, 5/13/2024, 5/24/2024, 5/28/2024, and 5/31/2024.

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The working group worked on developing an initial proposal to submit to the comment period. (Appendix I: Working Group Original Proposal).

A summary of the topics that were added or modified in this proposal is below:

1. Glossary
 - a. New terms: “adjacent surfaces” and “hard to reach areas”
 - b. Examples added to the term “food-contact surfaces.”
2. Training Requirements added to Issue 4:
 - a. Addition of training requirements for personnel conducting a self-assessment against section 8.1 and for personnel conducting cleaning and sanitation activities
3. Hygienic Design Reviews
 - a. Requirements to conduct annual hygienic design reviews, document corrective actions, and develop a timeline for addressing these.
4. SOP for Harvesting Equipment Cleaning and Sanitation
 - a. New Table 5 – Preparation. Adds steps and areas to prepare before conducting cleaning and sanitation, including personnel, personal protection equipment (PPE), sanitation tools, chemicals, and Instruments.
 - b. New Table 6 – Cleaning and Sanitation of Harvesting Equipment, Includes:
 - i. 7-steps of cleaning and sanitation
 - ii. verification procedures (once-per-season assessment against section 8.1, and a once-per-season quantitative verification of sanitation SSOPs
 - iii. day of harvest procedures
5. General Improvements
 - a. Language updates to align with AZ LGMA are included as part of the metrics review.
 - b. Modification to metrics for improved organization and clarity.
 - i. splitting Issue 8 into three subsections (8.1, 8.2, and 8.3)
 - ii. language updates recommended by the working group

Comment Period and Webinar

Summary and Attendees.

On June 3rd, 2024, Western Growers opened a 30-day comment period regarding changes to the Water section (Issue 6) to align its language with the final FSMA Pre-Harvest Agricultural Water Rule and the Harvesting Equipment Sanitation section (Issue 8). Interested parties could submit their comment and proposed changes through the www.leafygreenguidance.com website.

Following the comment period, WG hosted a webinar on July 11th, 2024. The goals for the webinar were (i) for the CA LGMA to share a summary of the proposals submitted by the working groups, and (ii) to provide those who submitted comments an opportunity to share a summary of the comments submitted.

For the Harvesting Equipment Sanitation Proposal. Five sets of comments were received via the www.leafygreenguidance.com website.

The webinar was moderated by Gustavo Reyes from Western Growers. Those who submitted proposals/comments were allowed to give a summary and remarks about their submission within a maximum time limit of 7 minutes. The webinar had 50 attendees, who are listed in Table 3 below in

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alphabetical order. The attendees were allowed to participate by online voting on (i) whether they had issues with the submitted comments, followed by (ii) the option to submit comments via online polls.

Table 3. Webinar Attendees (Does not include panelists)

Last Name	First Name	Affiliation
Alameda	Mary	Nunes Company Inc
Alencar	Fabia	Subway
Alfaro	Adriana	FM I- The Food Industry Association
Amaral	Matt	D'Arrigo Bros Co of California
Anderson	Aaron	Pacific International Marketing
Avila	Maggy	RAMCO Enterprises L P
Bermudez	Ernesto	GreenGate Fresh, LLP
Bourne-Lynch	Sherell	Schnucks
Burk	Tina	Heritage Farms LLC
Camarena	Lupe	Nature Fresh Farms
Dominguez	Cynthia	Duda Farms
Dorick	Jennifer	Darling Ingredients Inc
Eisenbeiser	Ashley	FMI - The Food Industry Association
Gibbons	Tom	
Gomez	Cristina	Nunes Company Inc
Gonzalez	Claudia	Legacy-Greens
Gumowski	Adrian	AZDA
Gutierrez	Martin	
Hsu	Bill	Yum Brands, Inc.
Kavanaugh	Megan	Bio S I Technology
Kelleher	Gillian	Kelleher Consultants LLC
Kohl	Larry	Ahold Delhaize USA company
Kunduru	Mahipal	Topco
Lakey	Katie	Crowe Cayman Ltd
LaPlante	Lance	Yum Brands, Inc.
Licata	Alyssa	CA LGMA
Longoria	Julia	Bonipak
Madison	Morgan	Florida Fruit and Vegetable Association
Mendoza	Cecilia	Taylor Farms
Munoz	Jorge	Taylor Farms
Nunes	Kristina	Nunes Company Inc
O'Donnell	Kathleen	Wegmans

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Ortiz	jose	D'Arrigo Bros Co of California
Padilla	Samuel	Pasquinelli Produce Company
Quanquin	Bruno	Stevens Water Monitoring Systems
Rock	Channah	University of Arizona Yavapai County Cooperative Extension
Ruelas	Paola	Rousseau Farming Company
Scott	Vicki	Scott Resources
Shakespeare	Mark	Walmart
Sierra	Valentin	Amigo Farms
Solorio	Marianna	Bonipak
Sughrue	Jay	BioSafe Systems LLC
Taylor	Michael	Stop Foodborne Illness
Unwer	Becky	Walmart
Valadez	Angela	Publix
Valadez	Angela	Publix Super Markets
Valdes	Francisco	Sabor Farms
Vargas	Erendira	RC Farms LLC
Voga	Brandon	Big Y
York	Tim	CA LGMA

Table 4. Webinar Panelists.

Last Name	First Name	Affiliation
Reyes	Gustavo	Western Growers
Salas	Sonia	Western Growers
Leaman	Sisan	iDecisionsSciences, LLC
Komar	Greg	CA LGMA
Teressa	Lopez	AZ LGMA
Joe	Stout	Commercial Food Sanitation
Thesmar	Hilary	FMI- The Food Industry Association
Mudahar	Gurmail	Tanimura & Antle
Odello	Jake	Nunes Company Inc
Danyluk	Michelle	University of Florida
Chedwick	Megan	Church Brothers
Banegas	Tony	Bonduelle Fresh Americas
Shebl	Marcus	Taylor Farms
Kerr	Justin	Factor IV Solutions
Arboisiere	Felice	Dole Fresh Vegetables

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Quinlan

Connie

CA LGMA

Webinar Description, concerns, and comments submitted.

The webinar began with background on the working groups' proposed changes presented by Greg Komar, CA LGMA Technical Director.

All draft of the comment submitted by the Harvest Forward Coalition, The Food Marketing Institute (FMI), Tanimura and Antle, the Arizona LGMA Technical Subcommittee, and Dole Fresh Vegetable can be found in Appendix II.

Joe Stout presented the comment submitted by the Harvest Forward Coalition

- 6/21 (28.6%) of attendees reported having concerns with the submitted comments
- Comment submitted include.
 - Participant comment: It's a step forward.

Gurmail Mudahar Presented the comments submitted by Tanimura and Antle

- 4/20 (20%) of attendees reported having concerns with the submitted comments
- Comment submitted include.
 - Participant comment: I agree with his assessment and recommendation of the 3 categories.
 - Participant comment: I like Dr. Mudahar's approach and think it would be good to explore further compared with the Stout proposal which is heavy on documentation not food safety improvement.

Hilary Thesmar presented the comment submitted by FMI.

- 2/21 (9.5%) of attendees reported having concerns with the submitted comments
- Comment submitted include.
 - Participant comment: Yum Brands is in full support of adding the PIC/PEC portions to the harvester equipment sanitation program, including associated training for identifying and performing cleaning tasks.
 - Participant comment: Not substantive, just a choice of words.

Teresa Lopez presented the comments submitted by the AZ LGMA Technical Subcommittee.

- 1/15 (6.6%) of attendees reported having concerns with the submitted comments
- The comments submitted include:
 - Participant comment: I fully support the AZ LGMA comments.

Gustavo Reyes presented the comments submitted by Dole Fresh Vegetables.

- 5/23 (21.8%) of attendees reported having concerns with the submitted comments
- The comments submitted include:
 - Participant comment: Requirements are overly prescriptive. companies can do more if they want but a minimum baseline is needed.
 - Participant comment: This proposal is highly specific and best left to individual companies and their SOPs SSOPs

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Working Groups Proposal Updates Post Comment Period

Following the comment period, WG, the and the LGMAs agreed that it would be beneficial to update the proposal based on the comments received. The working group held six (6) additional meetings (7/19/2024, 7/26/2024, 7/30/2024, 8/1/2024, 8/5/2024, and 8/7/2024) to update the proposal and address comments and updates submitted during the comment period. The update proposal is in the “Final Working Group Proposal” section of this document.

Summary of updates made to the document post-comment period.

A summary of the major updates done to the proposal over the entire comment period are below. Items added following the comment period are in blue.

1. Glossary: The following terms were added to the glossary
 - a. Adjacent Surfaces
 - b. Field Pack
 - c. Further Processing
 - d. Hard to Reach Areas
 - e. Master Sanitation Schedule (MSS)
 - f. Periodic Equipment Cleaning
 - g. Post Harvest Plant Debris
 - h. Routine Equipment Cleaning
2. Training Requirements
 - a. Required for 1 person in the organization to receive LGMA training, then adoption of train the trainer approach
 - b. Required training for personnel conducting self-assessment against issue 8.1.
 - i. Location for cleaning and sanitation, and labeling, storage & use of chemicals were added as training areas.
 - c. Required training for personnel conducting cleaning and sanitation activities.
 - i. Location for cleaning and sanitation, and labeling, storage & use of chemicals were added as training areas.
 - d. Included appropriate to the person’s duties, upon hiring, and periodically thereafter.
3. Equipment Categorization
 - a. Required to categorize equipment into 1,2,3 based on the type of product being harvested and food-contact surfaces. The categories are used in the document to dictate requirements for hygienic design reviews, and sanitation verification steps.
4. Harvesting Equipment Hygienic Design
 - a. Requirements to conduct annual hygienic design reviews for category 1 harvesting equipment, document corrective actions, and develop a timeline for addressing these.
 - b. Considerations were added for performing and planning for PECs as part of the hygienic design review.
5. Cleaning and Sanitation SOPs
 - a. For Harvesting Equipment (All Categories and Unique Types). Tables 5 (preparation steps) and 6 (7 steps for cleaning and sanitation) are required.
 - b. Require self-assessment against section 8.1 (once per season).
 - c. Require SSOP verification using a quantitative method (once per season)

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- i. Added information specifying that these verification activities should be performed by comparing pre- and post-sanitation results. If applicable also using historical data.
6. Additional changes: other small changes were performed, these include:
 - a. The word infrastructure was changed to buildings throughout the document.
 - b. Language updates to improve clarity on the hygienic design section.
 - c. Sanitation preparation section was reviewed to improve clarity.
 - d. The Routine Harvesting Equipment was reorganized to reflect that SOPs need to be developed for harvesting equipment, non-food-contact surfaces, and hand-harvest equipment.
 - i. Added section to clarify that the SOPs must address frequency of cleaning and sanitation activities, and that these should be documented.
 - ii. Hand harvest equipment was slightly modified for clarity.
 - e. Table 7 was updated to reflect documentation requirements in the left column, and Step details on the right column.

Review Timeline for Harvesting Equipment Cleaning and Sanitation

To address the priority set by the priority setting committee of reviewing harvesting equipment and sanitation as a continuous improvement process. The working group has decided to adopt a multi-year approach for reviewing the various requirements related to harvesting equipment and sanitation. This method ensures that all critical aspects are thoroughly addressed while providing the industry with the necessary time to implement these new standards effectively. By gradually introducing the requirements, the working group aims to facilitate a smoother transition and better compliance.

The review timeline proposed by the working group is below: The table contains requirements to be reviewed and adopted for this year, and the following two review periods. Enforcement of the metrics will be decided by the LGMAs.

Table 5: Review Timeline for Harvesting Equipment Cleaning and Sanitation Metrics

Review: 2024 (April – August) Enforcement: TBD by LGMA	Review Timeline Review: 2026 (Spring) Enforcement: TBD by LGMA	Review: 2028 (Spring) Enforcement: TBD by LGMA
<u>New Additions to Issue 8 Metrics</u>	<u>Review the following.</u>	<u>Review the following.</u>
<u>New Requirements:</u>	<u>Section 8 overall:</u>	<u>Section 8 overall:</u>
<u>Training</u>	- Revisit section 8 to address clarity issues based on data from LGMA audit non-conformances observed in Year 2025	- Revisit section 8 to address clarity issues based on data from LGMA audit non-conformances (learnings 2026-2027)
- Training requirements for personnel conducting self-assessments against issue 8.2.	<u>Categorization of equipment:</u>	<u>KPI tracking and data collection.</u>
- Training for personnel conducting cleaning and sanitation activities.	- Revisit categorizations for harvesting equipment.	- Establishing tracking and data collection standardized requirements (KPIs)
<u>Categorization of equipment:</u>	<u>Hygienic Design</u>	

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Review: 2024 (April – August) Enforcement: TBD by LGMA	Review Timeline Review: 2026 (Spring) Enforcement: TBD by LGMA	Review: 2028 (Spring) Enforcement: TBD by LGMA
<ul style="list-style-type: none"> - Required to categorize equipment into 1,2,3 based on the type of product being harvested and food-contact surfaces. 	<ul style="list-style-type: none"> - Revisit hygienic design reviews. Inclusion of Category 2 as a requirement 	
Hygienic Design	Master Sanitation Schedule	
<ul style="list-style-type: none"> - For Category 1 harvesting equipment: Conducting Hygienic Design Reviews, developing a timeline for corrective actions, and reviewing corrective actions (annually) 	<ul style="list-style-type: none"> - Review the inclusion of Master Sanitation Schedules for PECs, RECs, and Hygienic Design Reviews as a requirement. 	
Harvesting Equipment Sanitation	PECs	
<ul style="list-style-type: none"> - Develop SOPs for 7 steps of cleaning and sanitation for (category 1 and 2) - SOP for non-food-contact surfaces (Category 3) - SOP for hand harvest equipment. - Verification activities include self-assessment against section 8.1 (once per season) and once per season quantitative verification of SSOPs. 	<ul style="list-style-type: none"> - Review the Inclusion of PECs as a requirement for category 1 harvesting equipment. This will include of quantitative approach to establish PEC requirements. 	
	Routine quantitative verification	
	<ul style="list-style-type: none"> - Revisit establishing requirements for routine quantitative methods to aid verification (frequency, methods, and thresholds) 	
	KPIs and Data Tracking	
Considerations (Not Mandatory): <ul style="list-style-type: none"> - Considerations for PECs and establishing frequency of these after conducting the hygienic design review. - Considerations for routine quantitative methods to aid verification 	<ul style="list-style-type: none"> - Incorporate consideration language for tracking and data collection (KPIs). 	

Response to public comments

The working group developed a response to comments. See response to comments in (Appendix III: Response to comments)

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Final Working Group Proposal (Marked up)

Below is the final proposal developed by the working group. Text in red are modifications made to the current (September 2023) version of the CA LGMA Metrics



C A L I F O R N I A
LGMA

COMMITTED TO SAFE LEAFY GREENS

COMMODITY SPECIFIC FOOD SAFETY GUIDELINES

FOR THE PRODUCTION AND HARVEST OF
LETTUCE AND LEAFY GREENS



SEPTEMBER 20, 2023

This document supersedes all previously published versions of the Commodity Specific Food Safety Guidelines for the Production and Harvest of Leafy Greens including those dated on or before March 30, 2023.

Adopted by the California Leafy Green Products Handler Marketing Agreement Advisory Board
Document managed by Western Growers - learn more at www.leafygreenguidance.com

GLOSSARY

ACCREDITATION	A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems.
ACTIVE COMPOST	Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50° Celsius (122° Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
ADEQUATE / ADEQUATELY	That which is needed to accomplish the intended purpose in keeping with good public health practice.
ADJACENT SURFACES	Surfaces that are near food-contact surfaces but do not directly touch the food. The surfaces can still be a contamination source if human pathogens are transferred to the food or food-contact surfaces through drainage, drips, dirt or debris. Examples: Outer surface of a conveyor belt, tarps above food-contact surfaces
ADJACENT / NEARBY LAND	Land within a proximity that could potentially affect safe production of leafy greens.
AERATED STATIC PILE	Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days.
AERIAL APPLICATION	Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc.
AEROSOLIZED	The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas.
AGRICULTURAL / COMPOST TEA	A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document.

AGRICULTURAL MATERIAL	<i>Agricultural Material</i> means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues.
AGRICULTURAL TAILWATER	Excess run off water which is generated and collected during the process of irrigation.
AGRICULTURAL WATER	Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens).
AGRICULTURAL WATER SYSTEM	Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers.
AGRICULTURAL WATER TREATMENT SYSTEM	An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description.
ANCILLARY EQUIPMENT	Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc.
ANIMAL BY-PRODUCT/PRODUCT	Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements.
ANIMAL FEED OPERATION (AFO)	Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: *animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and *crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Less than 1,000 animal units does not meet the requirements of a CAFO.
ANIMAL HAZARD	Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated.

ANIMAL UNIT	There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis.
ANTIMICROBIAL WATER TREATMENT	A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard.
ADENOSINE TRI-PHOSPHATE (ATP)	A high-energy phosphate molecule required to provide energy for cellular function.
APPLICATION INTERVAL	Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied.
ATP TEST METHODS	Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness.
BIOFERTILIZERS	Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities.
BIOLOGICALS	Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients.
BIORATIONALS	Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts
BIOSOLIDS	<p>Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.</p> <p>Class A: Class A biosolids undergo a “Process to Further Reduce Pathogens (PFRP).” Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.</p> <p>Class B: Class B biosolids undergo a “Process to Significantly Reduce Pathogens (PSRP).” This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required.</p>
BLUE VALVE	Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use.
BREAKPOINT	The point at which the disinfection demand has been met.
BUILDINGS	Any fully or partially enclosed building on the farm that is used for storing off-food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls.

CARBOHYDRATE	Ingredient for soil amendments and crop inputs that could improve growth of bacteria.
CLOSED DELIVERY SYSTEM	A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use.
COLONY FORMING UNITS (CFU)	Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted.
COLIFORMS	Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature.
CO-MANAGEMENT	An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production.
COMPOST/MATURE COMPOST	<i>Compost</i> is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients.
COMPOST FEEDSTOCK	“Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments.
COMPOSTING	Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions.
CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)	A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 'animal units' (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
COVERED PRODUCE	Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens.

CROP INPUT	Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle.
CROSS-CONTAMINATION	The transfer of microorganisms, such as bacteria and viruses, from one place to another.
CURING	The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step.
DETECTION LIMIT	A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target.
DIRECT WATER APPLICATION	Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water.
ENTEROHEMORRHAGIC <i>E. COLI</i> (EHEC)	Shiga toxin-producing <i>E. coli</i> clinically associated with bloody diarrhea.
<i>ESCHERICHIA COLI</i> (<i>E. COLI</i>)	<i>Escherichia coli</i> are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. <i>E. coli</i> are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources.
FECAL COLIFORMS	Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called “thermotolerant coliforms.”
FIELD EQUIPMENT	Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities.
FIELD PACK	Refers to the process of harvesting and packing lettuce and leafy greens in the field. They are harvested, sorted, and placed into packaging containers for distribution.
FLOODING	The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field.
FOOD-CONTACT SURFACE	Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. “Food-contact surfaces” includes food-contact surfaces of equipment and tools used during harvest, packing and holding. Examples: Conveyor belts, cutting boards, knives, baskets.
FOOD MATERIAL	<i>Food Material</i> means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and

	residential food scrap collection. Material that is defined as “food material” is not agricultural material.
FOOD SAFETY ASSESSMENT	A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet.
FOOD SAFETY PERSONNEL	Person trained in basic food safety principals and/or working under the auspices of a food safety professional.
FOOD SAFETY PROFESSIONAL	Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details).
FURTHER PROCESSING	Refers to the additional steps taken after the initial harvesting of lettuce and leafy greens. Examples of further processing could include, but are not limited to: cleaning, coring, cutting, sorting, washing, or shredding.
GEOMETRIC MEAN	Mathematical def.: the n^{th} root of the product of n numbers, or: Geometric Mean = n^{th} root of $(X_1)(X_2)...(X_n)$, where X_1, X_2 , etc. represent the individual data points, and n is the total number of data points used in the calculation. Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number.
GRAZING LANDS	Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock.
GREEN WASTE	Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. ¹
GROUND/SOIL	Ground – solid surface of the Earth. Soil – upper layer of the Earth in which plants grow. [growing media] These two words are considered synonymous throughout and for the purpose of the document.

GROUND WATER	The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water.
HABITAT	The natural home or environment of an animal, plant, or other organism.
HARD TO REACH AREAS	Parts of the harvesting equipment that are difficult to access for cleaning, sanitation, and inspection due to location, design, or obstruction of components. Ensuring that these areas are properly cleaned and sanitized is important to prevent contamination.
HARVESTING	Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing.
HARVEST EQUIPMENT	Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc.
HAZARD	Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control.
HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS	Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA.
HOBBY FARM	A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products.
HOLDING	Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (e.g., activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food.
HYDROPONIC	The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support.
INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST	Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, <i>E. coli</i> , <i>E. coli</i> O157:H7, <i>Listeria</i> , and <i>Salmonella</i> have been eliminated.
INDICATOR MICROORGANISMS	An organism that when present suggests the possibility of contamination or under processing.
IRRIGATION WATER TREATMENT	Any system used to treat agricultural water, so it makes the quality adequate for its intended use
KNOWN OR REASONABLY FORESEEABLE HAZARD	Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with

	the farm or the food.
LETTUCE AND LEAFY GREENS	Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butterlettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard.
LISTERIA	Any of a genus (<i>Listeria</i>) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (<i>Listeria monocytogenes</i>) that causes listeriosis.
LOT (Pertaining to soil amendments and crop inputs other than compost)	Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture.
MANURE	Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment.
MASTER SANITATION SCHEDULE (MSS)	The document that contains the list of cleaning tasks with frequencies. It includes routine equipment cleaning (REC), periodic equipment cleaning (PEC) tasks, and annual tasks such as hygienic design reviews.
MICROORGANISMS	Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated.
MONITOR	To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement.
MONTHLY	Because irrigation schedules and delivery of water is not always in a grower's control "monthly" for purposes of water sampling means within 35 days of the previous sample.
MORTALITY COMPOST	<i>Mortality Compost</i> is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations.
MOST PROBABLE NUMBER (MPN)	Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers.
MUNICIPAL WATER	Water that is processed and treated by a municipality to meet USEPA drinking water standards.
NON-DETECT	Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis.
NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN	Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines.
OPEN DELIVERY SYSTEM	A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the

	water source to the point of use.
PACKING	Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (e.g., activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)).
PARTS PER MILLION (PPM)	Usually describes the concentration of something in water or soil; one particle of a given substance for every 999,999 other particles.
PATHOGEN	A disease-causing agent such as a virus, parasite, or bacteria.
PERIODIC EQUIPMENT CLEANING (PEC)	<p>Cleaning tasks for areas considered hard to reach (i.e., hard to see, touch, or sample), and therefore need disassembly to enable cleaning.</p> <p>Examples of these areas could include, but are not limited to the following:</p> <ul style="list-style-type: none"> • wear strips under belts, • sandwich spots (adjoined laminated surfaces such as support strips, flaps to chlorine tunnels), • hidden surfaces such as cutting board attachments and framework, • mechanical drive and support rollers, • bearings.
PEST	Any objectionable animals or insects, including birds, rodents, flies, and larvae.
POOLED WATER	An accumulation of standing water; not free flowing.
POST-CONSUMER WASTE	<i>Post-consumer waste</i> is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food.
POST-HARVEST PLANT DEBRIS	Refers to the remnants of lettuce and leafy greens left in the field or on equipment after harvesting.
POTABLE WATER	Water that is safe to drink or to use for food preparation without risk of health problems.
PRE-CONSUMER WASTE	A food item that was produced for consumption but that was never purchased, consumed or used.
PROCESS AUTHORITY	A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods.
READY-TO-EAT (RTE) FOOD (EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)	<p>(1) "Ready-to-eat food" means FOOD that:</p> <p>(a) Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or</p> <p>(d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes.</p>

	<p>(2) "Ready-to-eat food" includes:</p> <p>(b) Raw fruits and vegetables that are washed as specified under § 3-302.15;</p> <p>(c) Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13;</p> <p>(e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed.</p>
RECONDITIONED/RE-PROCESSED	Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used.
RESPONSIBLE PARTY	The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight.
RIPARIAN AREA	A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics necessary for them to be also classified as wetlands (USEPA 2005)
RISK MITIGATION	Actions to reduce the severity/impact of a risk.
ROUTINE EQUIPMENT CLEANING (REC)	Cleaning tasks that are performed daily using the 7 steps of cleaning and sanitation.
SALMONELLA	<i>Salmonella</i> is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as <i>Escherichia coli</i> , the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, <i>Salmonella</i> is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication.
SANITARY FACILITY	Includes both toilet and hand-washing stations.
SANITIZE	To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.
SEDIMENT	Undissolved organic and inorganic material transported or deposited by water.
SHIGA-TOXIN PRODUCING <i>E. COLI</i>	Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified

	and associated with severe illness and hospitalization in the United States is <i>E. coli</i> O157; however, there are over 50 other serogroups that can also cause illness.
SHIPPING UNIT/ EQUIPMENT	Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities.
SOIL AMENDMENT	Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life.
SURFACE WATER	Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.).
SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS (CHEMICAL FERTILIZERS)	Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process (e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.).
TOTAL COLIFORMS	Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system.
TRANSPORTER	The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting.
ULTRAVIOLET INDEX (UV INDEX)	A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15.
VALIDATED PROCESS	A process that has been demonstrated to be effective through a statistically based study, literature, or regulatory guidance.
VALIDATION	The act of determining whether products or services conform to meet specific requirements.
VEGETATIVE MATERIAL	<i>Vegetative material</i> means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream.
VERIFICATION	The act of confirming a product or service meets the requirements for which it was intended.
VESSEL COMPOST PROCESS	Enclosed composting process where ingredients are maintained at a minimum of 131°Fahrenheit for at least 3 days.
VISITOR	Any person (other than personnel) who enters your field/operations with your permission.
WATER DISTRIBUTION SYSTEM	Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop.
WATER SOURCE	The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams.

