Idaho Produce Safety Video Series

Brought to you by:

Idaho State Department of Agriculture

University of Idaho Extension

Agricultural Water

Contents

****websites and links, CTRL+click to follow link****

Introduction:

Hello! This video will cover some general requirements of Subpart E—Agricultural Water of the Produce Safety Rule.

The FDA is reviewing Subpart E—Agricultural Water and may propose future modifications to this section.

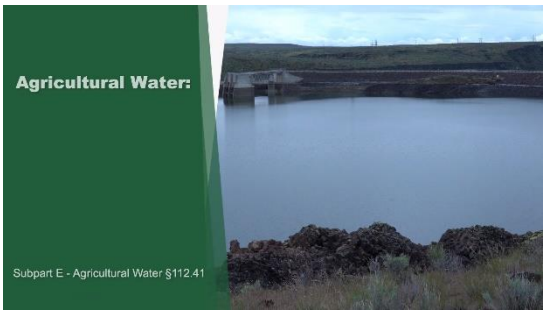
In order to complete a comprehensive review of this section, the FDA has:

1. Has extended the agricultural water compliance dates;
2. Is considering modifying the agricultural water standards; and
3. Has approved additional water testing methods.

Therefore, in this video we will only be covering general requirements of Subpart E, testing, and recommended water sampling techniques. We will not be covering all the sections within Subpart E—Agricultural Water.

Notes Section

When the FDA finalizes the agricultural water section of the Produce Safety Rule, we will update this video to include those specific requirements. If you have any questions on this or for updates, please visit our website.



Before we get started... let's review how the FDA Produce Safety Rule is laid out.

The Food and Drug Administration Produce Safety Rule is one part of the FDA Code of Federal Regulations (CFR).

This database includes a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.

The water section requirements can be found in CFR 21 Part 112.

Today we'll review:

- **RECORDKEEPING**
- **THE IMPORTANCE OF PROTECTING YOUR AGRICULTURAL WATER AND THE RISKS ASSOCIATED WITH IT**
- **PREHARVEST, HARVEST, AND POST-AGRICULTURAL WATER SOURCES**
- **AGRICULTURAL WATER SYSTEM INSPECTION REQUIREMENTS**
- **WATER TESTING AND RECOMMENDED WATER SAMPLING TECHNIQUES**
- **LASTLY…WE WILL DISCUSS GENERAL REQUIREMENTS FOR HARVEST AND POSTHARVEST WATER**

There will be definitions of important terms included on-screen throughout this video. Feel free to pause the video at these times in order to review the definitions.

Pay attention to the word ***MUST*** and *SHOULD*… ***MUST*** indicates that it is required by the Produce Safety Rule. *SHOULD* indicates suggested good agricultural practices.

You may print out this presentation at any time. This will be available for viewing on the Idaho State Department of Agriculture (ISDA) and University of Idaho Extension (UI) websites. It is a good idea to have a copy of the Produce Safety Rule when you view this video... so you can reference the rule throughout this presentation. You may pause this video at any time.

Okay, let's get started!

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Our first objective covers the recordkeeping requirements of Subpart E.

Covered Activities:

When using water for covered activities you ***MUST*** establish and keep records required under this subpart in accordance with the requirements of Subpart O – Records. If you are already keeping records that meet the requirements outlined, there is no need to duplicate them if they contain all the required information. If you are not keeping records currently, please visit the ISDA produce safety website or the Produce Safety Alliance Website for templates and instructions on how to use the record keeping templates. You can also find information on agricultural water record keeping in the ISDA video Recordkeeping—Agricultural Water, located on our website and hosted on YouTube under Idaho Produce Safety Video Series.

Agricultural water that is applied directly to produce can transfer **pathogens**; therefore, understanding the risks associated with the water used before, during and after growing produce is important in preventing or reducing risk.

Knowing where your agriculture water comes from, water application method, and when water is applied will greatly reduce the risk to produce, ultimately reducing risk to the consumer.

Risk factors will vary depending on when water is applied. Water applied preharvest or during growing, has a different set of risks than water that is applied during harvest or postharvest.

Preharvest water comes from a variety of sources including: public water systems, ground water, and surface water.

Preharvest water includes irrigation, spray applications, frost protection, dust abatement, cooling, and any other uses where water directly contacts produce and food contact surfaces prior to harvest or during the growing of produce.

Harvest and postharvest water usually come from two sources: a regulated public water system or a ground water source.

Harvest water is water used during harvest and may include cooling or washing in the field.

Postharvest water includes water used for washing or rinsing produce, movement of produce, ice, handwashing, cleaning and sanitizing, and any other uses where water directly contacts produce and food contact surfaces during or after harvest.

