



FOOD SAFETY PROGRAMS & AUDITING PROTOCOL

FOR THE FRESH TOMATO SUPPLY CHAIN

2019

Greenhouse

UNITED  FRESH
PRODUCE ASSOCIATION

Food Safety Programs and Auditing Protocol for the Fresh Tomato Supply Chain, 2019

Forward

The *Food Safety Programs and Auditing Protocol for the Fresh Tomato Supply Chain* was initiated in October 2008, shortly after completion of the *Commodity Specific Guidelines for the Fresh Tomato Supply Chain*, 2nd Edition, in an effort to harmonize food safety audit standards for the fresh tomato supply chain. To prevent the Tomato Food Safety Protocol from becoming 'just another standard', a critical mass of fresh tomato "buyers" (e.g., processors, foodservice and retail) were asked to participate and be prepared to accept audits of their suppliers using this standard. In this way, the goal was ultimately to replace the multitude of similar but different audit standards with this single standard. Since its completion, the Tomato Food Safety Protocol (or, 'Tomato Metrics') has been intended for use in operations that are primarily handling tomatoes, and those who would undergo tomato-specific audits only; e.g., open field operations, harvesting, field packing, greenhouses, packinghouses, tomato repackers, tomato distributors and warehouses.

In June 2009, the United Fresh Food Safety & Technology Council and Board of Directors endorsed a similar plan to drive harmonization of all-inclusive produce GAP standards, to reduce audit fatigue and allow operations to focus their food safety resources on achieving food safety, rather than passing audits. This plan evolved into the Produce GAP Harmonization Initiative, an industry-wide effort including growers, shippers, produce buyers, government agencies, audit organizations and other stakeholders from a wide variety of commodities and growing regions. United Fresh helped convene this diverse group of stakeholders to review and harmonize existing GAP audit standards, with the goal of "One audit by any credible third party, acceptable to all buyers." Thirteen commonly accepted fresh produce food safety standards were evaluated by a group of 150 volunteer technical experts. The group identified the commonalities and selected the words from each that best suited a common standard, without sacrificing any food safety considerations. The end result was the Produce GAPs Harmonized Standard.

2011 Revision

In late 2010, the tomato industry reconvened to review the performance of the Tomato Metrics and recommended some changes involving the clarification and addition of select items. Accompanying checklists were also amended based on new additions.

2019 Revision

In an effort to further reduce redundancy among audits, the Tomato Working Group compared requirements in each of the four modules to requirements in the Combined Harmonized Standards. The group identified a considerable amount of Tomato Metrics requirements that were functionally the same as requirements in the Harmonized Standards (i.e., not unique to tomato operations). A new structure for the Tomato Metrics was agreed upon in which tomato operations will use the Harmonized Standard (or other similar GAP programs) as the base food safety protocol with the Tomato Metrics included as an industry specific addendum. As such, in the 2019 revision the Tomato Metrics were greatly reduced compared to previous versions. Those items that remain are either unique to the tomato industry, or not necessarily unique, but not currently in the Harmonized Standards.

Format of the Tomato Metrics and Their Use

Four sets of Tomato Metrics were developed for use by operations and auditors: Open Field Production, Harvest and Field Packing; Greenhouse; Packinghouse; and Repacking and Distribution. Each set contains auditable requirements – “Items” – that the participants concluded should be attainable and in place for any North America fresh tomato operation, regardless of region, size, growing practice (e.g., organic) or sub-commodity handled. As appropriate to the type of operation, the Items were further divided into sections that the participants considered critical for a food safety program.

For each Item, the Tomato Metrics contains a simply-stated Requirement and a Procedure that restates the requirement in other words, in an effort to minimize misunderstanding. The Requirement and Procedure are instructions to the operation to clearly describe the programs that are expected to be in place and maintained, and that will be audited. Each Item also includes a Verification and Corrective Action/Disposition. The Verification is provided as instruction to the auditor how to verify whether the operation has complied with the Requirement. The Corrective Action/Disposition is provided as instruction to the operation if the audit determines that compliance has not been achieved. While each of these is not necessarily binding on the operation or the auditor – equivalent procedures and actions that meet the intent of the Item are acceptable or, in some cases, not applicable – they are provided in an effort to minimize “standards creep”, which has led to the multitude of disparate and often conflicting standards.