WATER TREATMENT	Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use.
WATER USE	The method by which water is being used in the agricultural process.
WELL	An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surfacedimension and whose purpose is to reach underground water supplies

4. PERSONNEL QUALIFICATIONS AND TRAINING

Adequate training of on-farm and handler personnel is a critically important element in a successful food safety program. In order to align with federal requirements under the Food Safety Modernization Act (FSMA) and to ensure that all activities prescribed in this document are effectively and adequately implemented, the following minimum training requirements must be maintained and documented:

The Best Practices Are:

- All personnel (including temporary, part time, seasonal, and contracted personnel) who handle lettuce / leafy greens or who have contact with food-contact surfaces, or who are engaged in the supervision thereof, must:
 - Receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.
 - Have a combination of education, training, and experience necessary to perform the person's assigned duties in a manner that ensures compliance with these best practices.
- Training must be:
 - Conducted in a manner easily understood by personnel being trained.
 - Repeated as necessary and appropriate based on observations or information indicating that personnel are not meeting standards outlined in these best practices.
- Minimum training requirements must include:
 - For all personnel who handle (contact) lettuce/leafy greens or supervise those who do so must receive training that includes the following:
 - Principles of food hygiene and safety.
 - The importance of health and personal hygiene for all personnel and visitors including recognizing symptoms of a health condition that is reasonably likely to result in contamination of lettuce/leafy greens or food-contact surfaces with microorganisms of public health significance.
 - The standards established in these best practices that are applicable to the employee's job responsibilities.
 - For harvest personnel, the training program must also address the following minimum requirements related to harvesting activities:
 - Recognizing lettuce/leafy greens that must not be harvested, including product that may be contaminated with known or reasonably foreseeable hazards.
 - Inspecting harvest containers, harvest equipment, and packaging materials to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of lettuce/leafy greens with known or reasonably foreseeable hazards.
 - Correcting problems with harvest containers, harvest equipment, or packaging materials or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
 - For personnel conducting environmental hazard and risk assessments, training must be completed, and the training program must address the following minimum requirements:

- When an environmental hazard or risk assessment should be completed.
 - How to conduct an environmental hazard or risk assessment.
 - Potential hazard and risk identification.
 - Recognizing product that may be contaminated with known or reasonably foreseeable hazards.
 - Mitigations and corrective actions.
 - When an environmental hazard or risk assessment deems pre-harvest product testing is necessary.
- Training requirements for harvesting equipment cleaning and sanitation, Issue 8:
 - At least one individual from the company must attend an LGMA training on harvesting equipment cleaning and sanitation and conducting a self-assessment against section 8. After this initial training, the company can adopt a train-the-trainer approach for the following activities:
 - Personnel conducting a sanitation program self-assessment against issue 8.1 must receive adequate training and the training program must address the following minimum requirements:
 - Developing of a Master Sanitation Schedule (MSS).
 - Hygienic design of harvesting equipment.
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation.
 - Location for harvesting equipment cleaning and sanitation to prevent cross-contamination.
 - Cleaning and sanitation verification activities.
 - Labeling, storage & use of chemicals.
 - Use and storage of sanitation tools.
 - Corrective actions.
 - Documentation and recordkeeping.
 - Personnel conducting cleaning and sanitation activities training must receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually. The training must address the following minimum requirements:
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation.
 - Location for harvesting equipment cleaning and sanitation to prevent cross-contamination.
 - Labeling, storage & use of chemicals.
 - Instruments and activities used to measure chemical solutions.
 - Use and storage of sanitation tools.
 - Visual inspections.
 - At least one supervisor or responsible party (e.g., the food safety professional) for each grower providing leafy green products must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the FDA.
 - Establish and keep records of training that document required training of personnel, including the date of training, topics covered, and the person(s) trained. Records must be reviewed, dated, and signed, within a

reasonable time per companies' SOP after the records are made, by a supervisor or responsible party.

8. ISSUE: HARVESTING EQUIPMENT ~~SANITATION AND DESIGN~~, PACKAGING MATERIALS, AND ~~BUILDINGS (FIELD SANITATION)~~

This section addresses harvest and harvest aid equipment and packaging materials used for lettuce/leafy greens as well as any fully or partially enclosed buildings used to store food-contact surfaces and packaging materials.

~~Mechanical or machine harvest has become increasingly prevalent and provides opportunity for increased surface contact exposure. This includes field-cored lettuce operations that use various harvest equipment and aids.~~

The Best Practices Are:

8.1 Harvesting Equipment

Categorization of Harvesting Equipment

Harvesting equipment must be categorized into one of the following:

- Category 1: Equipment used to harvest lettuce and leafy greens for further processing (i.e., clean and core lettuce, top and tail romaine, and mechanical harvesting of leafy greens). Examples of food-contact surfaces include belts with/ without cleats, mechanical blades, coring rings, knives, and cutting boards.
- Category 2: Equipment used to harvest lettuce and leafy greens for field pack (i.e., whole head lettuce, romaine hearts). Examples of food-contact surfaces include those that are primarily used for conveyance.
- Category 3: Equipment that does not come in direct contact with produce. (i.e., tractors, trailers, forklifts, water tanks).

Harvesting Equipment Hygienic Design

The hygienic design of harvesting equipment is crucial to prevent contamination and ensure the safety of lettuce and leafy greens. Hygienic design focuses on minimizing the areas where pathogens can accumulate (hard-to-clean areas). The best practices for hygienic design are:

- Design ~~or modify~~ harvesting equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed ~~as~~ to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non-food-contact surfaces.
- For operations with Category 1 harvesting equipment, a harvesting equipment hygienic design program (i.e., an SOP) shall be implemented and shall minimally address the following:
 - At least annually, and after designing, purchasing, or modifying harvesting equipment, conduct a hygienic design review for Category 1 harvesting equipment that evaluates areas of concern for food-contact surfaces and machine infrastructure.
 - For food-contact surfaces as applicable, minimally evaluate whether (or not):
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.

- For machine infrastructure as applicable, minimally, evaluate whether (or not):
 - Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
 - Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
 - Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
 - Unique features on the harvesting equipment could affect its cleanability or allow for bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces “sandwich joints”).
- Document areas of concern that need corrective actions and develop and maintain a timeline for the completion of these. At the next annual review, review these to ensure they were effectively implemented.
- Based on the findings of the hygienic design review consider the need for Periodic Equipment Cleaning (PEC) as well as documenting the frequency of PECs to be performed.

Sanitary Preparation and Operation

- Protect lettuce/leafy greens and harvesting equipment food-contact and adjacent surfaces, ~~production areas, and agricultural water sources and distribution systems~~ from contamination.
- Equipment cleaning and sanitizing operations should take place away from **unharvested** product and other equipment to reduce the potential for cross-contamination.
- Clean and sanitize food-contact **surfaces and adjacent surfaces** on harvest equipment **after at end of each daily use, harvest or** when moving between commodities and fields and when excessive soil has built up.
- Harvester sanitation personnel must utilize PPE equipment such as gloves, aprons, boots, face shields, respirators (if required) in such a way as to prevent cross-contamination of harvest equipment, tools, etc.
- Harvest sanitation crew must store all cleaning and sanitation chemicals in a secure **and designated** location.
- All water utilized in cleaning and sanitizing of equipment must meet harvest water acceptance criteria [see Table 2G].
- Documentation (logs or records) must be maintained for each harvest equipment (e.g., container, tools, etc.) cleaning and sanitation event.
- Records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made. FDA guidance suggests review within a week, but time can be lessened or increased on occasion. The company’s documentation control SOPs must designate the maximum **amount number** of days that will be necessary for the review, dating, and signing of records.
- Establish and implement equipment and tool storage and control procedures to minimize the potential for contamination and to prevent it from attracting and harboring pests when not in use.
- If re-circulated rinse or antioxidant solutions are used on the cut surface, ensure that water used meets requirements in Table 2G. Take all practicable precautions to prevent rinses and solutions from becoming a source of contamination.
- Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:
 - Accurate and precise as necessary and appropriate for their intended use
 - Adequately maintained, and
 - Adequate in number for their designated uses

- Prepare an SOP for sanitary operation of equipment which addresses the following:
 - Spills and leaks
 - Inoperative water sprays
 - Exclusion of foreign objects (including glass, plastic, metal, **trash**, and other debris)
 - Establish and implement procedures for the storage and control of water tanks and equipment used for hydration when not in use.
 - Maintain logs documenting cleaning and sanitation.
 - Retention of these records for at least two years.

Routine Harvesting Equipment Cleaning and Sanitation.

- Prepare ~~an~~ SOPs for all categories of harvesting equipment (examples of equipment categories as noted in the “Categorization of Harvesting Equipment” section), and tools that address the following:
 - ~~○ Cleaning and sanitation of harvesting equipment when moving between commodities and fields.~~
 - Frequency of cleaning and sanitation activities (i.e., after daily use, when moving between commodities and fields and when excessive soil has built up)
 - Documentation of cleaning and sanitation activities.
 - Cleaning and sanitizing of harvesting equipment (i.e., Categories 1 & 2) to reduce and control the potential for microbial cross-contamination, follow the preparation steps in Table 5, and 7 steps of cleaning and sanitation in Table 6.
 - Cleaning and sanitizing of non-food-contact surfaces (i.e., Category 3) to reduce and control the potential for microbial cross-contamination (i.e., tractors, trailers and other equipment utilized in harvest).
 - ~~○ Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, rinse and sanitize food-contact surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.)~~
 - Cleaning and sanitizing of hand-harvest equipment (knives, scythes, etc.) that at a minimum address the following:
 - Conducting proper cleaning and sanitation after daily use, when moving between commodities and fields, and if potential contamination occurs.
 - Rinsing and sanitizing at the beginning of every day.
 - A proper sanitizing solution should be readily available at the harvesting site. Receptacles with a sanitizer solution should be provided to store and sanitize all hand-held harvesting tools during crew breaks and when not in use.
 - Water used should be safe and of adequate sanitary quality for its intended use.
 - If equipment, tools, and food-contact surfaces have contact with produce that is not covered by the Produce Safety Rule, adequately clean and sanitize before using this equipment to harvest lettuce/leafy greens.
 - Consider routine quantitative methods that aid in sanitation verification beyond the seasonal SSOP verification (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).
 - Maintenance, cleaning, and sanitation schedules for equipment used in hydration must be maintained.
- Management procedures for when equipment is not in use (i.e., end of season). To include a policy for removal of equipment from the work area (e.g., containers, scabbards, sheathes, or other harvest equipment). ~~Develop and implement a sanitation schedule for machine harvest operations (e.g.,~~

transportation tarps, conveyor belts, etc.).

- ~~Develop and implement appropriate cleaning, sanitizing, storage, and handling procedures of all equipment and food-contact surfaces.~~
- ~~Convey, store, and dispose of trash, litter, and waste to:~~
 - ~~Minimize the potential to attract and harbor pests.~~

8.2 Food Packing Materials, Containers and Packaging

- Food packing materials, containers, and packaging must be of adequate food safety design and quality for their intended use, which includes:
 - Cleanable and/or designed for single-use to prevent the possible growth or transfer of pathogens.
 - Store packing containers and packaging materials off the floor or ground and protected to the degree possible to prevent contamination.
 - If containers or packaging materials are re-used, ensure that food-contact surfaces are clean or lined with a new liner.
 - Consider obtaining a letter of guarantee for reusable containers if not cleaned in-house.
- Prepare an SOP for handling and storage of harvest containers that addresses the following:
 - Daily pre-operational inspection
 - Proper cleaning and sanitation – routine cleaning and for changes in conditions of materials (i.e., weather events, pest activity, etc.)
 - Overnight storage
 - Contact with the floor, ground, soil, or post-harvest plant debris.
 - Container assembly (RPC, fiber bin, plastic bin, etc.)
 - Damaged containers
 - Use of containers only as intended.
- ~~Packaging containers shall be adequate for their intended use.~~
- ~~Allow adequate distance for the turning and manipulation of harvest equipment to prevent cross-contamination from areas or adjacent and nearby land that may pose a risk.~~

8.3 Buildings

- Buildings must be suitable in size, construction, and design to facilitate building maintenance and sanitary operations to reduce the potential for contamination of food-contact surfaces with known or reasonably foreseeable hazards. Buildings must:
 - Provide sufficient space for placement of equipment and storage of packaging materials.
 - Reduce the potential for contamination of food-contact surfaces by effective building design including the separations of operations in which contamination is likely to occur. Considerations for location, time, partition, enclosed systems, or other effective means.
 - Provide adequate drainage in all areas where water or other liquid waste is discharged on the ground or floor of the building.
 - Prevent contamination of food-contact surfaces and packaging materials by protecting them from drips or condensate and excluding pests and animals.
 - Maintain and document pest control prevention steps.

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Table 5 – Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment, sanitation tools, chemicals, and Instruments.

Item	Description
Personnel and Resources	<ul style="list-style-type: none">• Ensure you have the appropriate resources (including trained personnel) to conduct harvesting equipment cleaning and sanitation.
Personal Protection Equipment (PPE)	<ul style="list-style-type: none">• Ensure all staff have and use appropriate PPE for safety and repeatability of sanitation work
Sanitation Tools	<ul style="list-style-type: none">• Check tools availability and condition.• Use single-use scrub pads and designated brush colors for food-contact and nonfood-contact surfaces.
Chemicals (Cleaning and Sanitation)	<ul style="list-style-type: none">• Check cleaning and sanitizing chemicals are used according to manufacturer’s specifications
Instruments	<ul style="list-style-type: none">• Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:<ul style="list-style-type: none">○ Accurate and precise as necessary and appropriate for their intended use○ Adequately maintained, and○ Adequate in number for their designated uses

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Table 6– Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and verification.

Harvesting Equipment Sanitation Best Practices	
<ul style="list-style-type: none">• Conduct steps 1 through 7 after daily equipment use.• On the day of harvest follow the “day of harvest steps” in this table.• Avoid creation of excess mud.• Ensure proper lighting for cleaning.• Ensure a safe working environment to the crew (equipment access).• Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays.	
Documentation Requirements	Step Details
Sanitation preparation Step: Document and report abnormal conditions prior to cleaning and follow-up as necessary	<ul style="list-style-type: none">• Have harvest crew remove product, harvesting supplies, and waste from equipment and cleaning area.• Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product.• Stay on walking surfaces. Never walk or step on food-contact surfaces.

<p>Step 1:</p> <p>Dry cleaning</p>	<ul style="list-style-type: none"> • Prepare equipment to facilitate accessibility to “hard to reach” areas. • Remove gross soils from food-contact surfaces and adjacent surfaces. • Wipe excess grease from motors and bearings. • Slowly run conveyers to aid in removal of gross soils as necessary.
<p>Step 2:</p> <p>Pre-rinse; remove all visible soils and debris</p>	<ul style="list-style-type: none"> • Rinse and pay attention to “hard to reach” areas. • Remove all visible soils and debris (top to bottom). • Rinse food-contact and adjacent surfaces. • Slowly run conveyers to aid in removal of debris during rinsing as necessary.
<p>Step 3:</p> <p>Detergent application, removal of remaining soils</p>	<ul style="list-style-type: none"> • Select a detergent that can be applied in field conditions to remove soil and debris. • Apply detergent solution to ensure coverage of food-contact and adjacent surfaces. • Do not allow detergent solutions to dry before scrubbing and rinsing.
<p>Step 4:</p> <p>Scrubbing</p>	<ul style="list-style-type: none"> • All areas should be scrubbed with hygienic color-coded brushes for food and non-food-contact surfaces. • Scrub pads are designated for food- and non-food-contact surfaces and are for single-use only.
<p>Step 5:</p> <p>Detergent rinse, removal of detergents and remaining Soils</p>	<ul style="list-style-type: none"> • Rinse equipment top to bottom in the order detergents were applied, to ensure no chemical residues, soils and debris are evident. • Be sure to rinse “hard to reach” areas. • Slowly run conveyers to aid the removal of soap and detergent. • Avoid spraying on the ground to avoid splashing and cross-contamination of clean equipment.
<p>Step 6:</p> <p>Post-cleaning Self-inspection and approval for sanitation Document cleaning date and time, equipment identification and inspection results.</p> <ul style="list-style-type: none"> • Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items. • Document deficiencies and corrective actions including recleaning and follow-up inspection results. • If any items represent a food safety risk, equipment must not be placed 	<ul style="list-style-type: none"> • Prior to putting cleaning materials away, the operator or lead must self-inspect equipment to make sure it is visibly clean (e.g. removal of chemical residues, soils, and debris). • If observed during the self-inspection, remove the identified chemical residues, soils, and debris and re-clean as necessary. • Release equipment for sanitizing when visual results and equipment conditions are acceptable.

back into service until corrected.	
<p>Step 7: Sanitize</p> <p>Verify strength of sanitizing solution. Complete remaining sanitation documentation.</p>	<ul style="list-style-type: none"> • Thoroughly sanitize food-contact and adjacent surfaces • Upon completion, place cleaning equipment and supplies in designated locations. • Reassemble conveyers and other components. • Clean, wrap and store hoses. • Release equipment for harvesting.
<p>Day of Harvest Steps:</p> <p>Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. Based on the daily inspection, it may be necessary to re-clean or re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).</p>	
Verification requirements	
<ul style="list-style-type: none"> • Handlers/shippers must perform and document at least once per season a sanitation program self-assessment against issue 8.1 to ensure that cleaning and sanitation of the harvesting equipment is performed as described by the company's SSOPs. <ul style="list-style-type: none"> ○ Personnel conducting the self-assessment against issue 8.1 must comply with the training requirements in Issue 4. • At least once per season conduct one SSOP verification on the highest category of harvesting equipment within your operation. Use a quantitative method (i.e., ATP, rapid detection of residuals, microbial swab[†], etc.). Perform this verification using pre and post sanitation results, if available also perform verification against historical data. <p>[†]Use of microbial swabs is recommended for indicator organisms. If testing for pathogens, do it cautiously.</p>	

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Final Working Group Proposal (Clean Version)

Below is the final proposal developed by the working group. Modifications from the marked up proposal have been applied.



C A L I F O R N I A
LGMA

COMMITTED TO SAFE LEAFY GREENS

COMMODITY SPECIFIC FOOD SAFETY GUIDELINES

FOR THE PRODUCTION AND HARVEST OF
LETTUCE AND LEAFY GREENS



SEPTEMBER 20, 2023

This document supersedes all previously published versions of the Commodity Specific Food Safety Guidelines for the Production and Harvest of Leafy Greens including those dated on or before March 30, 2023.

Adopted by the California Leafy Green Products Handler Marketing Agreement Advisory Board
Document managed by Western Growers - learn more at www.leafygreenguidance.com

GLOSSARY

ACCREDITATION	A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems.
ACTIVE COMPOST	Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50° Celsius (122° Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
ADEQUATE / ADEQUATELY	That which is needed to accomplish the intended purpose in keeping with good public health practice.
ADJACENT SURFACES	Surfaces that are near food-contact surfaces but do not directly touch the food. The surfaces can still be a contamination source if human pathogens are transferred to the food or food-contact surfaces through drainage, drips, dirt or debris. Examples: Outer surface of a conveyor belt, tarps above food-contact surfaces
ADJACENT / NEARBY LAND	Land within a proximity that could potentially affect safe production of leafy greens.
AERATED STATIC PILE	Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days.
AERIAL APPLICATION	Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc.
AEROSOLIZED	The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas.
AGRICULTURAL / COMPOST TEA	A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document.

AGRICULTURAL MATERIAL	<i>Agricultural Material</i> means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues.
AGRICULTURAL TAILWATER	Excess run off water which is generated and collected during the process of irrigation.
AGRICULTURAL WATER	Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens).
AGRICULTURAL WATER SYSTEM	Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers.
AGRICULTURAL WATER TREATMENT SYSTEM	An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description.
ANCILLARY EQUIPMENT	Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc.
ANIMAL BY-PRODUCT/PRODUCT	Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements.
ANIMAL FEED OPERATION (AFO)	Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: *animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and *crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Less than 1,000 animal units does not meet the requirements of a CAFO.
ANIMAL HAZARD	Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated.

ANIMAL UNIT	There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis.
ANTIMICROBIAL WATER TREATMENT	A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard.
ADENOSINE TRI-PHOSPHATE (ATP)	A high-energy phosphate molecule required to provide energy for cellular function.
APPLICATION INTERVAL	Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied.
ATP TEST METHODS	Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness.
BIOFERTILIZERS	Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities.
BIOLOGICALS	Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients.
BIORATIONALS	Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts
BIOSOLIDS	<p>Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.</p> <p>Class A: Class A biosolids undergo a “Process to Further Reduce Pathogens (PFRP).” Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.</p> <p>Class B: Class B biosolids undergo a “Process to Significantly Reduce Pathogens (PSRP).” This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required.</p>
BLUE VALVE	Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use.
BREAKPOINT	The point at which the disinfection demand has been met.
BUILDINGS	Any fully or partially enclosed building on the farm that is used for storing off-food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls.

CARBOHYDRATE	Ingredient for soil amendments and crop inputs that could improve growth of bacteria.
CLOSED DELIVERY SYSTEM	A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use.
COLONY FORMING UNITS (CFU)	Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted.
COLIFORMS	Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature.
CO-MANAGEMENT	An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production.
COMPOST/MATURE COMPOST	<i>Compost</i> is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients.
COMPOST FEEDSTOCK	“Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments.
COMPOSTING	Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions.
CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)	A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 'animal units' (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
COVERED PRODUCE	Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens.

CROP INPUT	Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle.
CROSS-CONTAMINATION	The transfer of microorganisms, such as bacteria and viruses, from one place to another.
CURING	The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step.
DETECTION LIMIT	A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target.
DIRECT WATER APPLICATION	Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water.
ENTEROHEMORRHAGIC <i>E. COLI</i> (EHEC)	Shiga toxin-producing <i>E. coli</i> clinically associated with bloody diarrhea.
<i>ESCHERICHIA COLI</i> (<i>E. COLI</i>)	<i>Escherichia coli</i> are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. <i>E. coli</i> are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources.
FECAL COLIFORMS	Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called “thermotolerant coliforms.”
FIELD EQUIPMENT	Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities.
FIELD PACK	Refers to the process of harvesting and packing lettuce and leafy greens in the field. They are harvested, sorted, and placed into packaging containers for distribution.
FLOODING	The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field.
FOOD-CONTACT SURFACE	Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. “Food-contact surfaces” includes food-contact surfaces of equipment and tools used during harvest, packing and holding. Examples: Conveyor belts, cutting boards, knives, baskets.
FOOD MATERIAL	<i>Food Material</i> means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and

	residential food scrap collection. Material that is defined as “food material” is not agricultural material.
FOOD SAFETY ASSESSMENT	A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet.
FOOD SAFETY PERSONNEL	Person trained in basic food safety principals and/or working under the auspices of a food safety professional.
FOOD SAFETY PROFESSIONAL	Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details).
FURTHER PROCESSING	Refers to the additional steps taken after the initial harvesting of lettuce and leafy greens. Examples of further processing could include, but are not limited to: cleaning, coring, cutting, sorting, washing, or shredding.
GEOMETRIC MEAN	Mathematical def.: the n^{th} root of the product of n numbers, or: Geometric Mean = n^{th} root of $(X_1)(X_2)...(X_n)$, where X_1 , X_2 , etc. represent the individual data points, and n is the total number of data points used in the calculation. Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number.
GRAZING LANDS	Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock.
GREEN WASTE	Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. ¹
GROUND/SOIL	Ground – solid surface of the Earth. Soil – upper layer of the Earth in which plants grow. [growing media] These two words are considered synonymous throughout and for the purpose of the document.