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The FSMA Produce Safety Rule addresses what requirements apply to the quality of agricultural water–all agricultural water ***MUST*** be safe and of adequate sanitary quality for its intended use.

Throughout this video we will be looking at the different risks related to agricultural water.

Water Sources:

First, let's talk about agricultural water sources.

Public water sources are municipal drinking water systems and include wells or ground water…and surface water. They present the least amount of risk because they are closely monitored by the public water utility and closely regulated by the Environmental Protection Agency (EPA) and local state government. This means the water is tested regularly to verify that it meets drinking water standards; therefore, is generally considered a very low risk.

There is no requirement to test your agricultural water if you receive water from a regulated public water system.

Ground water sources…. or wells, for the most part, are less likely than surface water to be contaminated with pathogens because water filters through many layers of the ground before it reaches the ground water aquifer. Although, if a well is not maintained properly the risk can be higher. Risk factors include well construction, well location, and aquifer location.

For example, if a well is missing the well cap, it is essentially an open water source because it is open to the environment; therefore birds, rodents and other contaminants could reach the aquifer. Or…

In-ground well housing is another example. Flooding is often associated with in-ground well housings and if a well housing becomes flooded and the well casing is not properly sealed, surface water can enter the well and contaminate the aquifer.

If you are pumping ground water from a well into a pond or a ditch, the water is no longer considered ground water and is now considered a surface water source because it is open to the environment.

Surface water presents the highest risk because these sources are open to the environment. Canals, lakes, ponds and reservoirs are examples of surface water

sources. The quality of water varies greatly depending on the location of the water and other uses and users of the water.

For example: Water that comes from a large reservoir might be used by five different farms and run through six different irrigation ditches before reaching your farm.

In addition to the source of water used for produce, method and timing of application are important and may impact the potential for contamination of produce.

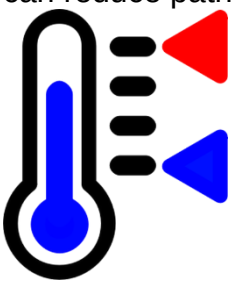
For example: drip irrigation applied in an orchard may be lower risk than sprinklers because water applied through drip irrigation does not typically contact the produce. Sprinkler applied water in an orchard would most likely contact the produce, increasing the risk of contamination.

Now lets' take a look at produce grown underground. Drip or furrow irrigation applied to produce grown underground would most likely contact the produce; therefore, the risk of contamination to the produce would be higher than produce grown off of the ground.

Application:

Now that we have looked at water sources and how water is applied, let's review the importance of when water is applied.

The more time between application of water and harvest can reduce pathogens on produce; therefore, reduce risk.



The more time between application of water and harvest can reduce pathogens on produce; therefore, reduce risk.

Pathogen die-off is an example of this. Many environmental factors can influence pathogen die-off including sunlight, temperature, and drying. More time between last water application and harvest is generally better for reducing pathogens on produce.

It is important to always ask yourself, "does this water directly contact the produce?", if the answer is yes, then you **MUST** reduce risk by managing the water source, application methods, and timing of application.

There are several components that address the inspection requirements of agricultural water.

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Section 112.42 covers the requirements that apply to agricultural water sources and systems.

At the beginning of a growing season, as appropriate, but at least once annually, you ***MUST*** inspect all of your agricultural water systems, to the extent that they are under your control.

Ground water sources *SHOULD* be frequently inspected to ensure the well is in good condition. It is equally important to be aware of adjacent land uses such as septic systems location, livestock operations, and waste water discharge locations.

Common things to inspect include ensuring the wellhead is properly capped, sealed and elevated, backflow prevention is installed, and land is sloped away from the wellhead to prevent runoff into the well.

Because **surface water** sources are open to the environment, they are exposed to many potential contamination sources. You *SHOULD* frequently inspect for contamination including dead animals, manure, humans, and unwanted debris. If you have recurring issues and are concerned about contamination to your water, you might take steps to reduce contamination risk such as, monitor and control access using fences, signs, animal deterrents, or netting.

Frequently inspect head gates, ditches, pipes and other water distribution systems that are within your control to ensure they do not become a source of contamination. If an inspection of these components reveals an issue, take the time to fix it or report it to someone who can.

Last but not least, you ***MUST*** consider the likelihood of introduction of known or reasonably foreseeable hazards to agricultural water by another user of the water before it reaches your covered farm.

For example, if a composting operation moves in just upstream from your farm, consider the likelihood of that operation affecting the water you use. You could do this through water sampling or frequent inspections of the water source that is in your control.