It was the intention in the development of these Tomato Metrics that the *Commodity Specific Guidelines for the Fresh Tomato Supply Chain*, 3rd edition serves as a prerequisite reference to the use of this document. Each of the four Tomato Metrics are intended for discrete segments of the fresh tomato supply chain, and it is the responsibility of the user to utilize the appropriate document. Throughout the documents, the term “shall” is used to indicate an action mandatory for compliance, while “should” indicates a recommended action that may not be necessary for some operations. In an operation’s food safety program that is compliant with the Tomato Metrics, standard operating procedures (SOPs) may be designed to cover more than one requirement.

Performance of an audit to verify compliance with the Tomato Metrics is expected to include reviews of pertinent policies and SOPs, official records demonstrating compliance, and visual observations of the operation to determine the current level of compliance. In order to demonstrate compliance, all required documentation shall be kept on file and made available for review by the auditor. Lot-specific records shall be retained for two (2) years or as required by prevailing laws or regulations. Observation of incomplete or otherwise noncompliant records required for compliance shall require a corrective action, such as retraining of the responsible individuals. The operation shall assess whether the noncompliant records indicate a potential food safety risk. Where training is required, it is expected that employees sign their training records, indicating that they understand and agree to follow the policy or procedure that is the subject of the training. Observations of noncompliances that may result in a risk of contamination of public health concern shall require an immediate corrective action and an assessment of the actual noncompliance and, if contamination is reasonably likely to have occurred, a corrective action shall be taken to prevent the affected product from being harvested or distributed into commerce. Such corrective actions shall be documented and those records shall be available for regulatory review, in compliance with prevailing laws and regulations. It is a violation of federal law (i.e., Federal Food, Drug and Cosmetic Act) to

introduce or deliver for introduction into interstate commerce any food that is adulterated or misbranded. Foods, including fresh tomatoes, that are discovered to be adulterated and have been released into commerce should be recalled and the prevailing regulatory authorities notified.

User's Note

This Tomato Food Safety Protocol identifies food safety practices that are intended to minimize the microbiological hazards associated with fresh and fresh-cut tomato production and handling. The intent of this document is to identify current industry standards for food safety and handling in a manner consistent with existing applicable regulations, standards and guidelines. The information provided herein is offered in good faith and believed to be reliable, but is made without warranty, express or implied, as to merchantability, fitness for a particular purpose, or any other matter. This Tomato Food Safety Protocol was designed to apply to any applicable North America fresh tomato operation, with the recognition that alternative processes and standards may be equally effective and acceptable, and that future research and experience may demonstrate a need, from time to time, to amend these standards. It is the responsibility of the user of this document to verify that this Tomato Food Safety Protocol is the current version and is appropriate for the audited operation. United Fresh Produce Association, its members and participants in the development of this Tomato Food Safety Protocol do not assume any responsibility for compliance with applicable laws and regulations, and recommend that users consult with their own legal and technical advisers to be sure that these standards meet with applicable requirements.

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Note: *These protocols are intended to be used as an addendum to the Harmonized Standard, or other GAP program. As such, corresponding sections of the Harmonized Standard are listed below the heading of each section within this protocol.*