GROUND WATER	The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water.
HABITAT	The natural home or environment of an animal, plant, or other organism.
HARD TO REACH AREAS	Parts of the harvesting equipment that are difficult to access for cleaning, sanitation, and inspection due to location, design, or obstruction of components. Ensuring that these areas are properly cleaned and sanitized is important to prevent contamination.
HARVESTING	Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing.
HARVEST EQUIPMENT	Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc.
HAZARD	Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control.
HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS	Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA.
HOBBY FARM	A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products.
HOLDING	Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (e.g., activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food.
HYDROPONIC	The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support.
INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST	Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, <i>E. coli</i> , <i>E. coli</i> O157:H7, <i>Listeria</i> , and <i>Salmonella</i> have been eliminated.
INDICATOR MICROORGANISMS	An organism that when present suggests the possibility of contamination or under processing.
IRRIGATION WATER TREATMENT	Any system used to treat agricultural water, so it makes the quality adequate for its intended use
KNOWN OR REASONABLY FORESEEABLE HAZARD	Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with

	the farm or the food.
LETTUCE AND LEAFY GREENS	Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butterlettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard.
LISTERIA	Any of a genus (<i>Listeria</i>) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (<i>Listeria monocytogenes</i>) that causes listeriosis.
LOT (Pertaining to soil amendments and crop inputs other than compost)	Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture.
MANURE	Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment.
MASTER SANITATION SCHEDULE (MSS)	The document that contains the list of cleaning tasks with frequencies. It includes routine equipment cleaning (REC), periodic equipment cleaning (PEC) tasks, and annual tasks such as hygienic design reviews.
MICROORGANISMS	Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated.
MONITOR	To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement.
MONTHLY	Because irrigation schedules and delivery of water is not always in a grower's control "monthly" for purposes of water sampling means within 35 days of the previous sample.
MORTALITY COMPOST	<i>Mortality Compost</i> is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations.
MOST PROBABLE NUMBER (MPN)	Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers.
MUNICIPAL WATER	Water that is processed and treated by a municipality to meet USEPA drinking water standards.
NON-DETECT	Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis.
NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN	Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines.
OPEN DELIVERY SYSTEM	A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the

	water source to the point of use.
PACKING	Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (e.g., activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)).
PARTS PER MILLION (PPM)	Usually describes the concentration of something in water or soil; one particle of a given substance for every 999,999 other particles.
PATHOGEN	A disease-causing agent such as a virus, parasite, or bacteria.
PERIODIC EQUIPMENT CLEANING (PEC)	<p>Cleaning tasks for areas considered hard to reach (i.e., hard to see, touch, or sample), and therefore need disassembly to enable cleaning.</p> <p>Examples of these areas could include, but are not limited to the following:</p> <ul style="list-style-type: none"> • wear strips under belts, • sandwich spots (adjoined laminated surfaces such as support strips, flaps to chlorine tunnels), • hidden surfaces such as cutting board attachments and framework, • mechanical drive and support rollers, • bearings.
PEST	Any objectionable animals or insects, including birds, rodents, flies, and larvae.
POOLED WATER	An accumulation of standing water; not free flowing.
POST-CONSUMER WASTE	<i>Post-consumer waste</i> is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food.
POST-HARVEST PLANT DEBRIS	Refers to the remnants of lettuce and leafy greens left in the field or on equipment after harvesting.
POTABLE WATER	Water that is safe to drink or to use for food preparation without risk of health problems.
PRE-CONSUMER WASTE	A food item that was produced for consumption but that was never purchased, consumed or used.
PROCESS AUTHORITY	A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods.
READY-TO-EAT (RTE) FOOD (EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)	<p>(1) "Ready-to-eat food" means FOOD that:</p> <p>(a) Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or</p> <p>(d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes.</p>

	<p>(2) "Ready-to-eat food" includes:</p> <p>(b) Raw fruits and vegetables that are washed as specified under § 3-302.15;</p> <p>(c) Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13;</p> <p>(e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed.</p>
RECONDITIONED/RE-PROCESSED	Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used.
RESPONSIBLE PARTY	The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight.
RIPARIAN AREA	A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics necessary for them to be also classified as wetlands (USEPA 2005)
RISK MITIGATION	Actions to reduce the severity/impact of a risk.
ROUTINE EQUIPMENT CLEANING (REC)	Cleaning tasks that are performed daily using the 7 steps of cleaning and sanitation.
<i>SALMONELLA</i>	<i>Salmonella</i> is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as <i>Escherichia coli</i> , the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, <i>Salmonella</i> is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication.
SANITARY FACILITY	Includes both toilet and hand-washing stations.
SANITIZE	To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.
SEDIMENT	Undissolved organic and inorganic material transported or deposited by water.
SHIGA-TOXIN PRODUCING <i>E. COLI</i>	Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified

	and associated with severe illness and hospitalization in the United States is <i>E. coli</i> O157; however, there are over 50 other serogroups that can also cause illness.
SHIPPING UNIT/ EQUIPMENT	Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities.
SOIL AMENDMENT	Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life.
SURFACE WATER	Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.).
SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS (CHEMICAL FERTILIZERS)	Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process(e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.).
TOTAL COLIFORMS	Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system.
TRANSPORTER	The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting.
ULTRAVIOLET INDEX (UV INDEX)	A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15.
VALIDATED PROCESS	A process that has been demonstrated to be effective through a statistically based study, literature, or regulatory guidance.
VALIDATION	The act of determining whether products or services conform to meet specific requirements.
VEGETATIVE MATERIAL	<i>Vegetative material</i> means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream.
VERIFICATION	The act of confirming a product or service meets the requirements for which it was intended.
VESSEL COMPOST PROCESS	Enclosed composting process where ingredients are maintained at a minimum of 131°Fahrenheit for at least 3 days.
VISITOR	Any person (other than personnel) who enters your field/operations with your permission.
WATER DISTRIBUTION SYSTEM	Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop.
WATER SOURCE	The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams.

WATER TREATMENT	Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use.
WATER USE	The method by which water is being used in the agricultural process.
WELL	An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surfacedimension and whose purpose is to reach underground water supplies

4. PERSONNEL QUALIFICATIONS AND TRAINING

Adequate training of on-farm and handler personnel is a critically important element in a successful food safety program. In order to align with federal requirements under the Food Safety Modernization Act (FSMA) and to ensure that all activities prescribed in this document are effectively and adequately implemented, the following minimum training requirements must be maintained and documented:

The Best Practices Are:

- All personnel (including temporary, part time, seasonal, and contracted personnel) who handle lettuce / leafy greens or who have contact with food-contact surfaces, or who are engaged in the supervision thereof, must:
 - Receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.
 - Have a combination of education, training, and experience necessary to perform the person's assigned duties in a manner that ensures compliance with these best practices.
- Training must be:
 - Conducted in a manner easily understood by personnel being trained.
 - Repeated as necessary and appropriate based on observations or information indicating that personnel are not meeting standards outlined in these best practices.
- Minimum training requirements must include:
 - For all personnel who handle (contact) lettuce/leafy greens or supervise those who do so must receive training that includes the following:
 - Principles of food hygiene and safety.
 - The importance of health and personal hygiene for all personnel and visitors including recognizing symptoms of a health condition that is reasonably likely to result in contamination of lettuce/leafy greens or food-contact surfaces with microorganisms of public health significance.
 - The standards established in these best practices that are applicable to the employee's job responsibilities.
 - For harvest personnel, the training program must also address the following minimum requirements related to harvesting activities:
 - Recognizing lettuce/leafy greens that must not be harvested, including product that may be contaminated with known or reasonably foreseeable hazards.
 - Inspecting harvest containers, harvest equipment, and packaging materials to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of lettuce/leafy greens with known or reasonably foreseeable hazards.
 - Correcting problems with harvest containers, harvest equipment, or packaging materials or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
 - For personnel conducting environmental hazard and risk assessments, training must be completed, and the training program must address the following minimum requirements:

- When an environmental hazard or risk assessment should be completed.
 - How to conduct an environmental hazard or risk assessment.
 - Potential hazard and risk identification.
 - Recognizing product that may be contaminated with known or reasonably foreseeable hazards.
 - Mitigations and corrective actions.
 - When an environmental hazard or risk assessment deems pre-harvest product testing is necessary.
- Training requirements for harvesting equipment cleaning and sanitation, Issue 8:
 - At least one individual from the company must attend an LGMA training on harvesting equipment cleaning and sanitation and conducting a self-assessment against section 8. After this initial training, the company can adopt a train-the-trainer approach for the following activities:
 - Personnel conducting a sanitation program self-assessment against issue 8.1 must receive adequate training and the training program must address the following minimum requirements:
 - Developing of a Master Sanitation Schedule (MSS).
 - Hygienic design of harvesting equipment.
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation.
 - Location for harvesting equipment cleaning and sanitation to prevent cross-contamination.
 - Cleaning and sanitation verification activities.
 - Labeling, storage & use of chemicals.
 - Use and storage of sanitation tools.
 - Corrective actions.
 - Documentation and recordkeeping.
 - Personnel conducting cleaning and sanitation activities training must receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually. The training must address the following minimum requirements:
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation.
 - Location for harvesting equipment cleaning and sanitation to prevent cross-contamination.
 - Labeling, storage & use of chemicals.
 - Instruments and activities used to measure chemical solutions.
 - Use and storage of sanitation tools.
 - Visual inspections.
- At least one supervisor or responsible party (e.g., the food safety professional) for each grower providing leafy green products must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the FDA.
- Establish and keep records of training that document required training of personnel, including the date of training, topics covered, and the person(s) trained. Records must be reviewed, dated, and signed, within a

reasonable time per companies' SOP after the records are made, by a supervisor or responsible party.

8. ISSUE: HARVESTING EQUIPMENT SANITATION AND DESIGN, PACKAGING MATERIALS, AND BUILDINGS

This section addresses harvest and harvest aid equipment and packaging materials used for lettuce/leafy greens as well as any fully or partially enclosed buildings used to store food-contact surfaces and packaging materials.

The Best Practices Are:

8.1 Harvesting Equipment

Categorization of Harvesting Equipment

Harvesting equipment must be categorized into one of the following:

- Category 1: Equipment used to harvest lettuce and leafy greens for further processing (i.e., clean and core lettuce, top and tail romaine, and mechanical harvesting of leafy greens). Examples of food-contact surfaces include belts with/ without cleats, mechanical blades, coring rings, knives, and cutting boards.
- Category 2: Equipment used to harvest lettuce and leafy greens for field pack (i.e., whole head lettuce, romaine hearts). Examples of food-contact surfaces include those that are primarily used for conveyance.
- Category 3: Equipment that does not come in direct contact with produce. (i.e., tractors, trailers, forklifts, water tanks).

Harvesting Equipment Hygienic Design

The hygienic design of harvesting equipment is crucial to prevent contamination and ensure the safety of lettuce and leafy greens. Hygienic design focuses on minimizing the areas where pathogens can accumulate (hard-to-clean areas). The best practices for hygienic design are:

- Design or modify harvesting equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non-food-contact surfaces.
- For operations with Category 1 harvesting equipment, a harvesting equipment hygienic design program (i.e., an SOP) shall be implemented and shall minimally address the following:
 - At least annually, and after designing, purchasing, or modifying harvesting equipment, conduct a hygienic design review for Category 1 harvesting equipment that evaluates areas of concern for food-contact surfaces and machine infrastructure.
 - For food-contact surfaces as applicable, minimally evaluate whether (or not):
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.
 - For machine infrastructure as applicable, minimally, evaluate whether (or not):

- Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
- Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
- Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
- Unique features on the harvesting equipment could affect its cleanability or allow for bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces “sandwich joints”).

- Document areas of concern that need corrective actions and develop and maintain a timeline for the completion of these. At the next annual review, review these to ensure they were effectively implemented.

- Based on the findings of the hygienic design review consider the need for Periodic Equipment Cleaning (PEC) as well as documenting the frequency of PECs to be performed.

Sanitary Preparation and Operation

- Protect lettuce/leafy greens and harvesting equipment food-contact and adjacent surfaces from contamination.
- Equipment cleaning and sanitizing operations should take place away from unharvested product and other equipment to reduce the potential for cross-contamination.
- Clean and sanitize food-contact and adjacent surfaces on harvest equipment after daily use, when moving between commodities and fields, and when excessive soil has built up.
- Harvester sanitation personnel must utilize PPE equipment such as gloves, aprons, boots, face shields, respirators (if required) in such a way as to prevent cross-contamination of harvest equipment, tools, etc.
- Harvest sanitation crew must store all cleaning and sanitation chemicals in a secure and designated location.
- All water utilized in cleaning and sanitizing of equipment must meet harvest water acceptance criteria [see Table 2G].
- Documentation (logs or records) must be maintained for each harvest equipment (e.g., container, tools, etc.) cleaning and sanitation event.
- Records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made. FDA guidance suggests review within a week, but time can be lessened or increased on occasion. The company’s documentation control SOPs must designate the maximum number of days that will be necessary for the review, dating, and signing of records.
- Establish and implement equipment and tool storage and control procedures to minimize the potential for contamination and to prevent it from attracting and harboring pests when not in use.
- If re-circulated rinse or antioxidant solutions are used on the cut surface, ensure that water used meets requirements in Table 2G. Take all practicable precautions to prevent rinses and solutions from becoming a source of contamination.
- Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:
 - Accurate and precise as necessary and appropriate for their intended use
 - Adequately maintained, and
 - Adequate in number for their designated uses

- Prepare an SOP for sanitary operation of equipment which addresses the following:
 - Spills and leaks
 - Inoperative water sprays
 - Exclusion of foreign objects (including glass, plastic, metal, trash, and other debris)
 - Establish and implement procedures for the storage and control of water tanks and equipment used for hydration when not in use.
 - Maintain logs documenting cleaning and sanitation.
 - Retention of these records for at least two years.

Routine Harvesting Equipment Cleaning and Sanitation.

- Prepare SOPs for all categories of harvesting equipment (examples of equipment categories as noted in the “Categorization of Harvesting Equipment” section), and tools that address the following:
 - Frequency of cleaning and sanitation activities (i.e., after daily use, when moving between commodities and fields and when excessive soil has built up)
 - Documentation of cleaning and sanitation activities.
 - Cleaning and sanitizing of harvesting equipment (i.e., Categories 1 & 2) to reduce and control the potential for microbial cross-contamination, follow the preparation steps in Table 5, and 7 steps of cleaning and sanitation in Table 6.
 - Cleaning and sanitizing of non-food-contact surfaces (i.e., Category 3) to reduce and control the potential for microbial cross-contamination (i.e., tractors, trailers and other equipment utilized in harvest).
 - Cleaning and sanitizing of hand-harvest equipment (knives, scythes, etc.) that at a minimum address the following:
 - Conducting proper cleaning and sanitation after daily use, when moving between commodities and fields, and if potential contamination occurs.
 - Rinsing and sanitizing at the beginning of every day.
 - A proper sanitizing solution should be readily available at the harvesting site. Receptacles with a sanitizer solution should be provided to store and sanitize all hand-held harvesting tools during crew breaks and when not in use.
 - Water used should be safe and of adequate sanitary quality for its intended use.
 - If equipment, tools, and food-contact surfaces have contact with produce that is not covered by the Produce Safety Rule, adequately clean and sanitize before using this equipment to harvest lettuce/leafy greens.
 - Consider routine quantitative methods that aid in sanitation verification beyond the seasonal SSOP verification (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).
 - Maintenance, cleaning, and sanitation schedules for equipment used in hydration must be maintained.
- Management procedures for when equipment is not in use (i.e., end of season). To include a policy for removal of equipment from the work area (e.g., containers, scabbards, sheathes, or other harvest equipment).

8.2 Food Packing Materials, Containers and Packaging

- Food packing materials, containers, and packaging must be of adequate food safety design and quality for

their intended use, which includes:

- Cleanable and/or designed for single-use to prevent the possible growth or transfer of pathogens.
- Store packing containers and packaging materials off the floor or ground and protected to the degree possible to prevent contamination.
- If containers or packaging materials are re-used, ensure that food-contact surfaces are clean or lined with a new liner.
- Consider obtaining a letter of guarantee for reusable containers if not cleaned in-house.
- Prepare an SOP for handling and storage of harvest containers that addresses the following:
 - Daily pre-operational inspection
 - Proper cleaning and sanitation – routine cleaning and for changes in conditions of materials (i.e., weather events, pest activity, etc.)
 - Overnight storage
 - Contact with the floor, ground, soil, or post-harvest plant debris.
 - Container assembly (RPC, fiber bin, plastic bin, etc.)
 - Damaged containers
 - Use of containers only as intended.

8.3 Buildings

- Buildings must be suitable in size, construction, and design to facilitate building maintenance and sanitary operations to reduce the potential for contamination of food-contact surfaces with known or reasonably foreseeable hazards. Buildings must:
 - Provide sufficient space for placement of equipment and storage of packaging materials.
 - Reduce the potential for contamination of food-contact surfaces by effective building design including the separations of operations in which contamination is likely to occur. Considerations for location, time, partition, enclosed systems, or other effective means.
 - Provide adequate drainage in all areas where water or other liquid waste is discharged on the ground or floor of the building.
 - Prevent contamination of food-contact surfaces and packaging materials by protecting them from drips or condensate and excluding pests and animals.
 - Maintain and document pest control prevention steps.

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Table 5 – Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment, sanitation tools, chemicals, and Instruments.

Item	Description
Personnel and Resources	<ul style="list-style-type: none">• Ensure you have the appropriate resources (including trained personnel) to conduct harvesting equipment cleaning and sanitation.
Personal Protection Equipment (PPE)	<ul style="list-style-type: none">• Ensure all staff have and use appropriate PPE for safety and repeatability of sanitation work
Sanitation Tools	<ul style="list-style-type: none">• Check tools availability and condition.• Use single-use scrub pads and designated brush colors for food-contact and nonfood-contact surfaces.
Chemicals (Cleaning and Sanitation)	<ul style="list-style-type: none">• Check cleaning and sanitizing chemicals are used according to manufacturer’s specifications
Instruments	<ul style="list-style-type: none">• Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:<ul style="list-style-type: none">○ Accurate and precise as necessary and appropriate for their intended use○ Adequately maintained, and○ Adequate in number for their designated uses

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Table 6– Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and verification.

Harvesting Equipment Sanitation Best Practices	
<ul style="list-style-type: none">• Conduct steps 1 through 7 after daily equipment use.• On the day of harvest follow the “day of harvest steps” in this table.• Avoid creation of excess mud.• Ensure proper lighting for cleaning.• Ensure a safe working environment to the crew (equipment access).• Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays.	
Documentation Requirements	Step Details
Sanitation preparation Step: Document and report abnormal conditions prior to cleaning and follow-up as necessary	<ul style="list-style-type: none">• Have harvest crew remove product, harvesting supplies, and waste from equipment and cleaning area.• Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product.• Stay on walking surfaces. Never walk or step on food-contact surfaces.
Step 1: Dry cleaning	<ul style="list-style-type: none">• Prepare equipment to facilitate accessibility to “hard to reach” areas.• Remove gross soils from food-contact surfaces and adjacent surfaces.• Wipe excess grease from motors and bearings.

	<ul style="list-style-type: none"> • Slowly run conveyers to aid in removal of gross soils as necessary.
<p>Step 2:</p> <p>Pre-rinse; remove all visible soils and debris</p>	<ul style="list-style-type: none"> • Rinse and pay attention to “hard to reach” areas. • Remove all visible soils and debris (top to bottom). • Rinse food-contact and adjacent surfaces. • Slowly run conveyers to aid in removal of debris during rinsing as necessary.
<p>Step 3:</p> <p>Detergent application, removal of remaining soils</p>	<ul style="list-style-type: none"> • Select a detergent that can be applied in field conditions to remove soil and debris. • Apply detergent solution to ensure coverage of food-contact and adjacent surfaces. • Do not allow detergent solutions to dry before scrubbing and rinsing.
<p>Step 4:</p> <p>Scrubbing</p>	<ul style="list-style-type: none"> • All areas should be scrubbed with hygienic color-coded brushes for food and non-food-contact surfaces. • Scrub pads are designated for food- and non-food-contact surfaces and are for single-use only.
<p>Step 5:</p> <p>Detergent rinse, removal of detergents and remaining Soils</p>	<ul style="list-style-type: none"> • Rinse equipment top to bottom in the order detergents were applied, to ensure no chemical residues, soils and debris are evident. • Be sure to rinse “hard to reach” areas. • Slowly run conveyers to aid the removal of soap and detergent. • Avoid spraying on the ground to avoid splashing and cross-contamination of clean equipment.
<p>Step 6:</p> <p>Post-cleaning Self-inspection and approval for sanitation Document cleaning date and time, equipment identification and inspection results.</p> <ul style="list-style-type: none"> • Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items. • Document deficiencies and corrective actions including recleaning and follow-up inspection results. • If any items represent a food safety risk, equipment must not be placed back into service until corrected. 	<ul style="list-style-type: none"> • Prior to putting cleaning materials away, the operator or lead must self-inspect equipment to make sure it is visibly clean (e.g. removal of chemical residues, soils, and debris). • If observed during the self-inspection, remove the identified chemical residues, soils, and debris and re-clean as necessary. • Release equipment for sanitizing when visual results and equipment conditions are acceptable.
<p>Step 7:</p> <p>Sanitize</p>	<ul style="list-style-type: none"> • Thoroughly sanitize food-contact and adjacent surfaces • Upon completion, place cleaning equipment and supplies in designated locations.

Verify strength of sanitizing solution. Complete remaining sanitation documentation.	<ul style="list-style-type: none"> • Reassemble conveyers and other components. • Clean, wrap and store hoses. • Release equipment for harvesting.
<p>Day of Harvest Steps:</p> <p>Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation.</p> <p>Based on the daily inspection, it may be necessary to re-clean or re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).</p>	
Verification requirements	
<ul style="list-style-type: none"> • Handlers/shippers must perform and document at least once per season a sanitation program self-assessment against issue 8.1 to ensure that cleaning and sanitation of the harvesting equipment is performed as described by the company's SSOPs. <ul style="list-style-type: none"> ○ Personnel conducting the self-assessment against issue 8.1 must comply with the training requirements in Issue 4. • At least once per season conduct one SSOP verification on the highest category of harvesting equipment within your operation. Use a quantitative method (i.e., ATP, rapid detection of residuals, microbial swab[†], etc.). Perform this verification using pre and post sanitation results, if available also perform verification against historical data. <p>[†]Use of microbial swabs is recommended for indicator organisms. If testing for pathogens, do it cautiously.</p>	

Appendices

Appendix I: Working Group Proposal Submitted into the Comment Period

Appendix II: Proposal Submitted by the Public

- **(Harvest Forward Coalition, Tanimura & Antle, The Food Marketing Institute, Arizona LGMA Technical subcommittee, Dole Fresh Vegetables)**

Appendix III: Response to Comments

Appendix I: Working Group Proposal Submitted into the Comment Period



C A L I F O R N I A
LGMA

COMMITTED TO SAFE LEAFY GREENS

COMMODITY SPECIFIC FOOD SAFETY GUIDELINES

FOR THE PRODUCTION AND HARVEST OF
LETTUCE AND LEAFY GREENS



SEPTEMBER 20, 2023

This document supersedes all previously published versions of the Commodity Specific Food Safety Guidelines for the Production and Harvest of Leafy Greens including those dated on or before March 30, 2023.

Adopted by the California Leafy Green Products Handler Marketing Agreement Advisory Board
Document managed by Western Growers - learn more at www.leafygreenguidance.com

GLOSSARY

ACCREDITATION	A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems.
ACTIVE COMPOST	Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50° Celsius (122° Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
ADEQUATE / ADEQUATELY	That which is needed to accomplish the intended purpose in keeping with good public health practice.
ADJACENT SURFACES	Surfaces that are near food-contact surfaces but do not directly touch the food. The surfaces can still be a contamination source if human pathogens are transferred to the food or food-contact surfaces through drainage, drips, dirt or debris. Examples: Outer surface of a conveyor belt, tarps above food-contact surfaces
ADJACENT / NEARBY LAND	Land within a proximity that could potentially affect safe production of leafy greens.
AERATED STATIC PILE	Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days.
AERIAL APPLICATION	Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc.
AEROSOLIZED	The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas.
AGRICULTURAL / COMPOST TEA	A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document.

AGRICULTURAL MATERIAL	<i>Agricultural Material</i> means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues.
AGRICULTURAL TAILWATER	Excess run off water which is generated and collected during the process of irrigation.
AGRICULTURAL WATER	Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens).
AGRICULTURAL WATER SYSTEM	Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers.
AGRICULTURAL WATER TREATMENT SYSTEM	An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description.
ANCILLARY EQUIPMENT	Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc.
ANIMAL BY-PRODUCT/PRODUCT	Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements.
ANIMAL FEED OPERATION (AFO)	Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: *animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and *crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Less than 1,000 animal units does not meet the requirements of a CAFO.
ANIMAL HAZARD	Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated.

ANIMAL UNIT	There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis.
ANTIMICROBIAL WATER TREATMENT	A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard.
ADENOSINE TRI-PHOSPHATE (ATP)	A high-energy phosphate molecule required to provide energy for cellular function.
APPLICATION INTERVAL	Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied.
ATP TEST METHODS	Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness.
BIOFERTILIZERS	Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities.
BIOLOGICALS	Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients.
BIORATIONALS	Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts
BIOSOLIDS	<p>Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.</p> <p>Class A: Class A biosolids undergo a “Process to Further Reduce Pathogens (PFRP).” Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.</p> <p>Class B: Class B biosolids undergo a “Process to Significantly Reduce Pathogens (PSRP).” This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required.</p>
BLUE VALVE	Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use.
BREAKPOINT	The point at which the disinfection demand has been met.
BUILDINGS	Any fully or partially enclosed building on the farm that is used for storing off-food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls.

CARBOHYDRATE	Ingredient for soil amendments and crop inputs that could improve growth of bacteria.
CLOSED DELIVERY SYSTEM	A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use.
COLONY FORMING UNITS (CFU)	Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted.
COLIFORMS	Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature.
CO-MANAGEMENT	An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production.
COMPOST/MATURE COMPOST	<i>Compost</i> is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients.
COMPOST FEEDSTOCK	“Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments.
COMPOSTING	Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions.
CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)	A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 'animal units' (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
COVERED PRODUCE	Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens.

CROP INPUT	Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle.
CROSS-CONTAMINATION	The transfer of microorganisms, such as bacteria and viruses, from one place to another.
CURING	The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step.
DETECTION LIMIT	A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target.
DIRECT WATER APPLICATION	Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water.
ENTEROHEMORRHAGIC <i>E. COLI</i> (EHEC)	Shiga toxin-producing <i>E. coli</i> clinically associated with bloody diarrhea.
<i>ESCHERICHIA COLI</i> (<i>E. COLI</i>)	<i>Escherichia coli</i> are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. <i>E. coli</i> are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources.
FECAL COLIFORMS	Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called “thermotolerant coliforms.”
FIELD EQUIPMENT	Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities.
FLOODING	The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field.
FOOD-CONTACT SURFACE	Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. “Food-contact surfaces” includes food-contact surfaces of equipment and tools used during harvest, packing and holding. Examples: Conveyor belts, cutting boards, knives, baskets.
FOOD MATERIAL	<i>Food Material</i> means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and residential food scrap collection. Material that is defined as “food material” is not agricultural material.

FOOD SAFETY ASSESSMENT	A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet.
FOOD SAFETY PERSONNEL	Person trained in basic food safety principals and/or working under the auspices of a food safety professional.
FOOD SAFETY PROFESSIONAL	Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details).
GEOMETRIC MEAN	Mathematical def.: the n^{th} root of the product of n numbers, or: Geometric Mean = n^{th} root of $(X_1)(X_2)...(X_n)$, where X_1 , X_2 , etc. represent the individual data points, and n is the total number of data points used in the calculation. Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number.
GRAZING LANDS	Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock.
GREEN WASTE	Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. ¹
GROUND/SOIL	Ground – solid surface of the Earth. Soil – upper layer of the Earth in which plants grow. [growing media] These two words are considered synonymous throughout and for the purpose of the document.
GROUND WATER	The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water.
HABITAT	The natural home or environment of an animal, plant, or other organism.