Testing:

Water testing is fundamental in knowing the quality of water and identifying whether your water source has been contaminated.

Knowing how and where to sample your water is very important to ensure your sample accurately represents the number of generic *E. coli* in your water. If you

receive water from a regulated Public Water System or treat water in accordance with the requirements of the rule, there is no requirement to test your agricultural water.

For **preharvest water**, when collecting ground water and surface water samples you should collect samples that are representative of the water used during growing activities. Which means you need to collect samples from the water body closest to where you are growing produce.

For example, if the water source used to water your produce field is a small irrigation ditch that is diverted off a large canal you would want to sample from the small ditch, because the small ditch is closer and more accurately represents the water applied to your produce.

For **harvest and postharvest water** activities, you ***MUST*** take samples that are representative of the use of the water used.

Corrective actions include applying a time interval for microbial die off, re-inspecting the water system to identify problems and make necessary changes, or treating the water. Corrective actions will vary depending on the covered activity being performed.

Water quality can vary greatly depending on the time of year, especially if you are using surface water sources. When collecting your sample, the location, attached hoses, filters and proper line flushing can all impact your test results. Aseptic sampling techniques ***MUST*** be used to ensure the integrity of your water sample.

In preparation for taking a water sample you should follow these simple steps:

First, you need to identify the sample collection location.

Untreated surface water and untreated ground water used during preharvest activities **MUST** be representative of your use of the water and **MUST** be collected as close in time as practicable to, but prior to harvest.

Untreated ground water used for harvest and postharvest activities **MUST** be representative of your use of water.

If possible, do not collect samples from hoses, as they could be a source of contamination. It is not a recommended practice to sample from a house tap, because many house taps use filters, water softeners or chlorinators and the production water used for covered crops may not be using a filter or chlorinator.

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Second, make sure you have the proper supplies—This includes a lab issued sterile sample bottle that has the ability to test your water using one of the approved water testing methods required by the Produce Safety Rule. Be sure to ask the lab for sampling instructions, including storage and acceptable hold times.

Do not rinse or re-use the bottles. The bottles are sterile so care must be taken not to contaminate the bottle or cap. It is good practice to label your sample bottle with the sample identifier, date of sample, name of sampler, time, and location before taking the sample. Make sure you are using a non-smearing pen to write on the bottle label.

Other supplies include a sampling device or pole, gloves, and cooler to keep the sample chilled.

Very important: do not store empty or full sample bottles and equipment in a dirty place such as the back of the truck or on the floor of your vehicle. Doing so may contaminate your sample container and alter your sample results.

Last, but not least, make sure you deliver or ship your water sample(s) to the lab in a timely manner and at the temperature recommended by the lab. The sample holding time starts at the time you collect your sample(s) and ends when the lab prepares and analyzes the sample. Every sample method has a different holding time requirement, so it is very important you follow instructions provided by the lab.

Groundwater Sampling:

Now that we are properly prepared with supplies and sampling location that is representative of the use of water, let's collect our sample.

When collecting a **groundwater or well sample**:

First, use a spigot located after any filters and try to use a spigot that is not attached to a hose. Water sampling from the end of a pipe or distribution system must reflect the water used during water applications and accurately reflect the water applied to your produce.

Second, use your non-smearing pen and write your sample identifier, date of sample, name of the person taking the sample, time, and location identifier on the side of the bottle.

Third, open the spigot and let the line flush for 3 to 6 minutes prior to collecting a sample. The length of time the water should run will depend on where you are sampling in the distribution system. The farther you are from the source, the longer the water should run before taking a sample.

After flushing, it is good practice to swab the inside and the outside of the spigot with an alcohol pad. After swabbing, open the spigot to flush out the alcohol for about 20 seconds. Do this before putting your sample bottle in the flow of water and before putting gloves on. There is no need to turn off the water before sampling.

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Fourth, glove up…. putting gloves on reminds you that you are about to take a sample and not to put your hands in the dirt or start another task. This should be done while you are flushing the water line.

Lastly, remove the cap from the bottle by holding the cap by its outside edges only; do not set the cap on the ground or other surface where it may become contaminated. You can hold the cap in one hand while collecting the sample with the other hand.

Tip the bottle into the main flow of water coming from the spigot until the bottle is at least 100 mL full, ensuring you leave headspace in the bottle, then place the lid tightly on the bottle. Place your bottle in a cooler with ice, but not so much that the lid is covered.

Now you are done!

Surface Water Sampling:

When collecting a **surface water sample**:

The sampling location *SHOULD* be closest to where the agricultural water is most likely to come in contact with produce prior to the actual use.