| 1. Management Responsibility | | | | |
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| Corresponds to Field Operations and Harvesting Harmonized Standard section 1.1 | | | | |
| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
| 1.1 | Operation has current copies of the <i>Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain, Food Safety Programs and Auditing Protocol for the Fresh Tomato Supply Chain</i> , the relevant <i>Harmonized Food Safety Standard</i> , and additional food safety documents as required by state and/or federal regulation. | Operation has a current copy of the Guidelines, this audit document and all other required documents. | Auditor observes the current copies at the operation. | Operation obtains current copies. |
| 2. Recordkeeping and Traceability | | | | |
| Corresponds to Field Operations and Harvesting Harmonized Standard sections 1.3 and 1.6 | | | | |
| A. Greenhouse Packing | | | | |
| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
| 2.1 | Containers shall be accurately labeled with commodity name, greenhouse firm name and information sufficient to allow for source and lot identification. | A product coding system is in place where product shall be labeled with grower and lot identification, and coded to enable access to date of harvest and/or packing, origin (name of greenhouse, grower and/or packing location), and country of origin for traceback purposes. If using reusable containers, procedures ensure that labels are accurate prior to packing. | Auditor reviews coding procedures, observes cases for appropriate coding, and verifies compliance by review of records. | Boxes with missing, inaccurate or illegible coding are labeled with appropriate identification. Procedure is developed or revised. Retraining is performed. |

| B. Packinghouse Packed Greenhouse Tomatoes | | | | |
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| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
| 2.2 | The greenhouse shall maintain supply chain information available to the packinghouse to facilitate accurate traceability; i.e., quantity, greenhouse identification and date of harvest/pack. | Operation has procedures to retain and provide to the packinghouse records of source of seed or transplants, soil inputs, irrigation water sources and test records, names of crews involved in greenhouse operations, and other crop history information relevant to product safety. Records are retained for at least two years or as required by prevailing regulation. | Auditor reviews policy and reviews records for compliance. | Policy is developed or revised. Non-compliances are corrected on-site. Retraining is performed. |

| 3. Self-Audits | | | | |
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| Corresponds to Field Operations and Harvesting Harmonized Standard sections 1.9 | | | | |
| 3.1 | Operation has procedures for conducting self-audits, and conducts self-audits to verify compliance with established internal policies and procedures. | In addition to the requirements of the Harmonized Standards, the operation's self-audit procedure ensures compliance with established internal policies and procedures, the <i>Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain</i> , these Tomato Metrics and additional food safety documents as required by state and/or federal regulation. | Auditor reviews the self-audit procedures, and records of self-audits to verify compliance with the procedures. | Operation develops and maintains self-audit program, with corrective actions preventive measures, documentation and follow-up. |

| 4. Greenhouse | | | | |
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| No corresponding section in Field Operations and Harvesting Harmonized Standard | | | | |
| Item# | Requirement | Procedure | Verification | Corrective Action/Disposition |
| 4.1 | The greenhouse shall be enclosed. | The greenhouse shall be permanent or temporary structure, sufficiently enclosed to maintain a controlled environment. This does not apply to open structures such as shade or hoop houses, which should operate according to the auditing protocol for Open Field Production, Harvest and Field Packing. | The Auditor shall inspect the structure for compliance with this definition. | If the structure is not in compliance, either the facility must be brought into compliance or different audit criteria (i.e., auditing protocol for Open Field Production, Harvest and Field Packing) should be used. |
| 4.2 | A foot dip station or other measure should be used to prevent the introduction of harmful microorganisms or agents and a written record of the sanitizer and maintenance kept. | If the facility has determined that footborne contaminants are a risk to food safety, they shall have procedures that effectively prevent contaminants from being brought into the greenhouse on shoes. This could be by means of chemical disinfectants in foot dips, sprays or boot wash, or by means of a shoe change procedure. If chemical disinfectants are used, the chemical shall be used according to label instructions and monitored at a frequency sufficient to assure continual effectiveness, and records shall be maintained to demonstrate compliance. | If the facility is using footborne contamination controls, the auditor shall review the procedure, and will observe whether those procedures are being followed at the time of the audit. The auditor shall also review any associated records, including the label instructions for any chemical disinfectants used, for evidence of compliance with the facility's procedures. | If the facility is using footborne contamination controls, they shall develop or implement the procedures to be effective, including training in their use. |
| 5. Worker Health/Hygiene and Toilet/Handwashing Facilities | | | | |
| Corresponds to Field Operations and Harvesting Harmonized Standard section 2.2 | | | | |
| Item# | Requirement | Procedure | Verification | Corrective Action/Disposition |
| 5.1 | Restrooms should not open directly into greenhouse production areas. | Restrooms that do open directly into greenhouse production areas shall be equipped with self-closing mechanisms or have a maze-type entrance/exit. | Auditor visually verifies that the toilet facilities are located and designed in a compliant manner. | Operation retrofits or relocates the toilet facility. |