HARD TO REACH AREAS	Parts of the harvesting equipment that are difficult to access for cleaning, sanitation, and inspection due to location, design, or obstruction of components. Ensuring that these areas are properly cleaned and sanitized is important to prevent contamination.
HARVESTING	Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing.
HARVEST EQUIPMENT	Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc.
HAZARD	Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control.
HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS	Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA.
HOBBY FARM	A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products.
HOLDING	Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (e.g., activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food.
HYDROPONIC	The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support.
INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST	Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, <i>E. coli</i> , <i>E. coli</i> O157:H7, <i>Listeria</i> , and <i>Salmonella</i> have been eliminated.
INDICATOR MICROORGANISMS	An organism that when present suggests the possibility of contamination or under processing.
IRRIGATION WATER TREATMENT	Any system used to treat agricultural water, so it makes the quality adequate for its intended use
KNOWN OR REASONABLY FORESEEABLE HAZARD	Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with the farm or the food.
LETTUCE AND LEAFY GREENS	Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butter lettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard.

LISTERIA	Any of a genus (<i>Listeria</i>) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (<i>Listeria monocytogenes</i>) that causes listeriosis.
LOT (Pertaining to soil amendments and crop inputs other than compost)	Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture.
MANURE	Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment.
MICROORGANISMS	Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated.
MONITOR	To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement.
MONTHLY	Because irrigation schedules and delivery of water is not always in a grower's control "monthly" for purposes of water sampling means within 35 days of the previous sample.
MORTALITY COMPOST	<i>Mortality Compost</i> is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations.
MOST PROBABLE NUMBER (MPN)	Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers.
MUNICIPAL WATER	Water that is processed and treated by a municipality to meet USEPA drinking water standards.
NON-DETECT	Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis.
NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN	Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines.
OPEN DELIVERY SYSTEM	A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the water source to the point of use.
PACKING	Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (e.g., activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)).
PARTS PER MILLION (PPM)	Usually describes the concentration of something in water or soil; one part of a given substance for every 999,999 other particles.

PATHOGEN	A disease-causing agent such as a virus, parasite, or bacteria.
PEST	Any objectionable animals or insects, including birds, rodents, flies, and larvae.
POOLED WATER	An accumulation of standing water; not free flowing.
POST-CONSUMER WASTE	<i>Post-consumer waste</i> is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food.
POTABLE WATER	Water that is safe to drink or to use for food preparation without risk of health problems.
PRE-CONSUMER WASTE	A food item that was produced for consumption but that was never purchased, consumed or used.
PROCESS AUTHORITY	A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods.
READY-TO-EAT (RTE) FOOD <i>(EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)</i>	<p>(1) "Ready-to-eat food" means FOOD that:</p> <ul style="list-style-type: none"> (a) Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or (d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes. <p>(2) "Ready-to-eat food" includes:</p> <ul style="list-style-type: none"> (b) Raw fruits and vegetables that are washed as specified under § 3-302.15; (c) Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13; (e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed.
RECONDITIONED/RE-PROCESSED	Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used.
RESPONSIBLE PARTY	The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight.
RIPARIAN AREA	A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics

	necessary for them to be also classified as wetlands (USEPA 2005)
RISK MITIGATION	Actions to reduce the severity/impact of a risk.
<i>SALMONELLA</i>	<i>Salmonella</i> is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as <i>Escherichia coli</i> , the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, <i>Salmonella</i> is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication.
SANITARY FACILITY	Includes both toilet and hand-washing stations.
SANITIZE	To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.
SEDIMENT	Undissolved organic and inorganic material transported or deposited by water.
SHIGA-TOXIN PRODUCING <i>E. COLI</i>	Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified and associated with severe illness and hospitalization in the United States is <i>E. coli</i> O157; however, there are over 50 other serogroups that can also cause illness.
SHIPPING UNIT/ EQUIPMENT	Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities.
SOIL AMENDMENT	Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life.
SURFACE WATER	Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.).
SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS (CHEMICAL FERTILIZERS)	Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process (e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.).
TOTAL COLIFORMS	Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system.
TRANSPORTER	The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting.

ULTRAVIOLET INDEX (UV INDEX)	A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15.
VALIDATED PROCESS	A process that has been demonstrated to be effective through a statistically based study, literature, or regulatory guidance.
VALIDATION	The act of determining whether products or services conform to meet specific requirements.
VEGETATIVE MATERIAL	<i>Vegetative material</i> means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream.
VERIFICATION	The act of confirming a product or service meets the requirements for which it was intended.
VESSEL COMPOST PROCESS	Enclosed composting process where ingredients are maintained at a minimum of 131°F Fahrenheit for at least 3 days.
VISITOR	Any person (other than personnel) who enters your field/operations with your permission.
WATER DISTRIBUTION SYSTEM	Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop.
WATER SOURCE	The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams.
WATER TREATMENT	Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use.
WATER USE	The method by which water is being used in the agricultural process.
WELL	An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies

4. PERSONNEL QUALIFICATIONS AND TRAINING

Adequate training of on-farm and handler personnel is a critically important element in a successful food safety program. In order to align with federal requirements under the Food Safety Modernization Act (FSMA) and to ensure that all activities prescribed in this document are effectively and adequately implemented, the following minimum training requirements must be maintained and documented:

The Best Practices Are:

- All personnel (including temporary, part time, seasonal, and contracted personnel) who handle lettuce / leafy greens or who have contact with food-contact surfaces, or who are engaged in the supervision thereof, must:
 - Receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.
 - Have a combination of education, training, and experience necessary to perform the person's assigned duties in a manner that ensures compliance with these best practices.
- Training must be:
 - Conducted in a manner easily understood by personnel being trained.
 - Repeated as necessary and appropriate based on observations or information indicating that personnel are not meeting standards outlined in these best practices.
- Minimum training requirements must include:
 - For all personnel who handle (contact) lettuce/leafy greens or supervise those who do so must receive training that includes the following:
 - Principles of food hygiene and safety.
 - The importance of health and personal hygiene for all personnel and visitors including recognizing symptoms of a health condition that is reasonably likely to result in contamination of lettuce/leafy greens or food-contact surfaces with microorganisms of public health significance.
 - The standards established in these best practices that are applicable to the employee's job responsibilities.
 - For harvest personnel, the training program must also address the following minimum requirements related to harvesting activities:
 - Recognizing lettuce/leafy greens that must not be harvested, including product that may be contaminated with known or reasonably foreseeable hazards.
 - Inspecting harvest containers, harvest equipment, and packaging materials to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of lettuce/leafy greens with known or reasonably foreseeable hazards.
 - Correcting problems with harvest containers, harvest equipment, or packaging materials or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
 - For personnel conducting environmental hazard and risk assessments, training must be completed, and the training program must address the following minimum requirements:

- 42 ▪ When an environmental hazard or risk assessment should be completed.
- 43 ▪ How to conduct an environmental hazard or risk assessment.
- 44 ▪ Potential hazard and risk identification.
- 45 ▪ Recognizing product that may be contaminated with known or reasonably foreseeable
- 46 hazards.
- 47 ▪ Mitigations and corrective actions.
- 48 ▪ When an environmental hazard or risk assessment deems pre-harvest product testing is
- 49 necessary.
- 50 ○ For personnel conducting a sanitation program self-assessment against section 8, training must be
- 51 completed, and the training program must address the following requirements: (This section was
- 52 added to require training to verify sanitation program self-assessment against section 8)
- 53 ▪ How to develop a master cleaning schedule
- 54 ▪ Harvest sanitation preparation and PPE requirements.
- 55 ▪ 7 steps of cleaning and sanitation
- 56 ▪ Cleaning and sanitation verification activities
- 57 ▪ Labeling, storage & use of chemicals
- 58 ▪ Hygienic design of harvesting equipment
- 59 ▪ Corrective actions
- 60 ▪ Documentation and recordkeeping
- 61 ○ For personnel conducting cleaning and sanitation activities training must be completed and training
- 62 must address
- 63 ▪ Harvest sanitation preparation and PPE requirements.
- 64 ▪ 7 steps of cleaning and sanitation
- 65 ▪ Labeling, storage & use of chemicals
- 66 ▪ Instruments used to measure chemical solutions.
- 67 ▪ Visual inspections.
- 68 • At least one supervisor or responsible party (e.g., the food safety professional) for each grower providing
- 69 leafy green products must have successfully completed food safety training at least equivalent to that received
- 70 under standardized curriculum recognized as adequate by the FDA.
- 71 • Establish and keep records of training that document required training of personnel, including the date
- 72 of training, topics covered, and the person(s) trained. Records must be reviewed, dated, and signed, within a
- 73 reasonable time per companies' SOP after the records are made, by a supervisor or responsible party.

8. ISSUE: HARVESTING EQUIPMENT SANITATION AND DESIGN, PACKAGING MATERIALS, AND INFRASTRUCTURE (FIELD SANITATION)

This section addresses harvest and harvest aid equipment and packaging materials used for lettuce/leafy greens as well as any fully or partially enclosed buildings used to store food-contact surfaces and packaging materials.

~~Mechanical or machine harvest has become increasingly prevalent and provides opportunity for increased surface contact exposure. This includes field-cored lettuce operations that use various harvest equipment and aids. (Deleted as working group considered statement not necessary)~~

The Best Practices Are:

8.1 Harvesting Equipment

Harvesting Equipment Hygienic Design

- Design harvest equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed as to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non-food-contact surfaces. (Moved up from line 1064- 1067, AZ Alignment)
- At least annually, conduct a hygienic design review for harvesting equipment. Document areas of concern and develop and maintain a timeline for the completion of corrective actions. Conduct a corrective action review two times a year. (This adds requirements for an annual review of harvesting equipment hygienic design of to the metrics)
 - For food-contact surfaces, evaluate whether (or not):
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.
 - For machine infrastructure, evaluate whether (or not):
 - Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
 - Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
 - Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
 - Unique features on the harvesting equipment could affect its cleanability or allow for bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces “sandwich joints”).

Sanitary Preparation and Operation

- Protect lettuce/leafy greens and harvesting equipment food-contact and adjacent surfaces, ~~production areas, and agricultural water sources and distribution systems~~ from contamination. (Moved up from line 1062, AZ Alignment, removal of production areas, water sources, and distribution systems as do not correspond to issue 8)
- Equipment cleaning and sanitizing operations should take place away from unharvested product and other equipment to reduce the potential for cross-contamination. (Moved up from line 1008, AZ Alignment)

- Clean and sanitize food-contact surfaces **and adjacent surfaces** on harvest equipment **after at end of each** daily **use harvest** or when moving between commodities and fields and when excessive soil has built up. (Moved down from line 1006-1007, AZ Alignment)
- Harvester sanitation personnel must utilize PPE equipment such as gloves, aprons, boots, face shields, respirators (if required) in such a way as to prevent cross-contamination of harvest equipment, tools, etc.
- Harvest sanitation crew must store all cleaning and sanitation chemicals in a secure **and designated** location.
- All water utilized in cleaning and sanitizing of equipment must meet harvest water acceptance criteria [see Table 2G].
- Documentation (logs or records) must be maintained for each harvest equipment (e.g., container, tools, etc.) cleaning and sanitation event.
- Records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made. FDA guidance suggests review within a week, but time can be lessened or increased on occasion. The company's documentation control SOPs must designate the maximum **amount number** of days that will be necessary for the review, dating, and signing of records. (AZ Alignment)
- Establish and implement equipment and tool storage and control procedures to minimize the potential for contamination and to prevent it from attracting and harboring pests when not in use. (Moved up from line 1086-1087, AZ Alignment)
- If re-circulated rinse or antioxidant solutions are used on the cut surface, ensure that water used meets requirements in Table 2G. Take all practicable precautions to prevent rinses and solutions from becoming a source of contamination.
- Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:
 - Accurate and precise as necessary and appropriate for their intended use
 - Adequately maintained, and
 - Adequate in number for their designated uses
- Prepare an SOP for sanitary operation of equipment which addresses the following:
 - Spills and leaks
 - Inoperative water sprays
 - Exclusion of foreign objects (including glass, plastic, metal, **trash**, and other debris)
 - Establish and implement procedures for the storage and control of water tanks and equipment used for hydration when not in use.
 - Maintain logs documenting cleaning and sanitation.
 - Retention of these records for at least two years. (Line 1051 was split, AZ alignment.)

Harvesting Equipment Cleaning and Sanitation SOPs

- Prepare ~~an~~ **SOPs** for harvest equipment, and tools that address the following:
 - ~~○ Cleaning and sanitation of harvesting equipment when moving between commodities and fields. (Removed to address redundant language)~~
 - Following the preparation steps in Table 5, and the 7 steps of cleaning and sanitation in Table 6, develop and implement Sanitation Standard Operating Procedures (SSOPs) to address **frequency of** cleaning and sanitizing of ~~non-food contact surfaces and food contact surfaces~~ harvesting

equipment to reduce and control the potential or microbial cross-contamination. (Section was moved up from lines 1068-1076. In addition, section was modified to address the inclusion of 7 steps of cleaning and sanitation)

- If equipment, tools, and food-contact surfaces have contact with produce that is not covered by the Produce Safety Rule, adequately clean and sanitize before using this equipment to harvest lettuce/leafy greens. (Moved from lines 1075-1076)
- Develop and implement Sanitation Standard Operating Procedures (SSOPs) to address frequency of cleaning and sanitizing of non-food-contact surfaces to reduce and control the potential for microbial cross-contamination (e.g., tractors, trailers and other equipment utilized in harvest). (Added to address equipment that does not have food contact surfaces)
- ~~○ Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, rinse and sanitize food-contact surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.) (Moved to 7 steps table under day of harvest requirements)~~
- For hand-harvest equipment (knives, scythes, etc.).
 - Conduct proper cleaning and sanitation at the end of every day, and if potential contamination occurs.
 - Rinse and sanitize at the beginning of every day.
 - A proper sanitizing solution should be readily available at the harvesting site. Receptacles with a sanitizer solution should be provided to store and sanitize all hand-held harvesting tools that are not in use.
 - Prior to harvest crews exiting for breaks, harvest tools should be placed in a clean receptacle filled with sanitizer solution.
 - Water used should be safe and of adequate sanitary quality for its intended use.
- Consider routine quantitative methods that aid in sanitation verification beyond the seasonal SSOP verification (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).
- Maintenance, cleaning, and sanitation schedules for equipment used in hydration must be maintained.
- Management procedures for when equipment is not in use (i.e., end of season). To include a policy for removal of equipment from the work area (e.g., containers, scabbards, sheathes, or other harvest equipment).

- ~~● Develop and implement a sanitation schedule for machine harvest operations (e.g., transportation tarps, conveyor belts, etc.). (Removed as addressed above)~~
- ~~● Develop and implement appropriate cleaning, sanitizing, storage, and handling procedures of all equipment and food-contact surfaces.~~
- ~~● Convey, store, and dispose of trash, litter, and waste to: (AZ alignment, removed)~~
 - ~~○ Minimize the potential to attract and harbor pests.~~

8.2 Food Packing Materials, Containers and Packaging

- Food packing materials, containers, and packaging must be of adequate food safety design and quality for their intended use, which includes: (AZ alignment, removed packaging redundancy)
 - Cleanable and/or designed for single use to prevent the possible growth or transfer of pathogens.

- Store packing containers and **packaging** materials off the floor or ground and protected to the degree possible to prevent contamination.
- If **containers or** packaging materials are re-used, ensure that food-contact surfaces are clean or lined with a new liner.
- Consider obtaining a letter of guarantee for reusable containers if not cleaned in-house.
- Prepare an SOP for handling and storage of harvest containers that addresses the following: **(Moved from above lines 1035-1044 AZ alignment)**
 - Daily **pre-operational** inspection
 - Proper cleaning and sanitation – routine cleaning and for changes in conditions of materials (i.e., weather events, pest activity, etc.)
 - Overnight storage
 - Contact with the floor ground **or soil, post-harvest plant debris.** **(AZ alignment)**
 - Container assembly (RPC, fiber bin, plastic bin, etc.)
 - Damaged containers
 - Use of containers only as intended.
- ~~Packaging containers shall be adequate for their intended use.~~ **(Removed, AZ alignment)**
- ~~Allow adequate distance for the turning and manipulation of harvest equipment to prevent cross-contamination from areas or adjacent and nearby land that may pose a risk.~~ **(Needs to be moved to Issue 9, AZ alignment)**

8.3 Infrastructure

- Buildings must be suitable in size, construction, and design to facilitate building maintenance and sanitary operations to reduce the potential for contamination of food-contact surfaces with known or reasonably foreseeable hazards. Buildings must:
 - Provide sufficient space for placement of equipment and storage of packaging materials.
 - Reduce the potential for contamination of food-contact surfaces by effective building design including the separations of operations in which contamination is likely to occur. Considerations for location, time, partition, enclosed systems, or other effective means.
 - Provide adequate drainage in all areas where water or other liquid waste is discharged on the ground or floor of the building.
 - Prevent contamination of food-contact surfaces and packaging materials by protecting them from drips or condensate and excluding pests and animals.
 - **Maintain and document pest control prevention steps.**

Table 5 – Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment, sanitation tools, chemicals, and Instruments.

Item	Description
Personnel and Resources	<ul style="list-style-type: none"> Ensure you have the appropriate resources (including personnel) to conduct harvesting equipment sanitation
Personal Protection Equipment (PPE)	<ul style="list-style-type: none"> Ensure all staff have and use appropriate PPE for safety and repeatability of sanitation work
Sanitation Tools	<ul style="list-style-type: none"> Check tools availability and condition Use single-use scrub pads and designated brush colors for food-contact and nonfood-contact surfaces.
Chemicals (Cleaning and Sanitation)	<ul style="list-style-type: none"> Check cleaning and sanitizing chemicals are used according to manufacturer's specifications
Instruments	<ul style="list-style-type: none"> Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be: <ul style="list-style-type: none"> Accurate and precise as necessary and appropriate for their intended use Adequately maintained, and Adequate in number for their designated uses

Table 6– Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and verification.

Harvesting Equipment Sanitation Best Practices	
<ul style="list-style-type: none"> Conduct steps 1 through 7 after daily equipment use. On the day of harvest follow the “day of harvest steps” in this table. Avoid creation of excess mud. Ensure proper lighting for cleaning. Ensure a safe working environment to the crew (equipment access). Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays. <i>moved from step 2</i> 	
Step	Step Details
Sanitation preparation	<ul style="list-style-type: none"> Have harvest crew remove product, harvesting supplies, and waste from equipment and cleaning area. Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product. Stay on walking surfaces. Never walk or step on food-contact surfaces. Document and report abnormal conditions prior to cleaning and follow-up as necessary
Step 1: Dry cleaning	<ul style="list-style-type: none"> Prepare equipment to facilitate accessibility to “hard to reach areas.” Remove gross soils from food-contact surfaces and adjacent surfaces. Wipe excess grease from motors and bearings. Slowly run conveyers to aid in removal of gross soils as necessary.

<p>Step 2:</p> <p>Pre-rinse; remove all visible soils and debris</p>	<ul style="list-style-type: none"> • Rinse and pay attention to “hard to reach” areas. • Remove all visible soils and debris (top to bottom). • Rinse food-contact and adjacent surfaces. • Slowly run conveyers to aid in removal of debris during rinsing as necessary. •
<p>Step 3:</p> <p>Detergent application, removal of remaining soils</p>	<ul style="list-style-type: none"> • Select a detergent that can be applied in field conditions to remove soil and debris • Apply detergent solution to ensure coverage of food-contact and adjacent surfaces. • Do not allow detergent solutions to dry before scrubbing and rinsing.
<p>Step 4:</p> <p>Scrubbing</p>	<ul style="list-style-type: none"> • All areas should be scrubbed with hygienic color-coded brushes for food and non-food contact surfaces. • Scrub pads are designated for food and non-food contacts surfaces and are for single use only.
<p>Step 5:</p> <p>Detergent rinse, removal of detergents and remaining Soils</p>	<ul style="list-style-type: none"> • Rinse equipment top to bottom in the order detergents were applied, to ensure no chemical residues, soils and debris are evident. • Be sure to rinse “hard to reach areas.” • Slowly run conveyers to aid the removal of soap and detergent. • Avoid spraying on the ground to avoid splashing and cross-contamination of clean equipment.
<p>Step 6:</p> <p>Post-cleaning Self-inspection and approval for sanitation</p>	<ul style="list-style-type: none"> • Prior to putting cleaning materials away, the operator or lead must self-inspect equipment to make sure it is visibly clean (e.g. removal of chemical residues, soils, and debris). • If observed during the self-inspection, remove the identified chemical residues, soils, and debris and re-clean as necessary. • Document cleaning date and time, equipment identification and inspection results. <ul style="list-style-type: none"> ○ Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items. ○ Document deficiencies and corrective actions including recleaning and follow-up inspection results. ○ If any items represent a food safety risk, equipment must not be placed back into service until corrected. • Release equipment for sanitizing when visual results and equipment conditions are acceptable.
<p>Step 7:</p> <p>Sanitize</p>	<ul style="list-style-type: none"> • Verify strength of sanitizing solution. • Thoroughly sanitize food-contact and adjacent surfaces • Upon completion, place cleaning equipment and supplies in designated locations. • Reassemble conveyers and other components. • Clean, wrap and store hoses. • Complete remaining sanitation documentation. • Release equipment for harvesting.
<p>Day of Harvest Steps:</p>	<ul style="list-style-type: none"> • Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary,

	re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).
Verification requirements	
<ul style="list-style-type: none"> • Handlers/shippers must perform and document at least once per season a sanitation program self-assessment against section 8.1 to ensure that cleaning and sanitation of the harvesting equipment is performed as described by the company's SSOPs. • At least once per season conduct a harvester specific SSOP verification using a quantitative method. (i.e., ATP, rapid detection of residuals, microbial swabs, etc.). • Personnel conducting the sanitation program self-assessment against section 8.1 must comply with the training requirements identified in Issue 4. 	

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Appendix II: Proposal Submitted by the Public

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Proposal Submitted by The Harvest Forward Coalition

Recommendations for LGMA Harvest Equipment Food Safety Guidelines

Submitted on Behalf of Harvest Forward

Questions or Feedback to joe.stout@cf-san.com

The information is being offered to Western growers as comments towards the LGMA harvest equipment, food safety guidelines update on section 8. Within this document, you will find parts of a total story with recommendations based on five years of focus on harvest, equipment, cleaning and hygienic design. The views are practical and meaningful and will help promote effective and efficient food, safety improvements.

Legend of Comments

Part I – Updated Glossary

Part II – Suggestions for 8-1 update

Part III- Value Added (RTE) vs. Field Pack (RTU)

Part IV - Industry Participation

Part V - Files with background information related to various Harvest subjects

Part I – Glossary

The first Part of recommendation for LGMA Section 8 offers additions and suggestions to help with the understanding of our comments and clarity of LGMA guidance.

Additions to Glossary

LEAFY GREENS DEFINITION <i>FSC 8915 METRIC A-A-20316B September 6, 2023</i>	The term “leafy greens” includes iceberg lettuce, romaine lettuce, leaf lettuce, butter lettuce, baby leaf spinach, (i.e., immature, lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage, kale, arugula, and chard. The term “leafy greens” does not include herbs, such as cilantro or parsley.
LEAFY GREENS READY TO USE DEFINITION <i>FSC 8915 METRIC A-A-20316B September 6, 2023</i>	Product is intended for consumption by the public and to be consumed after additional processing such as but not limited to washing or cooking by the end user. <i>(FSC 8915 METRIC A-A-20316B September 6, 2023 COMMERCIAL ITEM DESCRIPTION LEAFY GREENS, PRE-CUT, READY-TO-EAT OR READY-TO-USE The U.S. Department of Agriculture (USDA) has authorized the use of this Commercial Item Description (CID).</i>
LEAFY GREENS READY TO EAT DEFINITION <i>FSC 8915 METRIC A-A-20316B September 6, 2023</i>	Product is intended for consumption by the public and to be consumed directly from the container without washing or other preparation. <i>(FSC 8915 METRIC A-A-20316B September 6, 2023 COMMERCIAL ITEM DESCRIPTION LEAFY GREENS, PRE-CUT, READY-TO-EAT OR READY-TO-USE The U.S. Department of Agriculture (USDA) has authorized the use of this Commercial Item Description (CID).</i>
RTE VALUE ADDED PRODUCTS	Value Added Leafy Green are products harvested in the field on equipment requiring direct contact with conveyance with exposure to zones 1 & 2 intersect points. Equipment hygienic design (good and poor) has the

	potential for niche areas, which require disassembly and periodic equipment cleaning. The priority for Value Added items is to ensure all zone 1 and zone 2 intersects points are clean. Value added products are destined for processing and require additional handling causing more exposure to cross contamination points. Sanitation is critical from the first product / equipment contact forward. Sanitary conditions must be maintained at start up and during operation.
RTU FIELD PACKED ITEMS	Leafy Green products are products harvested and placed in a closed package & placed directly in a lined bulk case. The industry recognizes* the need for clean surfaces with Field Packed items. The difference with Field Pack equipment is the minimal product / equipment contact which offers exposure to intersect points with non-zone 1 areas. The priority for field packed items is to start and maintain clean food contact surfaces throughout the harvest process. This view does not minimize the importance of sanitation with field packed items however, it does recognize that zone one areas are limited to a small area where product is held and wrapped. Sanitation is critical whenever there is exposed product and therefore contact areas must always be clean and sanitary. <ul style="list-style-type: none"> Reference: <i>Periodic Deep Cleaning Study of Harvesting Equipment</i>, 12/1/2021
MASTER SANITATION SCHEDULE	A Master Sanitation Schedule (MSS) is the document which is the list of cleaning tasks with frequencies. It should include Routine and Periodic Cleaning Tasks and seasonal tasks such as Hygienic Design reviews. It is the backbone of sanitation effectiveness and if not applied properly creates risks to food safety.
PERIODIC EQUIPMENT CLEANING	Periodic Equipment cleaning tasks for areas considered hard to reach, hard to see, touch or sample, and therefore need disassembly to enable cleaning. These areas historically are known to have high micro activity based on industry knowledge. The goal should be to convert PECs to Routine cleaning events through hygienic design modifications. This will reduce down-time to allow for harvest equipment up time.
BEST PRACTICES	LGMA to define
CRITERIA FOR AUDIT INCLUSION	LGMA to define

Part II – Suggestions to - Section 8.1 Harvesting Equipment

Harvesting Equipment Hygienic Design

Suggested insertions are noted in Red.