First, you want a safe place to sample. Be careful when leaning into a body of water, so you do not fall in. If possible, use a sampling pole or some type of extending device to reach the middle of the body of water. A sampling pole will allow you to gather the sample from the middle of the water source where water is flowing and is most similar to what is being applied to covered produce.

Second, use your non-smearing pen and write your sample identifier, date of sample, name of person taking the sample, time, and location identifier on the side of the lab issued bottle.

Third, affix your sterile sample bottle from the lab to the extension device or pole.

Fourth, glove up! Putting gloves on reminds you that you are about to take a sample and to not put your hands in the dirt or start another task.

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Lastly, remove the cap from the bottle by holding the cap by its outside edges only; do not set the cap on the ground or other surface where it may become contaminated. You can hold the cap in one hand while collecting the sample with the other hand.

Now you are ready to collect your sample.

To collect your surface water sample, make sure the mouth to your sample bottle is facing downward and in a sweeping arc motion against the current—if there is one. Collect your sample from the middle of the whole body of water or as far away from the bank as possible. Fill your bottle to the 100 mL line, leaving headspace in the bottle. Place the lid on the bottle making sure your lid is tight and then place your bottle in a cooler with ice, but not so much ice that the lid is covered.

Now you are done!

Locations:

Be aware of your sampling location. You do not want to skew results by collecting your sample from the sides, top or bottom of your surface water source since this is where debris buildup and other containments reside. A good rule of thumb is to sample at least 6 inches out from the side of the water body and 6 inches down.

Now let's talk a little about harvest and postharvest water.

This section only applies to operations using water during harvest or during postharvest activities. Such as, water used for commodity movement, washing, or handwashing.

Harvest and postharvest water include water applied directly to produce and food contact surfaces, washing or cooling, dehydration prevention, making ice that will contact produce or food contact surfaces and handwashing water.

Harvest and postharvest water ***MUST*** be safe and of adequate sanitary quality for its intended use. If you plan on treating harvest or postharvest water you ***MUST*** monitor any treatments at a frequency adequate to ensure that the treated water is consistently safe and of adequate sanitary quality for its intended use.

Harvest and postharvest water ***MUST*** be free from generic E. *coli*. Untreated surface water is not allowed for these activities.

When using harvest and/or postharvest water you ***MUST*** manage the water as necessary, by establishing and following water change schedules for re-circulated

water, to maintain its safety and sanitary quality and minimize the potential for contamination of produce and food contact surfaces with known or reasonably foreseeable hazards.

If you are treating the water, you must monitor any treatment of agricultural water at a frequency adequate to ensure that the treated water is consistently safe and of adequate sanitary quality for its intended use and/or consistently meets the relevant microbial quality criteria listed in this subpart.

Water treatments used ***MUST*** be registered by the EPA for their intended use. Information on registration should be listed on the product label and ***MUST*** be followed.

Water pH can affect the effectiveness of a sanitizer, so it is important to monitor and adjust the pH as needed. pH strips are an easy way to monitor levels in the water. There are many ways to monitor; therefore, it is important to research products and make sure you are using the appropriate monitoring devices.

You ***MUST*** visually monitor the quality of water used during harvest, packing, and holding activities of produce for buildup of organic material such as soil and plant debris.

Last but not least….

You ***MUST*** maintain and monitor the temperature of water at a temperature that is appropriate for the commodity and operation, and is adequate to minimize the potential for **infiltration** of microorganisms of public health significance into produce.

In summary...knowing the risks associated with agricultural water sources, water application method, and timing of application, will greatly reduce the risk to produce and is an integral part in reducing food safety risk on the farm.

Do not hesitate to contact the Idaho State Department of Agriculture or University of Idaho Extension for more information on agricultural water requirements related to the Produce Safety Rule.

Thank you!

References:

1. “Produce Safety Alliance.” *Welcome to the Produce Safety Alliance Website!*

Notes Section

Produce Safety Alliance, www.producesafetyalliance.cornell.edu/
2. *NASDA*, www.nasda.org/
3. *US Food and Drug Administration Home Page*, Center for Biologics Evaluation and Research, www.fda.gov/
4. "UC Davis." *UC Davis*, www.ucdavis.edu/
5. ECFR.io. "e-CFR: Code of Federal Regulations." *ECFR.io*, www.ecfr.gov/
6. "Produce Safety Rule." *University of Idaho*, www.uidaho.edu/extension/food-safety-for-produce-growers/food-safety-modernzation-act/produce-safety-rule
7. "Idaho State Department of Agriculture." *Idaho State Department of Agriculture*, www.agri.idaho.gov/main/

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