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| 5.2 | If portable hand wash water tanks are used, they are cleaned and sanitized and the water is changed periodically. | Water tanks used to provide hand wash water shall be maintained at a prescribed frequency in a clean and sanitary manner. | Auditor reviews cleaning and sanitizing protocol and service logs, and visually observes condition of water tanks for signs of non-compliance. | Clean and sanitize the tank, replace water to compliance. |
| 5.3 | Operation shall have a written policy regarding employees' outer garments. | Policy includes that employees shall wear suitable outer garments, not reasonably likely to serve as a source of contamination of tomato or food contact surface, and, as appropriate to the operation, use of plastic aprons and sleeves, and empty pockets above the waist. Outer garments shall be changed after cleaning drains, restrooms or other activities that may result in contamination. | Auditor reviews the policy, observes employees for compliance and interviews employees for knowledge of the policy. | Policy is developed or revised. Non-compliances are corrected on site. Retraining is performed. |

6. Pesticides

Corresponds to Field Operations and Harvesting Harmonized Standard section 2.3

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| 6.1 | Water used to mix pesticides meets FDA <i>E. coli</i> standards for water in 21 CFR § 112.44(a); i.e., no detectable generic <i>E. coli</i> in 100 mL of agricultural water. | Operation has a written policy requiring foliar-application pesticides to be diluted only with water that meets FDA microbial standards for post-harvest agricultural water. Operations will have documentation demonstrating compliance, such as test results for the water source used. | Auditor reviews the policy and inspects pesticide mixing and application records. | Operation develops a written policy. Retraining of pesticide applicator as needed. If unknown or non-drinking quality water was used to prepare pesticides, then test the water source for compliance with drinking water <i>E. coli</i> standards. Do not harvest product unless test results demonstrate compliance. |
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7. Water Used in Growing Activities

Corresponds to Field Operations and Harvesting Harmonized Standard section 2.4

| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
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| 7.1 | Non-Foliar The water test meets FDA <i>E. coli</i> standards for foliar application of water as described in 21 CFR § 112.44(b). | Written procedure requires a BAM or other testing procedure validated for generic <i>E. coli</i> quantitation in water. | Auditor reviews water test results and any corrective actions taken to bring the water source into compliance. | Perform a sanitary survey for each affected water source, perform any remedial action as required and retest. If the retest also exceeds the standard, further evaluate potential corrective actions, such as treatment, retreatment, or discontinue use of source. |
| 7.2 | Foliar The water test meets FDA standards for water in 21 CFR § 112.44(a); i.e., no detectable generic <i>E. coli</i> in 100 milliliters (mL) of agricultural water. | Written procedure requires a BAM or other testing procedure validated for generic <i>E. coli</i> quantitation in water. | Auditor reviews water test results and any corrective actions taken to bring the water source into compliance. If tomatoes have been contacted with non-compliant water, auditor reviews the risk assessment and disposition. | Perform a sanitary survey for each affected water source, perform any remedial action as required and retest. If the retest also exceeds the standard, further evaluate potential corrective actions, such as treatment, retreatment, or discontinue use of source. Operation shall evaluate tomatoes that have been contacted with non-compliant water to assess food safety risk. The assessment is documented and tomatoes dispositioned accordingly. |