- Design / **modify** harvest equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed as to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non- food-contact surfaces. (Moved up from line 1064- 1067, AZ Alignment)
- At least annually, conduct a hygienic design review for harvesting equipment. Document areas of concern and develop and maintain a timeline for the completion of corrective actions. Conduct a corrective action review two times a year. (This adds requirements for an annual review of harvesting equipment hygienic design of to the metrics)

- For food-contact surfaces, evaluate whether (or not – **if not modified, repair or clean more frequently to mitigate risk**)
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.
- For machine infrastructure, evaluate whether (or not - **if not modify, repair or clean more frequently to mitigate risk**)
 - Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
 - Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
 - Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
 - Unique features on the harvesting equipment could affect its cleanability or allow for bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces “sandwich joints”).

Part III – Suggestions to Section 8.1 Harvesting Equipment Tables differentiating Value Added (considered RTE) from Field Pack (considered RTU)

Insert Table 5 (and Page 5 A below) on Page 18 line # 126 in front of current Table 5. Advance existing Table 5 as Table 6 and so on with subsequent tables.

Table 5 contains expectations for Value Added Products which are considered as RTE, While 5 A is for RTU Products. The differentiation is Value Added is handled extensively by equipment, product is washed. Extra care is supported by product positives at the retail level and by illnesses. Field Pack contacts a small area and is less exposed to contact surfaces, employees, other equipment and the environment. These are considered best practices for Field Packed product.

Information is also provided for measuring and tracking KPIs electronically vs placing in a 3-ring binder. Tracking and trending data is needed for continuous improvement.

Table 5		
Value Added Products RTE Expectations and Tracking		
Item	KPI measure	Description
Hygienic Design Reviews	% satisfactory and acceptable of list.	Harvest equipment unit hygienic design review and full completed. Recommend at the start of each half year production cycle. (Rating calculation is % Satisfactory and Acceptable of HD List. (HD List is to be maintained with harvest unit or be available electronically)
7-Step effectiveness	% acceptable of list	Complete and document the 7 Step cleaning process using HFC Sani Check list. (% expected / acceptable) for each cleaning event. Maintained in MSS with Harvester or electronically.

Sanitation Chemical controls	% in compliance with targets	Cleaning chemicals / concentrations and usage are documented for each cleaning event. See HFC sanitation chemical Check List. Maintained in MSS with Harvester or electronically.
Pre-op inspections	% compliance for visual inspections & tests	Pre-op inspections, verification data (ATP / APC / visual inspection) of zone 1 surfaces. Target is based on industry / company expectations. Visual inspections are to occur and pass prior to ATP and APC swabbing. Maintained in MSS with Harvester or electronically
Periodic Equipment Cleaning	% completed vs scheduled	Periodic equipment cleaning tasks (PECs) are scheduled and completed. (less than 90% of PECs complete = incomplete) Maintained in MSS with Harvest Unit or available electronically.
Continuous Improvement	Multiple KPIs	KPI measures tracked and trended and used as a roadmap for continuous improvement.

Table 5A

Field Packed **RTU** Products Best Practices

Item	KPI measure	Description	
Hygienic Design Reviews	% satisfactory and acceptable of list.	Harvest equipment unit hygienic design review and full completed. Recommend at the start of each half year production cycle. (Rating calculation is % Satisfactory and Acceptable of HD List. (HD List is to be maintained with harvest unit or be available electronically)	
7-Step effectiveness	% acceptable of list	Complete and document the 7 Step cleaning process using HFC Sani Check list. (% expected / acceptable) for each cleaning event. Maintained in MSS with Harvester or electronically.	
Sanitation Chemical controls	% in compliance with targets	Cleaning chemicals / concentrations and usage are documented for each cleaning event. See HFC sanitation chemical Check List. Maintained in MSS with Harvester or electronically.	
Pre-op inspections	% compliance for visual inspections & tests	Pre-op inspections, verification data (ATP / APC / visual inspection) of zone 1 surfaces. Target is based on industry / company expectations. Visual inspections are to occur and pass prior to ATP and APC swabbing. Maintained in MSS with Harvester or electronically	
Periodic Equipment Cleaning	% completed vs scheduled	Periodic equipment cleaning tasks (PECs) are scheduled and completed. (less than 90% of PECs complete = incomplete). Maintained in MSS with Harvest Unit or available electronically.	

Part IV - Industry Participation

Harvest Sanitation and Hygienic Design initiatives support

This has been a five-year journey of continuous improvement by the industry, based on science, practical hands-on approaches, taking baby steps leading to continuous improvement. Participation included members from Harvesting companies, Trade groups, Processors, Suppliers, Growers, Customers, Industry Experts, and others. Participation ranged from CEOs to Harvest teams and sanitation crews. Below is a list of persons who have been engaged in meetings and supported the initiative. There are many others - I apologize if I missed other industries and persons as there were many - this was and is an industry initiative with many contributors. Many of these individuals below have been engaged with activities since inception of the Team in August 2019.

Initial Harvest Equipment team attendees on August 16th, 2019

Ashley Avilla	Cosme Pina Taylor Farms	Leticia Reyes Fresh Express
Babiana Urbina Bonduelle	DeAnn Davis Church Brothers	Megan Chadwick Church Bros
Jesus Oseguera Taylor Farms	Marcus Shebl Taylor Farms	German Rios Fresh Express

Xavier Barda Bonduelle
Joe Stout CFS (facilitator)

Paul Winter Dole
Rick Katz CFS

Trevor Suslow PMA
Emily Church Brothers

Harvest Forward Steering Team leadership members-initiated February 2022.

John P Olivo Fresh express
Marcus Shebl Taylor Farms
Bob Erickson Foothills Packing
Tony Banegas Bonduelle
Joe Stout CFS (facilitator)

Carter McEntire (McEntire
Ronald Midyett (Dole),
Colby Pereira Braga Fresh
Glen Almeda Ocean Mist

Bull Hsu Taco Bell
Becky Unwer Walmart
German Rios Fresh Express
Felice Arboisiere Dole

Teams meeting participants on 6/20/24 for review and discussion of directional approach and basis for these comments for proposed changes to LGMA Section 8. There was good discussion and support for the approach as detailed in this document.

Joe Stout CFS (facilitator)
Jacob Odello Foxy Produce
Leticia Reyes Fresh express
Kristina Nunes Foxy produce
Alexandra Belias McEntire Produce
Tom Lovelace McEntire Produce
Matt (Unverified)
Valentin Sierra Amigo Produce
Miguel Martinez Ag-Pro Sanitation
Lupe Cameveue Nature Fresh Farm

Juan C Vargas Rava Ranch
Casey Anderson Robinson fresh
German L. Rios Fresh Express
Tony Banegas Bonduelle
Kate Burr Ocean mist
Jesus Canchola Fresh Express
Fabia Alencar Subway
Megan Chedwick Church Brothers
Megan Arnold. Robinson Fresh
Becky Unwer. Walmart

Carmen Ponce Chipotle
John P Olivo Fresh express
Ly Mai Fresh express
Stephen Basore DKM Farms
+18052498334
Art Velazquez Bonduelle
Felice Arboisiere. Dole Foods
Handelman, Betsy. Produce Alliance
Brad Klemme CFS

Industry participation and support to develop, learn, facilitate, share data. Many of these individuals have been engaged with activities since inception of the Team in August 2019.

Abraham Cardenas Taylor Farms
Adrian Matthews CFA Corp
AJU In-out-burger
Alex Recursos solutions
Alexandra Belias McEntire Produce
Andrew EnglesD. arrigo
Armado Figueroa Braga Fresh
Art Velazquez. Bonduelle
Audra Lakeside Farms
Barb Braden I Love Organic Girl
Beatriz Estrada
Becky Unwer. Walmart
Bibiana Urbina'. Chipotle
Bibiana Urbina' Chipotle
Bill Hsu Taco Bell
Bob Ericson Foothill Packing
Brett Chaplin Tap Produce

J Canchola. Fresh Express
J. Cambell. Veg Fresh
Jacob Aguirre. Fresh Express
Jaime Taylor Farms
Jake Odello. Foxy Produce
Jamie OrtizQ. V Produce
Jessica Jones. CFA Corp
Jesus Canchola. Fresh Express
J Amaral Foxy Produce
Jesus Oseguera Taylor Farms
Jim BrennanT. aylor Farms
Jim Brennan. Smartwash solutions
Joaquin Valdez. Foxy Produce
John P Olivo Fresh express
Joe Stout CFS (facilitator)
Joshua Funk. KFC
Juan Carlos Vargas. Foothill Pack

Shane Samples Sysco
Sharan Pim 4U
Sam IEH
Sanchez Taylor Farms
Stacy Kinzing Sprouts
Stephen Basore. DKM Farms
Suresh Decosta Lipman
T Granzier Lakeside Produce
Terry Martin TXM Food Safety
Thea Eubanks I Love Organic Girl
Tim York LGMA
Tom Lovelace McEntire Produce
Tony Foothill Packing
Tony Banegas Bonduelle
Trevor Suslow. UC Davis
V Mehta Chipotle
V Sierra Amigo Farms

C Nunes Harvest Management	Juan Zendejas Foothill Packing	Valentin Sierra. Amigo Produce
C Shuck Ocean Mist	Justin Kerr Factor Four	Viridiana Melgoza Bonduelle
Caitlin Eden Green	K Malloy Lakeside Produce	Wayne Bailey McEntire Produce
Carlos Costa Farms	K nunes Foxy Produce	A Huguez Mission Ranches
Carmen Ponce Chipotle	Karleigh Bacon. McDonalds	Amy Parks Dole
Carter McEntire McEntire Produce	Kartika Charan Sysco	Brett Champion Taproduce
Casey Anderson Robinson Fresh	Kate Burr. Ocean Mist	David SFCOS
Chad Amaral Darrigo	Kate Marcom	Emanuel Suncoast Farms
Chris Polito Inspire Brands	Kristina Nunes. Foxy produce	E. Morales Jvsmithcompanies'
Colby Pereira Braga Fresh	krodriguez@sfcos.com	Frank Ramsey Highlander
Daniele Garcia Dole	Larry Kohl FMI	Mark Shakespere Walmart
Dave Zada FRESH	Leticia Empire	Robert Perez. Taylor Fsrmsd
David Isaac Garland Chemical	Leticia Reyes Fresh Express	Vicki Scott Arizona LGMA
David Offerdah ISpudnik	Lidia Duda Farms	Karen Rodriguez. Fresh Harvest
Deidra Liddel Hbit Burger	Lupe Cameveue Nature Fresh Farm	Jose Garcia Hitchcock Farms
Dennis Escobar QV Produce	Ly Mai Fresh express	Jorge Verdugo Lamco Harvest
Drew McDonald Taylor Farms	M Gordon Costco	Nancy Hericra Hacienda Farms
E Moralesjvsmith hcompanies	M. Machovina Cabbage inc	Steve Basore TKM Bengsrd Farms
Elizabeth Paramo Auto Harvesting	M. Memes True Organic	Jake Drahuschak Agro Mgr
Emanuel Sun Coast Farms	Marcus Shebl. Taylor Farms	Delores Aceves Factor Four
Erendria RC Farms llc	Marj Davis Intralox	Milt Voss Zada FRESH
Erik The Growers Company	Mark Anquiano. The Growers Co	Ed Morales Jvsmithcompanies
F Valdez Sabor Farms	Martin Ayala Vis Veg	Angie Ramirez Triangle Farms
Fabia Alencar Subway	Megan Arnold Robinson Fresh	Rick Katz CFS
Felice Arboisiere Dole	Miguel Martinez Agro Sanitation	Betsy Handelman, Produce All
Fernando Perez The Growers Co	Mike Sexton McEntire Produce	
Francisco Noia Wendys	Mike Taylor Former FDA	
Frank Yiannis Former FDA	Octavio	
G Cruz Monterrey Mushrooms	Paula Fisher Ag	
Garrett Turner Foothill Packing	Rafael Valesquez Darrigo	
German Rios Fresh Express	Rick Demesa Panda	
Giavani Valdez Amigo Farms	Rick Maytorena. Direct Roots	
Gillian Kelleher LGSC	Robert Lopez. Taylor Farms	
Glen Almeda Ocean Mist	Robin Forgery Costco	
Greg Kolmar LGMA	Ronald Midyett. Dole	
Hector Pedraza Robinson Fresh	Rudi Groppe. HMI	
Isaac Torres Fresh Express	S Basore TKM Farms	

Signed as Honorary Supporters for Harvest Forward initiatives in 2024 to encourage supplier participation.

Frank <u>Yiannas</u> – Former FDA Deputy Commissioner of Food Policy & Response		Frank Yiannas 04/18/2024
Michael Taylor – Former FDA – FSMA enactment, Leader CFSAN and CVM.		Michael Taylor 05/28/2024
Fabia <u>Alencar</u> - Subway		Fabia Alencar 05/31/2024

Gillian Kelleher - LGSC Lead Kelleher Consultants		Gillian Kelleher 03/13/2024
Robin <u>Forgey</u> – Costco		Robin Forgey 03/13/2024
Becky <u>Unwer</u> - Walmart		Becky Unwer - Walmart
Bill Hsu – Yum Brands		Bill Hsu
Shane Samples – Sysco		Shane Samples 03/13/2024
Kartika Charan - Sysco		Kartika Charan 03/13/2024
Chris <u>Polito</u> – Inspire Brands		Chris Polito 03/14/2024
Megan Arnold – Robinson Fresh		Megan Arnold 03/15/2024
<u>Karleigh</u> Bacon – McDonalds USA		Karleigh Bacon 04/04/2024

Rudi Groppe - Heinen Manufacturing International		Rudi Groppe 05/08/2024
David Isaac – Garland Chemical Solutions		David Isaac 05/14/2024
Davis Offerdahl – Spudnik Equipment Co		 05/14/2024

Part V

Files with background information related to various Harvest subjects.

Submitted Files

1. **Harvest Forward Expectations & KPIs Excel file** – lists the harvest Forward Expectations developed by Harvest Forward team use in field harvest programs and KPIs – 7 separate work sheets
 - #1 Sample KPI for collection and reporting of continuous improvement data each month summarized quarterly.
 - #2 Harvest Forward Expectations (also appear in the LGMA comment section)
 - #3 Hygienic Design Checklist developed specifically for use with harvest equipment. Harvest Forward held three in person meeting (70 persons per meeting) they completed design reviews on multiple harvest units.
 - #4 7 Step sanitation process sample inspection check list.
 - #5 Sample recording check list for recording chemical concentrations for tracking with KOIs.
 - #6 Periodic Equipment Cleaning sample schedule and checklist for quarterly monitoring.
2. **Periodic Deep Cleaning Study** of Harvesting Equipment (White Paper) PDF file (2021)
 - Coordinated by Harvester Sanitation & Design Working Group, later called Harvest Forward Coalition
 - Original date of issue December 1, 2021 (updated May 20, 2024)
 - Update From Harvest Forward Coalition includes.
 - Cleaning and Hygienic Design Expectations with KPIs (page2) for tracking improvement
 - Hygienic Design review checklist (page16) specifically for Harvest Equipment
3. **Harvest Forward Charter** – includes mission & scope, HFC owners & Board members, lists the 7-step cleaning process.
4. **USDA Authorized** commercial item description for Leafy Greens, pre-cut, Ready-to-Eat or Ready to Use Metris A-A20316B September 6, 2023.

Proposal Submitted by Tanimura and Antle

Tanimura & Antle a LGMA member has following concerns and comments related to proposed “Harvest equipment sanitation and design, Packaging Materials and infrastructure (field sanitation):

Concerns:

1. This proposal is based on very specific type of harvest equipment (used to harvest raw materials used in salad processing) and does not apply on majority of harvest equipment used by LGMA membership. Majority of harvest equipment used for leafy green commodity harvesting are just moving platforms (in general, termed as harvest machines) and vastly different than clean and core, trim or tail or mechanical harvest machines, that were used to develop this document proposal.
2. Proposal also includes packaging materials and infrastructures that are not even part of harvest equipment and were not part of original LGMA mandate discussed for the working group.
3. Considering significant variations, practices and requirements for different leafy green crops, it is not practical to suggest specific design for harvest equipment.
4. Considering significant variations in equipment design and their use, this proposal should be a guidance document rather than a prescriptive requirement.
5. This proposal is not based on risk assessment related to harvest equipment so that effective and appropriate cleaning and sanitation SOPs are developed for target harvest equipment by LGMA members.
6. Overall, the proposal is confusing and not implementable for majority of harvest equipment used by LGMA members.

Comments/ suggestions:

In order to make this proposal workable, one of the following two options need to be adopted:

Option 1: Clearly specify intent of the proposal and make following changes in the title and make this proposal an **addendum** to original harvest sanitation document:

“Harvest equipment Sanitation and Design, Packaging materials and infrastructure for Clean/ core, trim/ tail and mechanical harvesting operations in the field”.

Option 2: In order to include commodity produce along with clean/core, field trim and mechanical harvesting in this proposal, make following changes in the proposal:

1. Page 15, Line 74-76: In proposal title, **remove** Packaging and infrastructure related language and the title should be **"Harvest Equipment Cleaning and Sanitation."**
2. Page 15, Line 81. **Place following risk assessment guidance Table** between line 81 and 82 so that realistic harvest equipment cleaning and sanitation plans for various types of equipment are developed.

Table 1: Harvest equipment risk assessment guidance

Equipment category	Products/ process	Food contact surfaces	Possible contamination to products	Risk level	Suggested frequency for sanitation
Category 1	Equipment used for Clean and core lettuce, top and tail romaine and mechanical harvesting of leafy greens	Belts with/ without cleats, mechanical blades, coring rings, knives, cutting boards	Due to lettuce juice (latex*), soil, outer leaves commingling and contamination to open wounds of product. Latex can spill on hard to reach areas.	High*	Constant sanitation by spraying high volume and high conc. sanitation solution to remove latex and soil on all contact surfaces, harvest knives and coring rings to be sanitized during every break. Detailed cleaning and sanitation of adjacent areas and food contact and adjacent surfaces at the end of harvest shift.
Category 2	Equipment used for whole head commodities.	Stationary food contact surfaces used for packing, harvest knives	There is only one cut at butt or non-edible area per plant and there is minimum product contact with surfaces.	Low	Frequent cleaning of food contact surfaces and sanitation of food contact surfaces at the end of the shift. Hand knives to be sanitized during every break.
Category 3	Harvest equipment does not come in direct contact of produce	No food contact surfaces, tractors, trailers, forklifts, water tanks	No direct product contact or only if products are placed directly on the trailer surfaces	Very low	Frequent inspection of areas that may be adjacent to crop or product. If there is plant or soil debris, it should be cleaned as needed basis.

*Per Dr. Mike Doyle and Dr. Brandle research, Latex helps in faster multiplication of pathogens during harvest process (references attached).

3. Page 15, line 87-105. This section is related to equipment category 1 only. To clarify that this section is related to Equipment category 1, the paragraph should start with the following text:

“For harvest equipment category 1, at least annually

4. Page 16 line 50-55: reading as “Following the preparation steps in Table 5 and the 7 steps of cleaningcross contamination” This section must be removed from this document and placed in reference document section because it is too prescriptive and does not apply on majority of harvest equipment. This section should be replaced as following:

“Develop cleaning and sanitation Sops according to Harvest equipment risk assessment guidance table 1 above”.

5. Page 17, line 59-62: This section should be removed and replaced with the following:

“Develop cleaning and sanitation SOPs according to Harvest equipment risk assessment guidance Table 1” above.

6. Section 8.2, page 17, Line 90-112: Package materials: This section must be removed from this document as this does not belong to Harvest equipment cleaning and sanitation document.
7. Section 8.3, page 18, 113-125 – Infrastructure: This section must be removed from this document as this section does not belong to this document.
8. Page 18-21, lines 126- , Table 5 and 6 should be removed from this section and placed in reference section as guidance document. These tables are prescriptive and mostly apply on Harvest equipment category 1 only.
9. Considering significant variability in leafy green crops harvest practices, type of harvest equipment used and risk levels, this document should be a guidance document rather than prescriptive to avoid confusion and contradiction at audit level.

Dr. Gurmail Mudahar
VP R&D and Food Safety
Tanimura & Antle

Proposal Submitted by the Food Marketing Institute



COMMODITY SPECIFIC FOOD SAFETY GUIDELINES

FOR THE PRODUCTION AND HARVEST OF
LETTUCE AND LEAFY GREENS



SEPTEMBER 20, 2023

This document supersedes all previously published versions of the Commodity Specific Food Safety Guidelines for the Production and Harvest of Leafy Greens including those dated on or before March 30, 2023.

Adopted by the California Leafy Green Products Handler Marketing Agreement Advisory Board
Document managed by Western Growers - learn more at www.leafygreenguidance.com

GLOSSARY

ACCREDITATION	A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems.
ACTIVE COMPOST	Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50° Celsius (122° Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
ADEQUATE / ADEQUATELY	That which is needed to accomplish the intended purpose in keeping with good public health practice.
ADJACENT SURFACES	Surfaces that are near food-contact surfaces but do not directly touch the food. The surfaces can still be a contamination source if human pathogens are transferred to the food or food-contact surfaces through drainage, drips, dirt or debris. Examples: Outer surface of a conveyor belt, tarps above food-contact surfaces
ADJACENT / NEARBY LAND	Land within a proximity that could potentially affect safe production of leafy greens.
AERATED STATIC PILE	Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days.
AERIAL APPLICATION	Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc.
AEROSOLIZED	The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas.
AGRICULTURAL / COMPOST TEA	A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document.

AGRICULTURAL MATERIAL	<i>Agricultural Material</i> means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues.
AGRICULTURAL TAILWATER	Excess run off water which is generated and collected during the process of irrigation.
AGRICULTURAL WATER	Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens).
AGRICULTURAL WATER SYSTEM	Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers.
AGRICULTURAL WATER TREATMENT SYSTEM	An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description.
ANCILLARY EQUIPMENT	Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc.
ANIMAL BY-PRODUCT/PRODUCT	Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements.
ANIMAL FEED OPERATION (AFO)	Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: *animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and *crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Less than 1,000 animal units does not meet the requirements of a CAFO.
ANIMAL HAZARD	Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated.

ANIMAL UNIT	There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis.
ANTIMICROBIAL WATER TREATMENT	A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard.
ADENOSINE TRI-PHOSPHATE (ATP)	A high-energy phosphate molecule required to provide energy for cellular function.
APPLICATION INTERVAL	Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied.
ATP TEST METHODS	Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness.
BIOFERTILIZERS	Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities.
BIOLOGICALS	Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients.
BIORATIONALS	Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts
BIOSOLIDS	<p>Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.</p> <p>Class A: Class A biosolids undergo a "Process to Further Reduce Pathogens (PFRP)." Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.</p> <p>Class B: Class B biosolids undergo a "Process to Significantly Reduce Pathogens (PSRP)." This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required.</p>
BLUE VALVE	Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use.
BREAKPOINT	The point at which the disinfection demand has been met.
BUILDINGS	Any fully or partially enclosed building on the farm that is used for storing of food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls.

CARBOHYDRATE	Ingredient for soil amendments and crop inputs that could improve growth of bacteria.
CLOSED DELIVERY SYSTEM	A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use.
COLONY FORMING UNITS (CFU)	Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted.
COLIFORMS	Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature.
CO-MANAGEMENT	An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production.
COMPOST/MATURE COMPOST	<i>Compost</i> is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients.
COMPOST FEEDSTOCK	“Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments.
COMPOSTING	Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions.
CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)	A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 ‘animal units’ (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
COVERED PRODUCE	Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens.

CROP INPUT	Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle.
CROSS-CONTAMINATION	The transfer of microorganisms, such as bacteria and viruses, from one place to another.
CURING	The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step.
DETECTION LIMIT	A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target.
DIRECT WATER APPLICATION	Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water.
ENTEROHEMORRHAGIC <i>E. COLI</i> (EHEC)	Shiga toxin-producing <i>E. coli</i> clinically associated with bloody diarrhea.
<i>ESCHERICHIA COLI</i> (<i>E. COLI</i>)	<i>Escherichia coli</i> are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. <i>E. coli</i> are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources.
FECAL COLIFORMS	Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called “thermotolerant coliforms.”
FIELD EQUIPMENT	Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities.
FLOODING	The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field.
FOOD-CONTACT SURFACE	Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. “Food-contact surfaces” includes food-contact surfaces of equipment and tools used during harvest, packing and holding. Examples: Conveyor belts, cutting boards, knives, baskets.
FOOD MATERIAL	<i>Food Material</i> means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and residential food scrap collection. Material that is defined as “food material” is not agricultural material.

FOOD SAFETY ASSESSMENT	A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet.
FOOD SAFETY PERSONNEL	Person trained in basic food safety principals and/or working under the auspices of a food safety professional.
FOOD SAFETY PROFESSIONAL	Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details).
GEOMETRIC MEAN	Mathematical def.: the n^{th} root of the product of n numbers, or: $\text{Geometric Mean} = \sqrt[n]{(X_1)(X_2)\dots(X_n)}$ where X_1, X_2 , etc. represent the individual data points, and n is the total number of data points used in the calculation. Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number.
GRAZING LANDS	Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock.
GREEN WASTE	Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. ¹
GROUND/SOIL	Ground – solid surface of the Earth. Soil – upper layer of the Earth in which plants grow. [growing media] These two words are considered synonymous throughout and for the purpose of the document.
GROUND WATER	The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water.
HABITAT	The natural home or environment of an animal, plant, or other organism.

HARD TO REACH AREAS	Parts of the harvesting equipment that are difficult to access for cleaning, sanitation, and inspection due to location, design, or obstruction of components. Ensuring that these areas are properly cleaned and sanitized is important to prevent contamination.
HARVESTING	Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing.
HARVEST EQUIPMENT	Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc.
HAZARD	Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control.
HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS	Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA.
HOBBY FARM	A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products.
HOLDING	Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (e.g., activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food.
HYDROPONIC	The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support.
INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST	Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, <i>E. coli</i> , <i>E. coli</i> O157:H7, <i>Listeria</i> , and <i>Salmonella</i> have been eliminated.
INDICATOR MICROORGANISMS	An organism that when present suggests the possibility of contamination or under processing.
IRRIGATION WATER TREATMENT	Any system used to treat agricultural water, so it makes the quality adequate for its intended use
KNOWN OR REASONABLY FORESEEABLE HAZARD	Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with the farm or the food.
LETTUCE AND LEAFY GREENS	Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butter lettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard.

LISTERIA	Any of a genus (<i>Listeria</i>) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (<i>Listeria monocytogenes</i>) that causes listeriosis.
LOT (Pertaining to soil amendments and crop inputs other than compost)	Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture.
MANURE	Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment.
MICROORGANISMS	Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated.
MONITOR	To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement.
MONTHLY	Because irrigation schedules and delivery of water is not always in a grower's control "monthly" for purposes of water sampling means within 35 days of the previous sample.
MORTALITY COMPOST	<i>Mortality Compost</i> is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations.
MOST PROBABLE NUMBER (MPN)	Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers.
MUNICIPAL WATER	Water that is processed and treated by a municipality to meet USEPA drinking water standards.
NON-DETECT	Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis.
NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN	Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines.
OPEN DELIVERY SYSTEM	A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the water source to the point of use.
PACKING	Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (e.g., activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)).
PARTS PER MILLION (PPM)	Usually describes the concentration of something in water or soil; one part of a given substance for every 999,999 other particles.

PATHOGEN	A disease-causing agent such as a virus, parasite, or bacteria.
PEST	Any objectionable animals or insects, including birds, rodents, flies, and larvae.
POOLED WATER	An accumulation of standing water; not free flowing.
POST-CONSUMER WASTE	<i>Post-consumer waste</i> is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food.
POTABLE WATER	Water that is safe to drink or to use for food preparation without risk of health problems.
PRE-CONSUMER WASTE	A food item that was produced for consumption but that was never purchased, consumed or used.
PROCESS AUTHORITY	A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods.
READY-TO-EAT (RTE) FOOD (EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)	<p>(1) "Ready-to-eat food" means FOOD that:</p> <p>(a) Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or</p> <p>(d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes.</p> <p>(2) "Ready-to-eat food" includes:</p> <p>(b) Raw fruits and vegetables that are washed as specified under § 3-302.15;</p> <p>(c) Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13;</p> <p>(e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed.</p>
RECONDITIONED/RE-PROCESSED	Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used.
RESPONSIBLE PARTY	The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight.
RIPARIAN AREA	A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics

Commented [A1]: FMI recommends the addition of a definition for Periodic Equipment Cleaning (PECs).

	necessary for them to be also classified as wetlands (USEPA 2005)
RISK MITIGATION	Actions to reduce the severity/impact of a risk.
SALMONELLA	<i>Salmonella</i> is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as <i>Escherichia coli</i> , the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, Salmonella is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication.
SANITARY FACILITY	Includes both toilet and hand-washing stations.
SANITIZE	To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.
SEDIMENT	Undissolved organic and inorganic material transported or deposited by water.
SHIGA-TOXIN PRODUCING E. COLI	Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified and associated with severe illness and hospitalization in the United States is <i>E. coli</i> O157; however, there are over 50 other serogroups that can also cause illness.
SHIPPING UNIT/ EQUIPMENT	Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities.
SOIL AMENDMENT	Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life.
SURFACE WATER	Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.).
SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS (CHEMICAL FERTILIZERS)	Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process (e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.).
TOTAL COLIFORMS	Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system.
TRANSPORTER	The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting.

Commented [A2]: FMI recommends adding a definition for Routine Equipment Cleaning (RECs).

ULTRAVIOLET INDEX (UV INDEX)	A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15.
VALIDATED PROCESS	A process that has been demonstrated to be effective through a statistically based study, literature, or regulatory guidance.
VALIDATION	The act of determining whether products or services conform to meet specific requirements.
VEGETATIVE MATERIAL	<i>Vegetative material</i> means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream.
VERIFICATION	The act of confirming a product or service meets the requirements for which it was intended.
VESSEL COMPOST PROCESS	Enclosed composting process where ingredients are maintained at a minimum of 131°F Fahrenheit for at least 3 days.
VISITOR	Any person (other than personnel) who enters your field/operations with your permission.
WATER DISTRIBUTION SYSTEM	Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop.
WATER SOURCE	The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams.
WATER TREATMENT	Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use.
WATER USE	The method by which water is being used in the agricultural process.
WELL	An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies

4. PERSONNEL QUALIFICATIONS AND TRAINING

Adequate training of on-farm and handler personnel is a critically important element in a successful food safety program. In order to align with federal requirements under the Food Safety Modernization Act (FSMA) and to ensure that all activities prescribed in this document are effectively and adequately implemented, the following minimum training requirements must be maintained and documented:

The Best Practices Are:

- All personnel (including temporary, part time, seasonal, and contracted personnel) who handle lettuce / leafy greens or who have contact with food-contact surfaces, or who are engaged in the supervision thereof, must:
 - Receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.
 - Have a combination of education, training, and experience necessary to perform the person's assigned duties in a manner that ensures compliance with these best practices.
- Training must be:
 - Conducted in a manner easily understood by personnel being trained.
 - Repeated as necessary and appropriate based on observations or information indicating that personnel are not meeting standards outlined in these best practices.
- Minimum training requirements must include:
 - For all personnel who handle (contact) lettuce/leafy greens or supervise those who do so must receive training that includes the following:
 - Principles of food hygiene and safety.
 - The importance of health and personal hygiene for all personnel and visitors including recognizing symptoms of a health condition that is reasonably likely to result in contamination of lettuce/leafy greens or food-contact surfaces with microorganisms of public health significance.
 - The standards established in these best practices that are applicable to the employee's job responsibilities.
 - For harvest personnel, the training program must also address the following minimum requirements related to harvesting activities:
 - Recognizing lettuce/leafy greens that must not be harvested, including product that may be contaminated with known or reasonably foreseeable hazards.
 - Inspecting harvest containers, harvest equipment, and packaging materials to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of lettuce/leafy greens with known or reasonably foreseeable hazards.
 - Correcting problems with harvest containers, harvest equipment, or packaging materials or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
 - For personnel conducting environmental hazard and risk assessments, training must be completed, and the training program must address the following minimum requirements:

- When an environmental hazard or risk assessment should be completed.
 - How to conduct an environmental hazard or risk assessment.
 - Potential hazard and risk identification.
 - Recognizing product that may be contaminated with known or reasonably foreseeable hazards.
 - Mitigations and corrective actions.
 - When an environmental hazard or risk assessment deems pre-harvest product testing is necessary.
- For personnel conducting a sanitation program self-assessment against section 8, training must be completed, and the training program must address the following requirements: (This section was added to require training to verify sanitation program self-assessment against section 8)
 - How to develop a master cleaning schedule
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation
 - Cleaning and sanitation verification activities
 - Labeling, storage & use of chemicals
 - Hygienic design of harvesting equipment
 - Corrective actions
 - Documentation and recordkeeping
- For personnel conducting cleaning and sanitation activities training must be completed and training must address
 - Harvest sanitation preparation and PPE requirements.
 - 7 steps of cleaning and sanitation
 - Labeling, storage & use of chemicals
 - Instruments used to measure chemical solutions.
 - Visual inspections.
- At least one supervisor or responsible party (e.g., the food safety professional) for each grower providing leafy green products must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the FDA.
- Establish and keep records of training that document required training of personnel, including the date of training, topics covered, and the person(s) trained. Records must be reviewed, dated, and signed, within a reasonable time per companies' SOP after the records are made, by a supervisor or responsible party.

8. ISSUE: HARVESTING EQUIPMENT SANITATION AND DESIGN, PACKAGING MATERIALS, AND INFRASTRUCTURE (FIELD SANITATION)

This section addresses harvest and harvest aid equipment and packaging materials used for lettuce/leafy greens as well as any fully or partially enclosed buildings used to store food-contact surfaces and packaging materials.

~~Mechanical or machine harvest has become increasingly prevalent and provides opportunity for increased surface contact exposure. This includes field-cored lettuce operations that use various harvest equipment and aids. (Deleted as working group considered statement not necessary)~~

The Best Practices Are:

8.1 Harvesting Equipment

Harvesting Equipment Hygienic Design

- Design harvest equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed as to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non-food-contact surfaces. (Moved up from line 1064- 1067, AZ Alignment)
- At least annually, conduct a hygienic design review for harvesting equipment. Document areas of concern and develop and maintain a timeline for the completion of corrective actions. Conduct a corrective action review two times a year. (This adds requirements for an annual review of harvesting equipment hygienic design of to the metrics)
 - For food-contact surfaces, evaluate whether (or not):
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.
 - For machine infrastructure, evaluate whether (or not):
 - Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
 - Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
 - Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
 - Unique features on the harvesting equipment could affect its cleanability or allow for bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces “sandwich joints”).

Sanitary Preparation and Operation

- Protect lettuce/leafy greens and harvesting equipment food-contact and adjacent surfaces, ~~production areas, and agricultural water sources and distribution systems~~ from contamination. (Moved up from line 1062, AZ Alignment, removal of production areas, water sources, and distribution systems as do not correspond to issue 8)
- Equipment cleaning and sanitizing operations should take place away from unharvested product and other equipment to reduce the potential for cross-contamination. (Moved up from line 1008, AZ Alignment)

Commented [A3]: FMI recommends a clearly defined frequency and/or additional verbiage surrounding factors to consider when establishing frequency. See: <https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/>. The use of the word 'or' in line 114 leaves much room for interpretation and could allow for extended periods of time between cleaning.

Commented [A4]: FMI recommends a requirement for documented pre-harvest inspections. See Appendix F: <https://www.wga.com/wp-content/uploads/d7files/Harvester%20Study.pdf>

Commented [A5]: There is nothing in this section related to Periodic Equipment Cleaning (PECs), which has been a topic of extensive conversation in industry. The 2021 Harvester Study <https://www.wga.com/wp-content/uploads/d7files/Harvester%20Study.pdf> highlights the value of including PECs in the holistic cleaning and sanitation program, and includes quantitative data to support the implementation of PECs.

Commented [A6]: There is nothing in this section regarding a Master Sanitation Schedule, though it is mentioned in the training section. FMI recommends including a requirement for including harvesting equipment in the Master Sanitation Schedule.

- Clean and sanitize food-contact surfaces **and adjacent surfaces** on harvest equipment **after at end of each** daily **use harvest** or when moving between commodities and fields and when excessive soil has built up. (Moved down from line 1006-1007, AZ Alignment)
- Harvester sanitation personnel must utilize PPE equipment such as gloves, aprons, boots, face shields, respirators (if required) in such a way as to prevent cross-contamination of harvest equipment, tools, etc.
- Harvest sanitation crew must store all cleaning and sanitation chemicals in a secure **and designated** location.
- All water utilized in cleaning and sanitizing of equipment must meet harvest water acceptance criteria [see Table 2G].
- Documentation (logs or records) must be maintained for each harvest equipment (e.g., container, tools, etc.) cleaning and sanitation event.
- Records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made. FDA guidance suggests review within a week, but time can be lessened or increased on occasion. The company's documentation control SOPs must designate the maximum **amount** **number** of days that will be necessary for the review, dating, and signing of records. (AZ Alignment)
- Establish and implement equipment and tool storage and control procedures to minimize the potential for contamination and to prevent it from attracting and harboring pests when not in use. (Moved up from line 1086-1087, AZ Alignment)
- If re-circulated rinse or antioxidant solutions are used on the cut surface, ensure that water used meets requirements in Table 2G. Take all practicable precautions to prevent rinses and solutions from becoming a source of contamination.
- Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:
 - Accurate and precise as necessary and appropriate for their intended use
 - Adequately maintained, and
 - Adequate in number for their designated uses
- Prepare an SOP for sanitary operation of equipment which addresses the following:
 - Spills and leaks
 - Inoperative water sprays
 - Exclusion of foreign objects (including glass, plastic, metal, **trash**, and other debris)
 - Establish and implement procedures for the storage and control of water tanks and equipment used for hydration when not in use.
 - Maintain logs documenting cleaning and sanitation.
 - Retention of these records for at least two years. (Line 1051 was split, AZ alignment.)

Harvesting Equipment Cleaning and Sanitation SOPs

- Prepare ~~an~~ SOPs for harvest equipment, and tools that address the following:
 - ~~Cleaning and sanitation of harvesting equipment when moving between commodities and fields. (Removed to address redundant language)~~
 - Following the preparation steps in Table 5, and the 7 steps of cleaning and sanitation in Table 6, develop and implement Sanitation Standard Operating Procedures (SSOPs) to address ~~frequency of~~ cleaning and sanitizing of ~~non-food contact surfaces and food contact surfaces~~ harvesting

equipment to reduce and control the potential or microbial cross-contamination. (Section was moved up from lines 1068-1076. In addition, section was modified to address the inclusion of 7 steps of cleaning and sanitation)

- If equipment, tools, and food-contact surfaces have contact with produce that is not covered by the Produce Safety Rule, adequately clean and sanitize before using this equipment to harvest lettuce/leafy greens. (Moved from lines 1075-1076)
- Develop and implement Sanitation Standard Operating Procedures (SSOPs) to address frequency of cleaning and sanitizing of non-food-contact surfaces to reduce and control the potential for microbial cross-contamination (e.g., tractors, trailers and other equipment utilized in harvest). (Added to address equipment that is does not have food contact surfaces)
- ~~Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, rinse and sanitize food contact surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.) (Moved to 7 steps table under day of harvest requirements)~~
- For hand-harvest equipment (knives, scythes, etc.).
 - Conduct proper cleaning and sanitation at the end of every day, and if potential contamination occurs.
 - Rinse and sanitize at the beginning of every day.
 - A proper sanitizing solution should be readily available at the harvesting site. Receptacles with a sanitizer solution should be provided to store and sanitize all hand-held harvesting tools that are not in use.
 - Prior to harvest crews exiting for breaks, harvest tools should be placed in a clean receptacle filled with sanitizer solution.
 - Water used should be safe and of adequate sanitary quality for its intended use.
- Consider routine quantitative methods that aid in sanitation verification beyond the seasonal SSOP verification (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).
- Maintenance, cleaning, and sanitation schedules for equipment used in hydration must be maintained.
- Management procedures for when equipment is not in use (i.e., end of season). To include a policy for removal of equipment from the work area (e.g., containers, scabbards, sheathes, or other harvest equipment).
- ~~Develop and implement a sanitation schedule for machine harvest operations (e.g., transportation tarps, conveyor belts, etc.). (Removed as addressed above)~~
- ~~Develop and implement appropriate cleaning, sanitizing, storage, and handling procedures of all equipment and food-contact surfaces.~~
- ~~Convey, store, and dispose of trash, litter, and waste to: (AZ alignment, removed)~~
- ~~Minimize the potential to attract and harbor pests.~~

8.2 Food Packing Materials, Containers and Packaging

- Food packing materials, containers, and packaging must be of adequate food safety design and quality for their intended use, which includes: (AZ alignment, removed packaging redundancy)
 - Cleanable and/or designed for single use to prevent the possible growth or transfer of pathogens.

Commented [A7]: FMI recommends including the need to validate SSOPs or identify established studies as specifically suitable validations as part of their food safety program and risk management strategies. See: <https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/>

See additional information within CPS funded project on harvest equipment cleaning & sanitation activities: https://www.centerforproducesafety.org/researchproject/508/awards/CPS_TriState_Special_Project_on_Harvest_Equipment_A_datainformed_consensus_of_clean_for_the_intended_purpose.html

Commented [A8]: FMI recommends adding recordkeeping to document When C&S of hand harvest equipment is done and by who.

Commented [A9]: Issue with “if potential”. How will they know that contamination has occurred?

FMI recommends changing to “where there is evidence of potential contamination”

Commented [A10]: FMI recommends using clean and sanitize instead of rinse and sanitize for consistency. FMI recommends combining bullet 2 (line 170) with bullet 1 (line 168) to eliminate duplicity.

Commented [A11]: FMI recommends removing the word “consider” as this will likely be difficult to audit against.

FMI recommends including specific examples of situations that would warrant the use of quantitative methods (ATP, APC). See: <https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/>; “...visual inspection is subjective (i.e., dependent on human senses and worker-related experience) and should not be solely relied on as evidence that the equipment has been thoroughly and appropriately cleaned and sanitized and is ready to harvest crops in the field”.

- Store packing containers and **packaging** materials off the floor or ground and protected to the degree possible to prevent contamination.
- If **containers** or **packaging** materials are re-used, ensure that food-contact surfaces are clean or lined with a new liner.
- Consider obtaining a letter of guarantee for reusable containers if not cleaned in-house.
- Prepare an SOP for handling and storage of harvest containers that addresses the following: **(Moved from above lines 1035-1044 AZ alignment)**
 - Daily **pre-operational** inspection
 - Proper cleaning and sanitation – routine cleaning and for changes in conditions of materials (i.e., weather events, pest activity, etc.)
 - Overnight storage
 - Contact with the floor ground **or soil, post-harvest plant debris.** **(AZ alignment)**
 - Container assembly (RPC, fiber bin, plastic bin, etc.)
 - Damaged containers
 - Use of containers only as intended.
- **Packaging containers shall be adequate for their intended use.** **(Removed, AZ alignment)**
- **Allow adequate distance for the turning and manipulation of harvest equipment to prevent cross-contamination from areas or adjacent and nearby land that may pose a risk.** **(Needs to be moved to Issue 9, AZ alignment)**

8.3 Infrastructure

- Buildings must be suitable in size, construction, and design to facilitate building maintenance and sanitary operations to reduce the potential for contamination of food-contact surfaces with known or reasonably foreseeable hazards. Buildings must:
 - Provide sufficient space for placement of equipment and storage of packaging materials.
 - Reduce the potential for contamination of food-contact surfaces by effective building design including the separations of operations in which contamination is likely to occur. Considerations for location, time, partition, enclosed systems, or other effective means.
 - Provide adequate drainage in all areas where water or other liquid waste is discharged on the ground or floor of the building.
 - Prevent contamination of food-contact surfaces and packaging materials by protecting them from drips or condensate and excluding pests and animals.
 - **Maintain and document pest control prevention steps.**

Table 5 – Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment, sanitation tools, chemicals, and Instruments.

Item	Description
Personnel and Resources	<ul style="list-style-type: none"> Ensure you have the appropriate resources (including personnel) to conduct harvesting equipment sanitation
Personal Protection Equipment (PPE)	<ul style="list-style-type: none"> Ensure all staff have and use appropriate PPE for safety and repeatability of sanitation work
Sanitation Tools	<ul style="list-style-type: none"> Check tools availability and condition Use single-use scrub pads and designated brush colors for food-contact and nonfood-contact surfaces.
Chemicals (Cleaning and Sanitation)	<ul style="list-style-type: none"> Check cleaning and sanitizing chemicals are used according to manufacturer's specifications
Instruments	<ul style="list-style-type: none"> Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be: <ul style="list-style-type: none"> Accurate and precise as necessary and appropriate for their intended use Adequately maintained, and Adequate in number for their designated uses

Commented [A12]: FMI recommends specifying personnel who are properly trained to carry out task.

Table 6– Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and verification.

Harvesting Equipment Sanitation Best Practices	
<ul style="list-style-type: none"> Conduct steps 1 through 7 after daily equipment use. On the day of harvest follow the “day of harvest steps” in this table. Avoid creation of excess mud. Ensure proper lighting for cleaning. Ensure a safe working environment to the crew (equipment access). Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays. <i>moved from step 2</i> 	
Step	Step Details
Sanitation preparation	<ul style="list-style-type: none"> Have harvest crew remove product, harvesting supplies, and waste from equipment and cleaning area. Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product. Stay on walking surfaces. Never walk or step on food-contact surfaces. Document and report abnormal conditions prior to cleaning and follow-up as necessary
Step 1: Dry cleaning	<ul style="list-style-type: none"> Prepare equipment to facilitate accessibility to “hard to reach areas.” Remove gross soils from food-contact surfaces and adjacent surfaces. Wipe excess grease from motors and bearings. Slowly run conveyers to aid in removal of gross soils as necessary.

Commented [A13]: FMI recommends ensuring practices are appropriate to avoid cross-contamination.

Commented [A14]: Away from

Step 2: Pre-rinse; remove all visible soils and debris	<ul style="list-style-type: none"> • Rinse and pay attention to “hard to reach” areas. • Remove all visible soils and debris (top to bottom). • Rinse food-contact and adjacent surfaces. • Slowly run conveyers to aid in removal of debris during rinsing as necessary. •
Step 3: Detergent application, removal of remaining soils	<ul style="list-style-type: none"> • Select a detergent that can be applied in field conditions to remove soil and debris • Apply detergent solution to ensure coverage of food-contact and adjacent surfaces. • Do not allow detergent solutions to dry before scrubbing and rinsing.
Step 4: Scrubbing	<ul style="list-style-type: none"> • All areas should be scrubbed with hygienic color-coded brushes for food and non-food contact surfaces. • Scrub pads are designated for food and non-food contacts surfaces and are for single use only.
Step 5: Detergent rinse, removal of detergents and remaining Soils	<ul style="list-style-type: none"> • Rinse equipment top to bottom in the order detergents were applied, to ensure no chemical residues, soils and debris are evident. • Be sure to rinse “hard to reach areas.” • Slowly run conveyers to aid the removal of soap and detergent. • Avoid spraying on the ground to avoid splashing and cross-contamination of clean equipment.
Step 6: Post-cleaning Self-inspection and approval for sanitation	<ul style="list-style-type: none"> • Prior to putting cleaning materials away, the operator or lead must self-inspect equipment to make sure it is visibly clean (e.g. removal of chemical residues, soils, and debris). • If observed during the self-inspection, remove the identified chemical residues, soils, and debris and re-clean as necessary. • Document cleaning date and time, equipment identification and inspection results. <ul style="list-style-type: none"> ○ Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items. ○ Document deficiencies and corrective actions including recleaning and follow-up inspection results. ○ If any items represent a food safety risk, equipment must not be placed back into service until corrected. • Release equipment for sanitizing when visual results and equipment conditions are acceptable.
Step 7: Sanitize	<ul style="list-style-type: none"> • Verify strength of sanitizing solution. • Thoroughly sanitize food-contact and adjacent surfaces • Upon completion, place cleaning equipment and supplies in designated locations. • Reassemble conveyers and other components. • Clean, wrap and store hoses. • Complete remaining sanitation documentation. • Release equipment for harvesting.
Day of Harvest Steps:	<ul style="list-style-type: none"> • Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary,

Commented [A15]: FMI recommends inspection should be done by an employee knowledgeable and trained to conduct through inspection.

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	re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).
Verification requirements	
<ul style="list-style-type: none">• Handlers/shippers must perform and document at least once per season a sanitation program self-assessment against section 8.1 to ensure that cleaning and sanitation of the harvesting equipment is performed as described by the company's SSOPs.• At least once per season conduct a harvester specific SSOP verification using a quantitative method. (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).• Personnel conducting the sanitation program self-assessment against section 8.1 must comply with the training requirements identified in Issue 4.	

Commented [A16]: FMI recommends changing to “re-clean”

Commented [A17]: FMI recommends adding
1)Pre-inspection should be documented
2)Any deficiencies in cleaning and/or equipment condition must be addressed, corrected, and documented.

Commented [A18]: Not all methods listed are quantitative.

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Proposal Submitted by the AZ LGMA Technical Subcommittee



COMMODITY SPECIFIC FOOD SAFETY GUIDELINES

FOR THE PRODUCTION AND HARVEST OF
LETTUCE AND LEAFY GREENS



SEPTEMBER 20, 2023

This document supersedes all previously published versions of the Commodity Specific Food Safety Guidelines for the Production and Harvest of Leafy Greens including those dated on or before March 30, 2023.

Adopted by the California Leafy Green Products Handler Marketing Agreement Advisory Board
Document managed by Western Growers - learn more at www.leafygreenguidance.com

GLOSSARY

ACCREDITATION	A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems.
ACTIVE COMPOST	Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50° Celsius (122° Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
ADEQUATE / ADEQUATELY	That which is needed to accomplish the intended purpose in keeping with good public health practice.
ADJACENT SURFACES	Surfaces that are near food-contact surfaces but do not directly touch the food. The surfaces can still be a contamination source if human pathogens are transferred to the food or food-contact surfaces through drainage, drips, dirt or debris. Examples: Outer surface of a conveyor belt, tarps above food-contact surfaces
ADJACENT / NEARBY LAND	Land within a proximity that could potentially affect safe production of leafy greens.
AERATED STATIC PILE	Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days.
AERIAL APPLICATION	Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc.
AEROSOLIZED	The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas.
AGRICULTURAL / COMPOST TEA	A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document.

AGRICULTURAL MATERIAL	<i>Agricultural Material</i> means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues.
AGRICULTURAL TAILWATER	Excess run off water which is generated and collected during the process of irrigation.
AGRICULTURAL WATER	Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens).
AGRICULTURAL WATER SYSTEM	Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers.
AGRICULTURAL WATER TREATMENT SYSTEM	An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description.
ANCILLARY EQUIPMENT	Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc.
ANIMAL BY-PRODUCT/PRODUCT	Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements.
ANIMAL FEED OPERATION (AFO)	Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: *animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and *crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Less than 1,000 animal units does not meet the requirements of aCAFO.
ANIMAL HAZARD	Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated.

ANIMAL UNIT	There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis.
ANTIMICROBIAL WATER TREATMENT	A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard.
ADENOSINE TRI-PHOSPHATE (ATP)	A high-energy phosphate molecule required to provide energy for cellular function.
APPLICATION INTERVAL	Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied.
ATP TEST METHODS	Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness.
BIOFERTILIZERS	Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities.
BIOLOGICALS	Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients.
BIORATIONALS	Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts
BIOSOLIDS	<p>Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.</p> <p>Class A: Class A biosolids undergo a "Process to Further Reduce Pathogens (PFRP)." Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.</p> <p>Class B: Class B biosolids undergo a "Process to Significantly Reduce Pathogens (PSRP)." This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required.</p>
BLUE VALVE	Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use.
BREAKPOINT	The point at which the disinfection demand has been met.
BUILDINGS	Any fully or partially enclosed building on the farm that is used for storing of food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls.