8. Soil and Soil Amendments

Corresponds to Field Operations and Harvesting Harmonized Standard section 2.6

| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
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| 8.1 | Soil or other growth medium shall be stored in a manner that minimizes opportunities for contamination. | If soil or growth medium is stored on-site, it is held in a sanitary manner to ensure it is not a source of contamination. Procedures for storage of growth media shall comply with prevailing laws or regulations in the location of the greenhouse. | The auditor shall observe storage location and procedures for evidence of compliance. | Operation develops a written procedure and provides training. If there is evidence of contamination of public health significance, the medium shall not be used. |
| 8.2 | Fertilizer manufacturer's instructions for usage and storage shall be followed. | Non-organic fertilizers must be used and stored in compliance with label instructions and any prevailing federal, state or local regulations. Fertilizer uses shall be documented. | Auditor reviews non-organic fertilizers used, storage location and application records. | Perform training on fertilizer handling and recordkeeping procedures, as needed. |
| 8.3 | If fertilizers containing manures or composts are used, only properly treated (composted or heat treated) manures are allowed for use in greenhouses. Biosolids are not permitted. | Soil amendment use records are available, reviewed and current (conventional or organic). If treated manures are used, records of composition, dates of treatment, methods utilized, application dates and letter of guarantee, certificate of analysis (COA) or any test results or verification data demonstrating compliance with process or microbial standards must be documented. For non-composted animal by-products-containing soil amendments, the operations shall retain a certificate or letter showing the lethality of the process. Compost applications shall be no less than 45 days prior to harvest. | Auditor reviews the amendment use documents and records demonstrating compliance with prevailing national or local established composting or heat treatment standards or guidelines. | Operations must obtain the necessary documents. If the documents cannot be obtained, crop cannot be harvested for that crop cycle. |

9. Sanitizing Agents Used During Harvest

Corresponds to Field Operations and Harvesting Harmonized Standard section 2.7

| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
|-------|--|--|---|--|
| 9.1 | All compounds used to clean or sanitize food contact containers, tools, utensils, equipment or other food contact surfaces are approved for that use by the US EPA, FDA or other prevailing agency. Actual use conforms to label directions. | Documentation is available to demonstrate that cleaning and sanitizing products are approved for their use, and are used according to label directions. Sanitizing chemicals uses shall be documented. | Auditors review documentation and supplies to confirm approved use, and interview individuals responsible for their use for knowledge of approved use. Auditor reviews records of use, and visually observes use, to verify compliance with label directions. | Non-compliances are corrected on-site. Records are reviewed for potential product adulteration. Retraining is performed. |
| 9.2 | Chemicals used on product that are not registered pesticides may be permitted for food contact use if allowed under regulations of the FDA or prevailing agency. | Any product contact chemicals not specifically approved as registered pesticides shall be identified, the authority permitting their use identified and their uses documented. | Auditors review documentation and supplies to confirm approved use, and interview individuals responsible for their use for knowledge of approved use. Auditor reviews records of use, and visually observes use, to verify compliance with label directions. | Non-compliances are corrected on-site. Records are reviewed for potential product adulteration. Retraining is performed. |

10. Product Wash Water Management

Corresponds to Field Operations and Harvesting Harmonized Standard section 3.2

| Item# | Requirement | Procedure | Verification | Corrective Action/ Disposition |
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| 10.1 | In systems where tomatoes are submerged or dwell in water, water temperature is monitored and controlled. Water temperature should be at least 10°F above average pulp temperature of tomatoes when entering the water. | Operation shall have methods for determining average pulp temperature of a minimum of 5 tomatoes, a procedure for control of water temperature, shall monitor temperature at a prescribed frequency sufficient to assure continuous compliance (minimum of hourly) and shall maintain records of water temperature. Operation shall have a procedure as to what corrective actions are taken if criteria are not met. Water spray or shower systems, wherein tomatoes are not submerged or dwell, do not require temperature control. | Auditor shall review the procedure and shall review records of temperature monitoring. Auditor observes process including the operation's sampling of pulp and water temperatures. Auditor reviews records for deviations and their disposition. | Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at temperatures less than the average measured pulp temperature shall be discarded back to the last evidence of compliance. |
| 10.2 | Operations utilizing spray systems in place of whole tomato immersion shall design the line so that the entire tomato surface is rinsed. | Spray systems shall be designed such that rinse water contacts all surfaces of the tomato. | Auditor observes spray system for compliance. | Equipment or process is redesigned or retrofitted to ensure all surfaces of tomato are contacted. |
| 10.3 | If a spray bar system is used, operation has a water use SOP that addresses treatment of that water. | Operation's water use SOP requires spray bar water to be treated using an approved antimicrobial to maintain a microbially hostile environment on equipment. | Auditor shall review water use SOP for completeness, and observes water treatment records for adequacy and consistency of treatment. | Operation discontinues using spray bar water that is not treated sufficiently to maintain a hostile environment on equipment. Retraining is performed and documented. Affected product is evaluated for potential contamination and disposition. |

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| 10.4 | If water quality is based upon a chlorine-based sanitizer, the process shall be targeted to be at least 100 ppm free available chlorine (FAC), measured at the exit of the product from the water system, unless validation data are available to demonstrate a lower FAC is effective under operating conditions. | Operation shall have a procedure to manage FAC levels, shall establish process adjustments for when the FAC drops below 100 ppm, and shall maintain records to verify proper management of levels. | Auditor shall review the procedure and shall review records of FAC measurement and appropriate management. Auditor reviews records for deviations and their disposition. | Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at FAC less than 100 ppm shall be discarded back to the last evidence of compliance. |
| 10.5 | If water quality is based upon a peroxyacetic, peracetic or peracid system, levels shall be maintained in accordance with manufacturer's label directions. | Operation shall have a procedure to manage peracid levels, shall establish process targets so as not to drop below the minimum ppm, shall establish adjustments for when the peracid level drops below the target ppm, and shall maintain records to verify proper management of levels. | Auditor shall review the procedure and shall review records of peracetic measurement and appropriate management. Auditor reviews records for deviations and their disposition. | Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at less than manufacturer's recommendation shall be discarded back to the last evidence of compliance. |
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11. Product Containers and Packaging Materials

Corresponds to Field Operations and Harvesting Harmonized Standard section 2.72 and 3.3

| Item# | Requirement | Procedure | Verification | Corrective Action/Disposition |
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| 11.1 | Operation has a written procedure for inspecting incoming packaging material. | All packaging materials are inspected for evidence of contamination upon arrival. Results are recorded. | Auditor reviews procedure and examples of packaging and receiving records for compliance. | Operation creates or revises policy. Contaminated or adulterated packaging material is rejected or discarded. Retraining is performed. |

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| 11.2 | Reusable containers and food contact equipment and utensils shall be constructed of impervious materials that can be easily cleaned and sanitized. | Written SOP requires that all reusable product containers are made of materials that can be sanitized, or clean and sanitary liners are used. Wood is not an appropriate food contact surface. Procedures require damaged containers that are no longer easily cleanable or sanitary shall be removed from service of food contact purposes. | Auditor reviews SOP, visually observes product bins, trays and containers and their use for evidence of non-compliance. | Policy is developed or revised. Non-compliances are corrected. Operation makes a commitment for phasing out non-conforming product containers; e.g., wooden bins, in a reasonable timeline. Retraining is performed. |
| 11.3 | Finished product containers are prohibited from direct contact with the floor, and pallets, slip sheets, and supports used to keep product containers off the floor are clean and in good condition. | Operation has a policy prohibiting finished product containers in direct contact with the floor, and that pallets, slip sheets, and supports used to keep product containers off the floor are maintained so as not to be a source of contamination. | Auditor reviews policy and examines finished product staging and storage areas and pallets, slip sheets, and supports for compliance with the policy. | Operation creates or revises policy. Non-compliances are corrected on site. Retraining is performed. |