CARBOHYDRATE	Ingredient for soil amendments and crop inputs that could improve growth of bacteria.
CLOSED DELIVERY SYSTEM	A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use.
COLONY FORMING UNITS (CFU)	Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted.
COLIFORMS	Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature.
CO-MANAGEMENT	An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production.
COMPOST/MATURE COMPOST	<i>Compost</i> is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients.
COMPOST FEEDSTOCK	“Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments.
COMPOSTING	Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions.
CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)	A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 ‘animal units’ (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
COVERED PRODUCE	Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens.

CROP INPUT	Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle.
CROSS-CONTAMINATION	The transfer of microorganisms, such as bacteria and viruses, from one place to another.
CURING	The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step.
DETECTION LIMIT	A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target.
DIRECT WATER APPLICATION	Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water.
ENTEROHEMORRHAGIC <i>E. COLI</i> (EHEC)	Shiga toxin-producing <i>E. coli</i> clinically associated with bloody diarrhea.
<i>ESCHERICHIA COLI</i> (<i>E. COLI</i>)	<i>Escherichia coli</i> are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. <i>E. coli</i> are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources.
FECAL COLIFORMS	Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called "thermotolerant coliforms."
FIELD EQUIPMENT	Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities.
FLOODING	The flowing or overflowing of a field with water outside a grower's control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field.
FOOD-CONTACT SURFACE	Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. "Food-contact surfaces" includes food-contact surfaces of equipment and tools used during harvest, packing and holding. Examples: Conveyor belts, cutting boards, knives, baskets.
FOOD MATERIAL	<i>Food Material</i> means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and residential food scrap collection. Material that is defined as "food material" is not agricultural material.

FOOD SAFETY ASSESSMENT	A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet.
FOOD SAFETY PERSONNEL	Person trained in basic food safety principals and/or working under the auspices of a food safety professional.
FOOD SAFETY PROFESSIONAL	Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details).
GEOMETRIC MEAN	Mathematical def.: the n^{th} root of the product of n numbers, or: $\text{Geometric Mean} = \sqrt[n]{(X_1)(X_2)\dots(X_n)}$, where X_1, X_2 , etc. represent the individual data points, and n is the total number of data points used in the calculation. Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number.
GRAZING LANDS	Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock.
GREEN WASTE	Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. ¹
GROUND/SOIL	Ground – solid surface of the Earth. Soil – upper layer of the Earth in which plants grow. [growing media] These two words are considered synonymous throughout and for the purpose of the document.
GROUND WATER	The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water.
HABITAT	The natural home or environment of an animal, plant, or other organism.

HARD TO REACH AREAS	Parts of the harvesting equipment that are difficult to access for cleaning, sanitation, and inspection due to location, design, or obstruction of components. Ensuring that these areas are properly cleaned and sanitized is important to prevent contamination.
HARVESTING	Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing.
HARVEST EQUIPMENT	Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc.
HAZARD	Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control.
HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS	Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA.
HOBBY FARM	A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products.
HOLDING	Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (e.g., activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food.
HYDROPONIC	The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support.
INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST	Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, <i>E. coli</i> , <i>E. coli</i> O157:H7, <i>Listeria</i> , and <i>Salmonella</i> have been eliminated.
INDICATOR MICROORGANISMS	An organism that when present suggests the possibility of contamination or under processing.
IRRIGATION WATER TREATMENT	Any system used to treat agricultural water, so it makes the quality adequate for its intended use
KNOWN OR REASONABLY FORESEEABLE HAZARD	Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with the farm or the food.
LETTUCE AND LEAFY GREENS	Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butter lettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard.

LISTERIA	Any of a genus (<i>Listeria</i>) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (<i>Listeria monocytogenes</i>) that causes listeriosis.
LOT (Pertaining to soil amendments and crop inputs other than compost)	Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture.
MANURE	Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment.
MICROORGANISMS	Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated.
MONITOR	To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement.
MONTHLY	Because irrigation schedules and delivery of water is not always in a grower's control "monthly" for purposes of water sampling means within 35 days of the previous sample.
MORTALITY COMPOST	<i>Mortality Compost</i> is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations.
MOST PROBABLE NUMBER (MPN)	Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers.
MUNICIPAL WATER	Water that is processed and treated by a municipality to meet USEPA drinking water standards.
NON-DETECT	Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis.
NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN	Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines.
OPEN DELIVERY SYSTEM	A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the water source to the point of use.
PACKING	Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (e.g., activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)).
PARTS PER MILLION (PPM)	Usually describes the concentration of something in water or soil; one part of a given substance for every 999,999 other particles.

PATHOGEN	A disease-causing agent such as a virus, parasite, or bacteria.
PEST	Any objectionable animals or insects, including birds, rodents, flies, and larvae.
POOLED WATER	An accumulation of standing water; not free flowing.
POST-CONSUMER WASTE	<i>Post-consumer waste</i> is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food.
POTABLE WATER	Water that is safe to drink or to use for food preparation without risk of health problems.
PRE-CONSUMER WASTE	A food item that was produced for consumption but that was never purchased, consumed or used.
PROCESS AUTHORITY	A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods.
READY-TO-EAT (RTE) FOOD (EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)	<p>(1) "Ready-to-eat food" means FOOD that:</p> <p>(a) Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or</p> <p>(d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes.</p> <p>(2) "Ready-to-eat food" includes:</p> <p>(b) Raw fruits and vegetables that are washed as specified under § 3-302.15;</p> <p>(c) Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13;</p> <p>(e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed.</p>
RECONDITIONED/RE-PROCESSED	Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used.
RESPONSIBLE PARTY	The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight.
RIPARIAN AREA	A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics

	necessary for them to be also classified as wetlands (USEPA 2005)
RISK MITIGATION	Actions to reduce the severity/impact of a risk.
SALMONELLA	<i>Salmonella</i> is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as <i>Escherichia coli</i> , the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, <i>Salmonella</i> is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication.
SANITARY FACILITY	Includes both toilet and hand-washing stations.
SANITIZE	To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.
SEDIMENT	Undissolved organic and inorganic material transported or deposited by water.
SHIGA-TOXIN PRODUCING <i>E. COLI</i>	Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified and associated with severe illness and hospitalization in the United States is <i>E. coli</i> O157; however, there are over 50 other serogroups that can also cause illness.
SHIPPING UNIT/ EQUIPMENT	Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities.
SOIL AMENDMENT	Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life.
SURFACE WATER	Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.).
SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS (CHEMICAL FERTILIZERS)	Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process (e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.).
TOTAL COLIFORMS	Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system.
TRANSPORTER	The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting.

ULTRAVIOLET INDEX (UV INDEX)	A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15.
VALIDATED PROCESS	A process that has been demonstrated to be effective through a statistically based study, literature, or regulatory guidance.
VALIDATION	The act of determining whether products or services conform to meet specific requirements.
VEGETATIVE MATERIAL	<i>Vegetative material</i> means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream.
VERIFICATION	The act of confirming a product or service meets the requirements for which it was intended.
VESSEL COMPOST PROCESS	Enclosed composting process where ingredients are maintained at a minimum of 131°F Fahrenheit for at least 3 days.
VISITOR	Any person (other than personnel) who enters your field/operations with your permission.
WATER DISTRIBUTION SYSTEM	Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop.
WATER SOURCE	The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams.
WATER TREATMENT	Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use.
WATER USE	The method by which water is being used in the agricultural process.
WELL	An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies

4. PERSONNEL QUALIFICATIONS AND TRAINING

Adequate training of on-farm and handler personnel is a critically important element in a successful food safety program. In order to align with federal requirements under the Food Safety Modernization Act (FSMA) and to ensure that all activities prescribed in this document are effectively and adequately implemented, the following minimum training requirements must be maintained and documented:

The Best Practices Are:

- All personnel (including temporary, part time, seasonal, and contracted personnel) who handle lettuce / leafy greens or who have contact with food-contact surfaces, or who are engaged in the supervision thereof, must:
 - Receive adequate training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.
 - Have a combination of education, training, and experience necessary to perform the person's assigned duties in a manner that ensures compliance with these best practices.
- Training must be:
 - Conducted in a manner easily understood by personnel being trained.
 - Repeated as necessary and appropriate based on observations or information indicating that personnel are not meeting standards outlined in these best practices.
- Minimum training requirements must include:
 - For all personnel who handle (contact) lettuce/leafy greens or supervise those who do so must receive training that includes the following:
 - Principles of food hygiene and safety.
 - The importance of health and personal hygiene for all personnel and visitors including recognizing symptoms of a health condition that is reasonably likely to result in contamination of lettuce/leafy greens or food-contact surfaces with microorganisms of public health significance.
 - The standards established in these best practices that are applicable to the employee's job responsibilities.
 - For harvest personnel, the training program must also address the following minimum requirements related to harvesting activities:
 - Recognizing lettuce/leafy greens that must not be harvested, including product that may be contaminated with known or reasonably foreseeable hazards.
 - Inspecting harvest containers, harvest equipment, and packaging materials to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of lettuce/leafy greens with known or reasonably foreseeable hazards.
 - Correcting problems with harvest containers, harvest equipment, or packaging materials or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
 - For personnel conducting environmental hazard and risk assessments, training must be completed, and the training program must address the following minimum requirements:

- 42 ▪ When an environmental hazard or risk assessment should be completed.
- 43 ▪ How to conduct an environmental hazard or risk assessment.
- 44 ▪ Potential hazard and risk identification.
- 45 ▪ Recognizing product that may be contaminated with known or reasonably foreseeable
- 46 hazards.
- 47 ▪ Mitigations and corrective actions.
- 48 ▪ When an environmental hazard or risk assessment deems pre-harvest product testing is
- 49 necessary.
- 50 ○ For personnel conducting a sanitation program self-assessment against section 8, training must be
- 51 completed, and the training program must address the following minimum requirements: (This
- 52 section was added to require training to verify sanitation program self-assessment against section 8)
- 53 ▪ How to develop a master cleaning schedule
- 54 ▪ Harvest sanitation preparation and PPE requirements.
- 55 ▪ 7 steps of cleaning and sanitation
- 56 ▪ Cleaning and sanitation verification activities
- 57 ▪ Labeling, storage & use of chemicals
- 58 ▪ Hygienic design of harvesting equipment
- 59 ▪ Corrective actions
- 60 ▪ Documentation and recordkeeping
- 61 ○ For personnel conducting cleaning and sanitation activities training must be completed and training
- 62 must address the following minimum requirements:
- 63 ▪ Harvest sanitation preparation and PPE requirements.
- 64 ▪ 7 steps of cleaning and sanitation
- 65 ▪ Labeling, storage & use of chemicals
- 66 ▪ Instruments used to measure chemical solutions.
- 67 ▪ Visual inspections.
- 68 • At least one supervisor or responsible party (e.g., the food safety professional) for each grower providing
- 69 leafy green products must have successfully completed food safety training at least equivalent to that received
- 70 under standardized curriculum recognized as adequate by the FDA.
- 71 • Establish and keep records of training that document required training of personnel, including the date
- 72 of training, topics covered, and the person(s) trained. Records must be reviewed, dated, and signed, within a
- 73 reasonable time per companies' SOP after the records are made, by a supervisor or responsible party.

Commented [KVH1]: AZLGMA TSC: add "minimum" to be consistent with other training language.

Commented [KVH2]: AZLGMA TSC: add "the following minimum requirements" to be consistent with other training language.

8. ISSUE: HARVESTING EQUIPMENT SANITATION AND DESIGN, PACKAGING MATERIALS, AND INFRASTRUCTURE (FIELD SANITATION)

This section addresses harvest and harvest aid equipment and packaging materials used for lettuce/leafy greens as well as any fully or partially enclosed buildings used to store food-contact surfaces and packaging materials.

~~Mechanical or machine harvest has become increasingly prevalent and provides opportunity for increased surface contact exposure. This includes field-cored lettuce operations that use various harvest equipment and aids. (Deleted as working group considered statement not necessary)~~

The Best Practices Are:

8.1 Harvesting Equipment

Harvesting Equipment Hygienic Design

- Design harvest equipment and tools to facilitate cleaning. Food-contact equipment must be constructed and maintained to ensure effective cleaning of the equipment over its lifespan. The equipment should be designed as to prevent bacterial ingress, survival, growth, and reproduction on both food-contact and non-food-contact surfaces. (Moved up from line 1064- 1067, AZ Alignment)
- At least annually, conduct a hygienic design review for harvesting equipment that includes areas of concern and maintain a timeline for completion of necessary corrective actions. ~~Document areas of concern and develop and maintain a timeline for the completion of corrective actions.~~ Conduct a corrective action review annually to ensure the corrective actions were effective. ~~two times a year.~~ (This adds requirements for an annual review of harvesting equipment hygienic design of to the metrics)
- A food-contact harvesting equipment hygienic design program (i.e., an SOP) shall be implemented and it should address the following:
 - Develop an equipment schedule for the annual review of food-contact harvesting equipment.
 - Determine how different types of machines will be assessed, i.e. field-pack vs value added.
 - Evaluation parameters for food-contact surfaces and machine infrastructure (refer to Appendix S-pending)
 - Corrective Action & Verification
 - For food contact surfaces, evaluate whether (or not):
 - They are accessible for cleaning.
 - They are resistant to corrosion, non-toxic, and non-absorbent.
 - They are properly painted or coated.
 - They are ripped, torn, or damaged (e.g., belts and tarps)
 - Belts can be adjusted or removed to allow cleaning of unexposed areas.
 - They are rust-free, and adjacent areas are also rust-free.
 - For machine infrastructure, evaluate whether (or not):
 - Hydraulic fluid, motors, trash, or oil pans drip, drain or are drawn to food-contact surfaces.
 - Drives, chain guards, control boxes, or bearings are located over open food-contact surfaces.
 - Standing water accumulates, drips, or drains onto food-contact surfaces during operation.
 - Unique features on the harvesting equipment could affect its cleanability or allow for

Commented [KVH3]: AZLGMA TSC: Heading for Issue 8: keep “buildings” instead of infrastructure, as we have a definition of buildings in the glossary and it is consistent with PSR.

Commented [KVH4]: AZLGMA TSC: We feel that once corrective actions are recorded the review two times a year is not necessary. We also feel that the hygienic design review should include the corrective actions. We do not think the intent is to review all equipment every year but to establish a schedule for each type of equipment and to move through that schedule over time. We are leaving that up to organizations to schedule their equipment into the review. We also do not think it is the intent to review tools, knives, or non-food contact equipment such as trailers, or tractors.

Commented [KVH5]: AZLGMA TSC: The hygienic design should follow a company program(i.e SOP) that can be verified during an inspection.

Commented [KVH6]: AZLGMA TSC: Remove lines 98-112 and move to appendix S(pending). Having these statements in the metrics can potentially limit what companies will look for on their equipment. The metrics follow an appendix approach for resources on developing assessments and evaluations.

bacterial ingress, survival, growth, and reproduction (e.g., cracks or holes in square tubing or welds, temporary welds, adjoined flat surfaces "sandwich joints").

Sanitary Preparation and Operation

- Protect lettuce/leafy greens and harvesting equipment food-contact and adjacent surfaces, ~~production areas, and agricultural water sources and distribution systems~~ from contamination. (Moved up from line 1062, AZ Alignment, removal of production areas, water sources, and distribution systems as do not correspond to issue 8)
- Equipment cleaning and sanitizing operations should take place away from unharvested product and other equipment to reduce the potential for cross-contamination. (Moved up from line 1008, AZ Alignment)
- Clean and sanitize food-contact surfaces and adjacent surfaces on harvest equipment after at end of each daily use harvest or when moving between commodities and fields and when excessive soil has built up. (Moved down from line 1006-1007, AZ Alignment)
- Harvester sanitation personnel must utilize PPE equipment such as gloves, aprons, boots, face shields, respirators (if required) in such a way as to prevent cross-contamination of harvest equipment, tools, etc.
- Harvest sanitation crew must store all cleaning and sanitation chemicals in a secure and designated location.
- All water utilized in cleaning and sanitizing of equipment must meet harvest water acceptance criteria [see Table 2G].
- Documentation (logs or records) must be maintained for each harvest equipment (e.g., container, tools, etc.) cleaning and sanitation event.
- Records must be reviewed, dated, and signed by a supervisor or responsible party within a reasonable time after the records are made. FDA guidance suggests review within a week, but time can be lessened or increased on occasion. The company's documentation control SOPs must designate the maximum amount number of days that will be necessary for the review, dating, and signing of records. (AZ Alignment)
- Establish and implement equipment and tool storage and control procedures to minimize the potential for contamination and to prevent it from attracting and harboring pests when not in use. (Moved up from line 1086-1087, AZ Alignment)
- If re-circulated rinse or antioxidant solutions are used on the cut surface, ensure that water used meets requirements in Table 2G. Take all practicable precautions to prevent rinses and solutions from becoming a source of contamination.
- Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:
 - Accurate and precise as necessary and appropriate for their intended use
 - Adequately maintained, and
 - Adequate in number for their designated uses
- Prepare an SOP for sanitary operation of equipment which addresses the following:
 - Spills and leaks
 - Inoperative water sprays
 - Exclusion of foreign objects (including glass, plastic, metal, trash, and other debris)
 - Establish and implement procedures for the storage and control of water tanks and equipment used for hydration when not in use.

- Maintain logs documenting cleaning and sanitation.
- Retention of these records for at least two years. (Line 1051 was split, AZ alignment.)

Harvesting Equipment Cleaning and Sanitation SOPs

- Prepare ~~an~~ SOPs for harvest equipment, and tools that address the following:
 - ~~○ Cleaning and sanitation of harvesting equipment when moving between commodities and fields. (Removed to address redundant language)~~
 - Following the preparation steps in Table 5, and the 7 steps of cleaning and sanitation in Table 6, develop and implement Sanitation Standard Operating Procedures (SSOPs) to address frequency of cleaning and sanitizing of ~~non-food-contact surfaces and food-contact surfaces~~ harvesting equipment to reduce and control the potential or microbial cross-contamination. (Section was moved up from lines 1068-1076. In addition, section was modified to address the inclusion of 7 steps of cleaning and sanitation)
 - If equipment, tools, and food-contact surfaces have contact with produce that is not covered by the Produce Safety Rule, adequately clean and sanitize before using this equipment to harvest lettuce/leafy greens. (Moved from lines 1075-1076)
 - Develop and implement Sanitation Standard Operating Procedures (SSOPs) to address frequency of cleaning and sanitizing of non-food-contact surfaces to reduce and control the potential for microbial cross-contamination (e.g., tractors, trailers and other equipment utilized in harvest). (Added to address equipment that is does not have food contact surfaces)
 - ~~○ Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, rinse and sanitize food contact surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.) (Moved to 7 steps table under day of harvest requirements)~~
 - For hand-harvest equipment (knives, scythes, etc.).
 - Conduct proper cleaning and sanitation at the end of every day, and if potential contamination occurs.
 - Rinse and sanitize at the beginning of every day.
 - A proper sanitizing solution should be readily available at the harvesting site. Receptacles with a sanitizer solution should be provided to store and sanitize all hand-held harvesting tools during crew breaks and when ~~that are~~ not in use.
 - ~~▪ Prior to harvest crews exiting for breaks, harvest tools should be placed in a clean receptacle filled with sanitizer solution.~~
 - Water used should be safe and of adequate sanitary quality for its intended use.
 - Consider routine quantitative methods that aid in sanitation verification beyond the seasonal SSOP verification (i.e., ATP, rapid detection of residuals, microbial swabs, etc.).
 - Maintenance, cleaning, and sanitation schedules for equipment used in hydration must be maintained.
 - Management procedures for when equipment is not in use (i.e., end of season). To include a policy for removal of equipment from the work area (e.g., containers, scabbards, sheathes, or other harvest equipment).
- ~~• Develop and implement a sanitation schedule for machine harvest operations (e.g., transportation tarps,~~

Commented [KVH7]: AZLGMA TSC: Is the intent of the committee to remove this requirement in an SOP? It is listed in best practices, but included here for inclusion in an SOP. We do not think it should be removed from an SOP.

Commented [KVH8]: AZLGMA TSC: Removed redundant language with addition in line 181.

conveyor belts, etc.). (Removed as addressed above)

- ~~Develop and implement appropriate cleaning, sanitizing, storage, and handling procedures of all equipment and food-contact surfaces.~~
- ~~Convey, store, and dispose of trash, litter, and waste to:~~ (AZ alignment, removed)
 - ~~Minimize the potential to attract and harbor pests.~~

8.2 Food Packing Materials, Containers and Packaging

- Food packing materials, containers, and packaging must be of adequate food safety design and quality for their intended use, which includes: (AZ alignment, removed packaging redundancy)
 - Cleanable and/or designed for single use to prevent the possible growth or transfer of pathogens.
 - Store packing containers and packaging materials off the floor or ground and protected to the degree possible to prevent contamination.
 - If containers or packaging materials are re-used, ensure that food-contact surfaces are clean or lined with a new liner.
 - Consider obtaining a letter of guarantee for reusable containers if not cleaned in-house.
- Prepare an SOP for handling and storage of harvest containers that addresses the following: (Moved from above lines 1035-1044 AZ alignment)
 - Daily pre-operational inspection
 - Proper cleaning and sanitation – routine cleaning and for changes in conditions of materials (i.e., weather events, pest activity, etc.)
 - Overnight storage
 - Contact with the floor ground or soil, **post-harvest plant debris.** (AZ alignment)
 - Container assembly (RPC, fiber bin, plastic bin, etc.)
 - Damaged containers
 - Use of containers only as intended.
- ~~Packaging containers shall be adequate for their intended use.~~ (Removed, AZ alignment)
- ~~Allow adequate distance for the turning and manipulation of harvest equipment to prevent cross-contamination from areas or adjacent and nearby land that may pose a risk.~~ (Needs to be moved to Issue 9, AZ alignment)

8.3 Infrastructure

- Buildings must be suitable in size, construction, and design to facilitate building maintenance and sanitary operations to reduce the potential for contamination of food-contact surfaces with known or reasonably foreseeable hazards. Buildings must:
 - Provide sufficient space for placement of equipment and storage of packaging materials.
 - Reduce the potential for contamination of food-contact surfaces by effective building design including the separations of operations in which contamination is likely to occur. Considerations for location, time, partition, enclosed systems, or other effective means.
 - Provide adequate drainage in all areas where water or other liquid waste is discharged on the ground or floor of the building.
 - Prevent contamination of food-contact surfaces and packaging materials by protecting them from drips or condensate and excluding pests and animals.
 - **Maintain and document pest control prevention steps.**

Commented [KVH9]: AZLGMA TSC: “post-harvest plant debris” would be a new addition to the AZLGMA document as well. We agree with it’s addition here.

Commented [KVH10]: AZLGMA TSC: The term “Buildings” is the preferred language to be consistent with PSR and Glossary.

Commented [KVH11]: AZLGMA TSC: This section was not under review or discussed in the subgroup, it should be removed.

234 **Table 5 – Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment,**
235 **sanitation tools, chemicals, and Instruments.**

Item	Description
Personnel and Resources	<ul style="list-style-type: none">• Ensure you have the appropriate resources (including personnel) to conduct harvesting equipment sanitation
Personal Protection Equipment (PPE)	<ul style="list-style-type: none">• Ensure all staff have and use appropriate PPE for safety and repeatability of sanitation work
Sanitation Tools	<ul style="list-style-type: none">• Check tools availability and condition• Use single-use scrub pads and designated brush colors for food-contact and nonfood-contact surfaces.
Chemicals (Cleaning and Sanitation)	<ul style="list-style-type: none">• Check cleaning and sanitizing chemicals are used according to manufacturer’s specifications
Instruments	<ul style="list-style-type: none">• Instruments or controls used to measure, regulate, or record temperatures, hydrogen ion concentration (pH), sanitizer efficacy, or other conditions must be:<ul style="list-style-type: none">○ Accurate and precise as necessary and appropriate for their intended use○ Adequately maintained, and○ Adequate in number for their designated uses

236
237 **Table 6– Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and**
238 **verification.**

Harvesting Equipment Sanitation Best Practices	
<ul style="list-style-type: none">• Conduct steps 1 through 7 after daily equipment use.• On the day of harvest follow the “day of harvest steps” in this table.• Avoid creation of excess mud.• Ensure proper lighting for cleaning.• Ensure a safe working environment to the crew (equipment access).• Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays. <i>moved from step 2</i>	
Step & Documentation Requirements	Step-Details Process Considerations
Sanitation preparation Document and report abnormal conditions prior to cleaning and follow-up as necessary	<ul style="list-style-type: none">• Have harvest crew remove product, harvesting supplies, and waste from equipment and cleaning area.• Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product.• Stay on walking surfaces. Never walk or step on food-contact surfaces.• Document and report abnormal conditions prior to cleaning and follow-up as necessary

Commented [KVH12]: AZ Technical Subco: We feel moving documentation requirements into column 1 improves clarity. We’ve renamed column 1 to include documentation requirements, and changed name of column 2, now titled “process considerations”

<p>Step 1:</p> <p>Dry cleaning</p>	<ul style="list-style-type: none"> • Prepare equipment to facilitate accessibility to “hard to reach areas.” • Remove gross soils from food-contact surfaces and adjacent surfaces. • Wipe excess grease from motors and bearings. • Slowly run conveyers to aid in removal of gross soils as necessary.
<p>Step 2:</p> <p>Pre-rinse; remove all visible soils and debris</p>	<ul style="list-style-type: none"> • Rinse and pay attention to “hard to reach” areas. • Remove all visible soils and debris (top to bottom). • Rinse food-contact and adjacent surfaces. • Slowly run conveyers to aid in removal of debris during rinsing as necessary. •
<p>Step 3:</p> <p>Detergent application, removal of remaining soils</p>	<ul style="list-style-type: none"> • Select a detergent that can be applied in field conditions to remove soil and debris. • Apply detergent solution to ensure coverage of food-contact and adjacent surfaces. • Do not allow detergent solutions to dry before scrubbing and rinsing.
<p>Step 4:</p> <p>Scrubbing</p>	<ul style="list-style-type: none"> • All areas should be scrubbed with hygienic color-coded brushes for food and non-food contact surfaces. • Scrub pads are designated for food and non-food contacts surfaces and are for single use only.
<p>Step 5:</p> <p>Detergent rinse, removal of detergents and remaining Soils</p>	<ul style="list-style-type: none"> • Rinse equipment top to bottom in the order detergents were applied, to ensure no chemical residues, soils and debris are evident. • Be sure to rinse “hard to reach areas.” • Slowly run conveyers to aid the removal of soap and detergent. • Avoid spraying on the ground to avoid splashing and cross-contamination of clean equipment.
<p>Step 6:</p> <p>Post-cleaning Self-inspection and approval for sanitation</p> <p><u>Document cleaning date and time, equipment identification and inspection results.</u></p> <ul style="list-style-type: none"> • <u>Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items.</u> • <u>Document deficiencies and</u> 	<ul style="list-style-type: none"> • Prior to putting cleaning materials away, the operator or lead must self-inspect equipment to make sure it is visibly clean (e.g. removal of chemical residues, soils, and debris). • If observed during the self-inspection, remove the identified chemical residues, soils, and debris and re-clean as necessary. • Document cleaning date and time, equipment identification and inspection results. <ul style="list-style-type: none"> ◦ Identify any damage or items that may need further maintenance (frayed belts, table condition, hoses, corrosion, chipping paint, excessive lubricant); document and address these items. ◦ Document deficiencies and corrective actions including re-cleaning and follow up inspection results. ◦ If any items represent a food safety risk, equipment must not be placed back into service until corrected. • Release equipment for sanitizing when visual results and equipment conditions are acceptable.

<p><u>corrective actions including recleaning and follow-up inspection results.</u></p> <ul style="list-style-type: none"> • <u>If any items represent a food safety risk, equipment must not be placed back into service until corrected.</u> 	
<p>Step 7: Sanitize <u>Verify strength of sanitizing solution.</u> <u>Complete remaining sanitation documentation.</u></p>	<ul style="list-style-type: none"> • Verify strength of sanitizing solution. • Thoroughly sanitize food-contact and adjacent surfaces • Upon completion, place cleaning equipment and supplies in designated locations. • Reassemble conveyers and other components. • Clean, wrap and store hoses. • Complete remaining sanitation documentation. • Release equipment for harvesting.
<p>Day of Harvest Steps: <u>Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).</u></p>	<ul style="list-style-type: none"> • Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation. If necessary, re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).
<p>Verification requirements</p> <ul style="list-style-type: none"> • Handlers/shippers must perform and document at least once per season a sanitation program self-assessment against <u>section 8.1</u> to ensure that cleaning and sanitation of the harvesting equipment is performed as described by the company's SSOPs. • At least once per season conduct a <u>harvester specific SSOP</u> verification using a quantitative method. (i.e., ATP, rapid detection of residuals, microbial swabs, etc.). • Personnel conducting the sanitation program self-assessment against <u>section 8.1</u> must comply with the training requirements identified in Issue 4. 	

Commented [KVH13]: AZLGMA TSC: Should use term "Issue" to be consistent with language.

Commented [KVH14]: AZLGMA TSC: Is the intent to have each piece of equipment go through a verification using a quantitative method? Or is the intent to have one piece of equipment in the harvesters fleet verified against the cleaning SSOP? For auditing purposes clarity is important.

Commented [KVH15]: AZLGMA TSC: Should use term "Issue" to be consistent with language.

Proposal Submitted by Dole Fresh Vegetables

LGMA Metrics Update

Gustavo Reyes, from Western Growers, managed the process for updating the CA LGMA metrics in partnership with members of the Arizona and California LGMA's and Subject Matter Experts Channah Rock (University of Arizona), Michelle Danyluk (University of Florida), and Trevor Suslow (Emeritus UC Davis).

In February of 2024 two priorities were set by the priority setting committee:

- (i) Review Harvesting Equipment Cleaning and Sanitation
- (ii) Review Water Requirements

During the months of April and May the two priority working groups met multiple times

- Harvest Equipment Sanitation - 9 meetings
- Water - 6 meetings

Harvesting Equipment Cleaning and Sanitation

The following amendments were submitted:

Training

- New training requirements for sanitation crew members
- Frequency of the training should be included in the requirements- for example upon hire, seasonal, and tailgates (monthly or quarterly).
- Should mention the requirements for individuals who are conducting the sanitation training- for example, they should be a qualified individual
- At least one individual from the company must attend an LGMA training on Cleaning and Sanitizing of Harvest Equipment
- Include the following training topics: Use and storage of sanitation tools, Location of the equipment for cleaning to prevention of cross contamination
- New training requirements for personnel conducting sanitation program self-assessments

Harvest Equipment Sanitation

1. New Table 5 – Pre-cleaning preparation information
 - personnel, personal protection equipment (PPE), sanitation tools, chemicals, and Instruments.
2. New Table 6 – Cleaning and sanitizing of harvest equipment
 - sanitation best practice language
 - 7-steps of cleaning and sanitation
 - Sanitation Preparation- Add verbiage around covering extra packaging material if it cannot be moved and covering electrical components before beginning activities.

- Step 3- This step states “do not allow detergents solutions to dry” but there should be some verbiage around required contact times must be met before solution is rinsed.
- verification procedures-
- Quantitative measurements on food contact surfaces should be taken regularly, such as ATP (daily or weekly) on value-added machines
- Sanitation procedures should be developed and assessed using quantitative measurements (ex. APC) before and after cleaning. Food contact and adjacent surfaces should be included.
- Per Harvest Forward the parameters for APC <2,000 CFU, ATP <10,000 RLU
- Pathogen testing (ex. Listeria) should be done on zones 2-3 seasonally (ex. during transition)
- Measurements could be taken on rotating equipment- for example, not all equipment needs to be tested every time
- day of harvest/post-cleaning procedures
- Harvest equipment should be sanitized prior to starting harvesting activities, the metrics only mentions hand-harvest equipment should be rinsed and sanitized at the beginning of the day.
- Food contact and adjacent surfaces should be rinsed/sanitized after each break/lunch. This is outlined in our SSOPs for Value-Added and Fresh Pack

VA machines –

7.10. STEP 7: SANITIZE (BEFORE USE)

- 7.10.1. To be completed at the beginning of the workday, after breaks, and lunches for all food contact surfaces
- 7.10.2. Verify strength of solution according to chemical chart
- 7.10.3. Thoroughly sanitize food contact and adjacent surfaces
- 7.10.4. Upon completion, place cleaning tools and supplies in assigned locations
- 7.10.5. Release equipment for harvesting activities

FP machines –

7.10. STEP 7: SANITIZE (BEFORE USE)

- 7.10.1. This step is to be completed for all food contact surfaces at the following times:
 - 7.10.1.1. Beginning of workday, before starting work
 - 7.10.1.2. After each break
 - 7.10.1.3. After lunch
- 7.10.2. Verify strength of sanitizer solution
 - 7.10.2.1. Cl: 100-200ppm, Target 100ppm
 - 7.10.2.2. pH: 6.0 – 7.0, Target 6.5
- 7.10.3. Thoroughly sanitize food contact (Zone 1) and adjacent surfaces (Zone 2)
- 7.10.4. Upon completion, place cleaning tools and supplies in assigned locations
- 7.10.5. Release equipment for use

3. Self-assessment against new sanitation requirements

- documented seasonally
- Random spot checks/audits of sanitation crew audits should be completed as part of the seasonal sanitation program assessment
- Evaluation of chemicals used for sanitation should be done by qualified individual or through a 3rd-party sanitation or chemical company

4. Hygienic design review

- documented annually
- Assessments should be completed seasonally for each value-added harvest machine and at least annually for external machines.
- Fresh pack machines should be done annually.
- Assessments should be completed when there are modifications made to the harvesting equipment or a piece of equipment is brought back into production after not being used for an extended period of time.
- Assessments must be completed for new harvesting equipment before it is used for production.
- review includes evaluation of food contact and machine infrastructure of the harvesting equipment.
- Machines may need to be partially disassembled to conduct a comprehensive hygienic design assessment.
- Under Section 8.1 Harvesting Equipment Hygienic Design Evaluation Criteria, it is missing features such hollow areas (ex. rollers) and hinges (ex. piano hinges, alligator clips, etc.), braided covers, conveyor belt materials, bolts/nuts/fasteners on food contact surfaces.
- PECs are not mentioned in the proposed metrics but should be used when corrective measures or modifications cannot be taken. Harvest Forward outlined the requirements on how to handle PECs when equipment cannot be modified.
- Assessment should include evaluating the ability to dismantle and reassemble equipment for cleaning.
- Corrective actions should also address specific issues identified during the assessment such as bad welds, torn belts, etc.
- Documentation showing before and after should be included in the corrective actions.

5. General Improvements

- language updates to align with AZ LGMA are included as part of the metrics review.
- modification to Metrics for improved organization and clarity.
 1. new glossary terms
 2. splitting Issue 8 into three subsections (8.1, 8.2, and 8.3)
 3. language updates recommended by the working group

Water

Current Review Period

The language in the water section was slightly modified to align with language in the FSMA Final rule for pre-harvest agricultural water. The updates include:

- language related to crop characteristics such as susceptibility to pathogen adhesion and internalization
- updates to our current agricultural water assessment requirements
- additional information for protection from possible sources of contamination

Next Review Period

In addition to the language noted above a second comment period will be conducted later this year for the following areas:

- assessing, sampling, and testing of wells
- reviewing new classifications for water beyond Type A and B

Western Growers Comments Period (June 3 – July 2)

The comment period for the proposed changes starts on Monday, June 3rd and closes on Tuesday, July 2nd.

The proposed changes can be viewed by visiting the Leafy Green Guidance website:

<https://www.leafygreenguidance.com/>

Western Growers Webinar (July 9)

On July 9, Western Growers will host a web discussion surrounding all submissions received during the comment period. During the web discussion, proposed changes to the LGMA-approved metrics will be publicly presented by the corresponding submitter with open dialogue allowed for all attendees.

Appendix III: Response to Comments:

Glossary Items

Comment received during the comment period proposed the addition of the following items to the glossary. A response to the actions recommended by the working group is below each glossary item recommendation.

HFC: Leafy Greens

Response: The addition of leafy greens was suggested to be added. The glossary already contains a term for Lettuce and Leafy Greens.

HFC: Leafy Greens Ready-to-Eat, Leafy Greens Ready-to-Use.

The glossary contains the description of a **Ready-to-Eat Product (RTE)**. The **Ready-to-Use** term was not included in the draft as the working group used and defined the terms “field pack” and “further processing”. These terms were used when referring to equipment categories.

HFC: RTE value-added product, RTU Field Packed Items

The working group adopted these terms as “field pack” and “further processing”. These terms were used when referring to equipment categories.

HFC: Master Sanitation Schedule (MSS)

The term was added to the glossary and the concept was introduced into the metrics as a training requirement for personnel conducting self-assessment against issue 8.1,

HFC: Periodic Equipment Cleaning (PEC)

The term was added to the glossary and the concept was introduced into the metrics as a consideration for category 1 harvesting equipment.

FMI: Routine Equipment Cleaning (REC)

The term was added to the glossary, it includes the 7 steps for cleaning and sanitation.

HFC: Best Practices

The term was not added to the metrics. To address this, we have improved language to clarify requirements and considerations.

HFC: Criteria for Audit Inclusion

The term was not added to the metrics this year.

AZ LGMA TSC: Post Harvest Plant Debris

This term was added to the metrics.

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Personnel Qualification and Training

DOLE FSQA: Include the following training topics: Use and storage of sanitation tools, location of the equipment for cleaning to prevent cross-contamination.

The topics were added to the training requirements.

DOLE FSQA: At least one individual from the company must attend an LGMA training on cleaning and sanitizing harvest equipment

The metrics were revised to include that one member of the company must attend the LGMA training on cleaning and sanitation. The company can adopt a train-the-trainer approach to train additional workers.

DOLE FSQA: The frequency of the training should be included in the requirements - for example upon hire, seasonal, and tailgates (monthly or quarterly).

Frequencies were specified under the training requirements. Personnel conducting cleaning and sanitation must receive training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.

DOLE FSQA: Should mention the requirements for individuals who are conducting the sanitation training - for example, they should be a qualified individual.

This was clarified in the requirements established for those conducting training. The working group added personnel must receive training, as appropriate to the person's duties, upon hiring, and periodically thereafter, at least once annually.

AZ LGMA TSC: Adding the word “minimum” to be consistent with other training language.

The proposed language was accepted.

Issue 8 overall comments

AZ LGMA TSC: keep “buildings” instead of infrastructure, as we have a definition of buildings in the glossary, and it is consistent with PSR.

The term “infrastructure” was replaced with “building” throughout the document.

Categorization from Harvesting Equipment

T&A: Comments received highlight that not all harvesting equipment is the same. Therefore, the categorization of harvesting equipment based on the food-contact surfaces, the product, and cross-contamination routes needs to be established.

Three categories for harvesting equipment were developed and added to the metrics. Different requirements have been highlighted for these different categories.

Harvesting Equipment Hygienic Design

DOLE FSQA: Assessments must be completed for new harvesting equipment before it is used for production.

2024 CA LGMA Amendment Process Report – Harvesting Equipment

Language was adopted to address this comment. After designing, purchasing, or modifying harvesting equipment a hygienic design review should be conducted.

DOLE FSQA: Fresh pack machines should be done annually.

To address this the working group established that: “At least annually, and after designing, purchasing, or modifying harvesting equipment, conduct a hygienic design review for category 1 harvesting equipment that evaluates areas of concern for food-contact surfaces and machine infrastructure.”

The proposed Language by the AZ LGMA TSC suggested removing specific hygienic design review bullet points for food-contact surfaces and machine infrastructure.

- **AZ LGMA TSC: The hygienic design should follow a company program (i.e. SOP) that can be verified during an inspection.**
- **AZLGMA TSC: Remove lines 98-112 and move to appendix S(pending). Having these statements in the metrics can potentially limit what companies will look for on their equipment. The metrics follow an appendix approach for resources on developing assessments and evaluations.**

The working group had extensive conversations regarding the language modifications and decided to modify the language within the metrics. Hygienic design reviews will be required for category 1 harvesting equipment and will be conducted at least annually, and after designing, purchasing, or modifying harvesting equipment. The bulleted areas of concern for food-contact surfaces and machine infrastructure were kept in the document.

Dole FSQA: Under Section 8.1 Harvesting Equipment Hygienic Design Evaluation Criteria, it is missing features such hollow areas (ex. rollers) and hinges (ex. piano hinges, alligator clips, etc.), braided covers, conveyor belt materials, bolts/nuts/fasteners on food-contact surfaces.

The working group did not consider for such detailed language to be added to the metrics. The LGMA and Western Growers will develop an appendix to address these areas in detail.

Dole FSQA: Documentation showing before and after should be included in the corrective actions.

Minimum requirements establish that the annual review will address any corrective actions previously identified and that they were effectively implemented.

Dole FSQA: Corrective actions should also address specific issues identified during the assessment such as bad welds, torn belts, etc.

This is part of the proposal, under the machine infrastructure evaluation bullet points.

AZLGMA TSC: We feel that once corrective actions are recorded the review two times a year is not necessary. We also feel that the hygienic design review should include the corrective actions. We do not think the intent is to review all equipment every year but to establish a schedule for each type of equipment and to move through that schedule over time. We are leaving that up to organizations to schedule their equipment into the review. We also do not think it is the intent to review tools, knives, or non-food-contact equipment such as trailers, or tractors.

The suggested language was accepted, by adjusting requirements to category 1 equipment, and also changing that the corrective actions review will be conducted at the same time as the hygienic design review.

Dole FSQA: PECs are not mentioned in the proposed metrics but should be used when corrective measures or modifications cannot be taken. Harvest Forward outlined the requirements on how to

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handle PECs when equipment cannot be modified.

PEC considerations were added to the document. PECs have been included in the review timeline, and the group will discuss PECs becoming a requirement in the next review. PECs were added to the glossary.

Sanitary Preparation and Operation

FMI recommends a clearly defined frequency and/or additional verbiage surrounding factors to consider when establishing frequency. See: <https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/>. The use of the word ‘or’ in line 114 leaves much room for interpretation and could allow for extended periods of time between cleanings.

Under the SOPs for cleaning and sanitation the group added language regarding the frequency of cleaning “Frequency of cleaning and sanitation activities (i.e. after daily use, when moving between commodities and fields and when excessive soil has built up)”. In addition, this specific sentence was modified to clarify “after daily use, when moving between commodities and fields and when excessive soil has built up.” Frequency requirements will be evaluated as part of the review timeline.

FMI: FMI recommends a requirement for documented pre-harvest inspections. See Appendix F: <https://www.wga.com/wp-content/uploads/d7files/Harvester%20Study.pdf>

The pre-harvest inspection was included as part of the daily assessment in Table 6. The language was modified to require conducting the inspection before releasing the product to harvest. Also, depending on the results of the inspection, the equipment may need to be re-cleaned or re-rinsed and sanitized.

FMI: There is nothing in this section regarding a Master Sanitation Schedule, though it is mentioned in the training section. FMI recommends including a requirement for including harvesting equipment in the Master Sanitation Schedule.

The group decided to keep the MSS in the training requirements, MSS was added to the glossary. In addition, the group will review adding MSS into the requirement in the next metrics review. The LGMA will focus on training and education regarding the development of a MSS.

FMI: There is nothing in this section related to Periodic Equipment Cleaning (PECs), which has been a topic of extensive conversation in industry. The 2021 Harvester Study <https://www.wga.com/wp-content/uploads/d7files/Harvester%20Study.pdf> highlights the value of including PECs in the holistic cleaning and sanitation program, and includes quantitative data to support the implementation of PECs.

Language regarding PECs was added by the group under the “Hygienic Design Review” section. PECs have been included in the review timeline, and the group will discuss PECs becoming a requirement in the next review. PECs were added to the glossary.

Dole FSQA: Food-contact and adjacent surfaces should be rinsed/sanitized after each break/lunch. This is outlined in our SSOPs for Value-Added and Fresh Pack

AZLGMA TSC: Is the intent of the committee to remove this requirement in an SOP? It is listed in best practices but included here for inclusion in an SOP. We do not think it should be removed from an SOP.

Under the SOPs for cleaning and sanitation the group added language regarding the frequency of cleaning “(Frequency of cleaning and sanitation activities (i.e. after daily use, when moving between commodities and fields and when excessive soil has built up)”. In addition, this specific sentence was

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modified to clarify “after daily use, when moving between commodities and fields and when excessive soil has built up.” Frequency requirements will be evaluated as part of the review timeline.

FMI recommends including the need to validate SSOPs or identify established studies as specifically suitable validations as part of their food safety program and risk management strategies. See:

<https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/>

See additional information within CPS funded project on harvest equipment cleaning & sanitation activities:

https://www.centerforproducesafety.org/researchproject/508/awards/CPS_TriState_Special_Project_on_Harvest_Equipment_A_datainformed_consensus_of_clean_for_the_intended_purpose.html

Verification requirements against the cleaning and sanitation SSOPs were added to be performed once a year using a quantitative method. (pre- and post-sanitation comparisons, and if available using historical data).

Regarding validation of harvesting equipment. There is limited availability on validated studies. CPS researcher (Michelle Danyluk) clarified that the funded CPS study does not contain information on validation of SSOPs. Validation of the SSOPs will be added to the review timeline, and the topic will be reviewed if studies regarding this topic are published.

FMI: FMI recommends adding recordkeeping to document when cleaning and sanitizing of hand harvest equipment is done and by whom.

This practice is part of the recordkeeping requirements of the LGMA.

FMI: Issue with “if potential”. How will they know that contamination has occurred? FMI recommends changing to “where there is evidence of potential contamination.”

This sentence was updated to reflect the recommendation.

“Conduct proper cleaning and sanitation after daily use, when moving between commodities and fields, and if potential contamination occurs.”

FMI recommends using clean and sanitize instead of rinse and sanitize for consistency. FMI recommends combining bullet 2 (line 170) with bullet 1 (line 168) to eliminate duplicity.

The working group modified this section to reflect the recommendations. Rinse was kept at the second bullet point as at the beginning of the day hand harvest equipment is rinsed and sanitized. While cleaning will happen after daily use, when moving between commodities and fields, and if potential contamination occurs.

- Conduct proper cleaning and sanitation after daily use, when moving between commodities and fields, and if potential contamination occurs.
- Rinse and sanitize at the beginning of every day.

AZLGMA TSC: Removed redundant language with addition in line 181.

The working group accepted modification of this language.

FMI recommends removing the word ‘consider’ as this will likely be difficult to audit against.

FMI recommends including specific examples of situations that would warrant the use of quantitative methods (ATP, APC). See: <https://www.foodprotection.org/members/fpt-archive-articles/2023-03-fresh-produce-harvesting-equipment-a-review-of-cleaning-and-sanitizing-practices-and-related/> :

“...visual inspection is subjective (i.e., dependent on human senses and worker-related experience) and should not be solely relied on as evidence that the equipment has been thoroughly and appropriately cleaned and sanitized and is ready to harvest crops in the field”.

The consideration was kept in the language. Verification requirements against the cleaning and sanitation SSOPs were added to be performed once a year using a quantitative method. (pre- and post-sanitation comparisons and, if available, using historical data).

Routine verification of SSOPs have been added to the review timeline, where this consideration will become a requirement.

Food Packaging Material Containers and Packaging

AZLGMA TSC: The term “Buildings” is the preferred language to be consistent with PSR and Glossary.

“Buildings” was accepted, replacing “infrastructure” throughout this section.

AZLGMA TSC: This section was not under review or discussed in the subgroup, it should be removed.

The working group discussed the addition of “Maintain and document pest control prevention steps.” The working group agreed to keep in the metrics.

Table 5: Harvesting Equipment Cleaning and Sanitation Preparation – Personnel, personal protection equipment, sanitation tools, chemicals, and Instruments.

FMI recommends specifying personnel who are properly trained to carry out task.

Language calling for trained personnel were added to table 5.

Table 6: Harvesting equipment cleaning and sanitation best practices, and 7 Steps for cleaning and sanitation, and verification.

FMI recommends ensuring practices are appropriate to avoid cross-contamination.

Under table 6 best practices language was included “Do not place clean equipment or equipment parts on the ground. Take precautions to avoid cross-contamination of product and/or equipment from high pressure water sprays.” Also under the sanitation preparation steps: “Move the harvester to a location away from unharvested product to avoid cross-contamination from spray and run-off. Cleaning and sanitizing chemicals should not reach unharvested product.”

AZ LGMA TSC: We feel moving documentation requirements into column 1 improves clarity. We’ve renamed column 1 to include documentation requirements, and changed name of column 2, now titled “process considerations.”

These improvements were accepted by the working group.

Dole FSQA: This step states “do not allow detergents solutions to dry” but there should be some verbiage around required contact times must be met before solution is rinsed.

Contact times and use of chemicals will be part of the training curriculum. Contact times vary depending on manufacturer specifications, therefore this should be addressed through training and included in the preparation steps, “Check cleaning and sanitizing chemicals are used according to manufacturer’s specifications.”

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Dole FSQA: Evaluation of chemicals used for sanitation should be done by qualified individual or through a 3rd-party sanitation or chemical company.

Dole FSQA: Harvest equipment should be sanitized prior to starting harvesting activities, the metrics only mentions hand-harvest equipment should be rinsed and sanitized at the beginning of the day.

FMI recommends adding.

1. Pre-inspection should be documented.
2. Any deficiencies in cleaning and/or equipment condition must be addressed, corrected, and documented.

FMI recommends changing to “re-clean.”

Language withing the metrics updated under the day of harvest steps.

“Prior to beginning harvest, conduct a daily inspection that addresses cleaning and sanitation or noticeable change in conditions since prior sanitation.

Based on the daily inspection, it may be necessary to re-clean or re-rinse and re-sanitize food-contact surfaces and adjacent surfaces on harvest equipment (i.e., accumulation of dirt, debris, dust, droppings, etc.).”

Dole FSQA: Per Harvest Forward the parameters for APC <2,000 CFU, ATP <10,000 RLU.

Pathogen testing (ex. Listeria) should be done on zones 2-3 seasonally (ex. during transition)

The working group included clarification on the verification using quantification methods. Routine quantification methods will be evaluated in the next review.

Dole FSQA: Random spot checks/audits of sanitation crew audits should be completed as part of the seasonal sanitation program assessment.

This is part of the sanitation self-assessment against issue 8.1.

AZLGMA TSC: Should use term “Issue” to be consistent with language.

Updated

Dole FSQA: Quantitative measurements on food-contact surfaces should be taken regularly, such as ATP (daily or weekly) on value-added machines.

Measurements could be taken on rotating equipment- for example, not all equipment needs to be tested every time.

The working group added quantitative measurements as part of the considerations. The frequency of these will be reviewed in the next review, when these will be required.

AZLGMA TSC: Is the intent to have each piece of equipment go through a verification using a quantitative method? Or is the intent to have one piece of equipment in the harvester’s fleet verified against the cleaning SSOP? For auditing purposes clarity is important.

The language was updated to reflect that one SSOP verification will be done per season as a way to review the SSOP and not individual harvesters.

FMI: Not all methods listed are quantitative.

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Clarification was added under microbial swabs to reflect that they are recommended for indicators and to use with caution when testing for pathogens.

Dole FSQA: Sanitation procedures should be developed and assessed using quantitative measurements (ex. APC) before and after cleaning. Food-contact and adjacent surfaces should be included.

This is addressed as part of the seasonal quantitative verification of the cleaning and sanitation SSOP.

KPI Tracking

Comments received by the HFC identified the need to track for KPIs and data collection.

This topic was widely discussed by the working group. KPI tracking and data collection efforts have been added to the development timeline. In the second review, the working group will review incorporating language regarding tracking KPIs. In the third review, the working group will discuss adding KPI tracking and data collection requirements to the metrics.



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