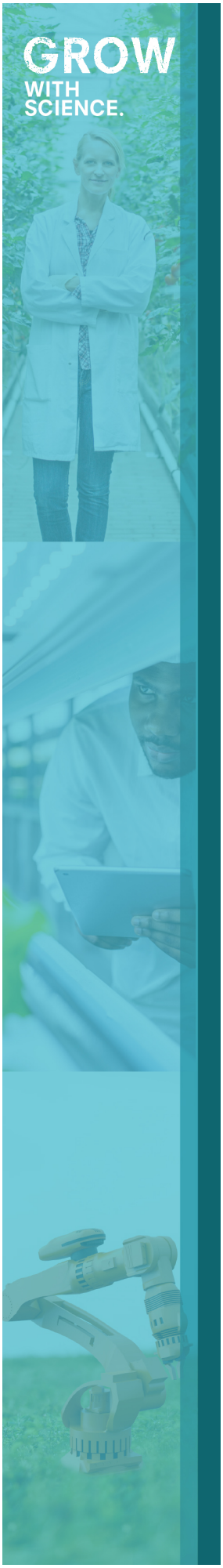

Updated October 26, 2018
Rebranded June 11, 2020

Appendix G

Considerations for Evaluating Potential Contamination Risk Related to Concentrated Animal Feeding Operations *CAFO's*

Acknowledgements

Special thanks to the following individuals/entities who reviewed and/or contributed to the development of this document:

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There are many known factors that influence the potential for pathogens of human concern within an animal feeding operation and many others that influence the potential movement of pathogens of human concern offsite from a CAFO to neighboring homes, farms, irrigation systems, etc. Since fresh produce is vulnerable to contamination from nearby CAFOs and since there are no known methods to eliminate contamination after the fact, best practices must be focused on prevention to minimize contamination risk. In many cases, growers have limited control over these factors – especially when they involve temperature, humidity, precipitation, wind, wildlife, water, etc. In other cases, risk factors may be more controllable through managerial practices implemented within a CAFO (dust management, water management, composting operations, etc.). Regardless, growers need to conduct a comprehensive food safety assessment for leafy green production areas near CAFOs. These evaluations may be conducted by a designated third party on behalf of growers near a specific CAFO. For instance, Cooperative Extension or a contracted food safety expert may collect information to complete this assessment and make it available to all the leafy greens growers near a specific CAFO. As part of the comprehensive evaluation, growers need to:

- Be familiar with local, state, and federal CAFO regulations
- Check a feedlot operator's permit status
- Check other public records for information about the feedlot's operations and activities
- Update the risk evaluation annually or anytime there is a change in the feedlot's operations

In conducting a risk evaluation, growers need to consider three potential vectors that may transport human pathogens from a CAFO to a nearby leafy greens field:

- Bio-aerosols
- Water
- Animals including birds, insects, rodents, etc.

When evaluating all potential food safety risks related to a CAFO operation, consider how human pathogens might be transported to your fields via the aforementioned vectors. In particular, consider the location and practices related to the following areas as appropriate for each CAFO operation:

- <u>CAFO discharge and drainage</u>:
    - How is a CAFO discharge managed?
    - Where does runoff go?
    - Where is the outlet for discharge located?
    - Are irrigation water sources adequately protected from runoff / discharge?
- <u>Compost</u>:
    - Is manure composted onsite at the CAFO?
    - If so, are the composting operations located in proximity to your fields and/or water sources?
    - Where is finished compost stored?
    - How is compost transported onsite and offsite?
- <u>Sick pens</u>: Sick animals pose an increased contamination risk. Sick animal may or may not be ill from human pathogens (i.e., some human pathogens such as *Salmonella* may cause illness in cattle, too), but even if an animal's illness is not caused by a human pathogen, sick animals' feces may carry human pathogens such as STEC. It is important to know and understand:

  - The CAFO's practices related to sick animals
  - Where on the property these animals are housed and/or kept in relation to your fields and ag water sources.
- Dead animals: Besides being a potential direct source of contamination, dead animals attract insects and other scavenger animals that could transport human pathogens, if present, to leafy green production areas. It is important to understand:
  - How the CAFO operation handles its dead animals?
  - Where are dead animals stored?
  - How are they held, processed, transported?
- Traffic: Animal transport and other vehicles traveling to and from the CAFO may spread human pathogens to leafy green production areas by:
  - Stirring up dust
  - Carrying animals into, out of, and within the feedlot
  - Traffic patterns for transporting compost
  - Otherwise spreading human pathogens.

  When evaluating potential risks for routes used by these vehicles, consider:
  - Road location and conditions
  - Maintenance practices such as dust abatement
  - Roads as potential conduit for water runoff
  - Methods for controlling dust along the entire length of unpaved roads on the site
- Settling and manure ponds: Pond leakage poses a contamination risk to fields and water sources. Leakage may occur around the outlet and drainpipes as these structures may rust or otherwise become corroded. Tunneling can also cause pond leakage, which can be estimated by seepage testing as described here: https://www.waterboards.ca.gov/rwqcb5/water_issues/.
- Animals: Flies, known carriers of human pathogens, and other insects may transmit pathogens from animals to crops and/or water sources. In particular, note any increases in population densities. When increased populations are observed, consider trapping and testing insects. Birds can carry and transmit human pathogens from CAFOs to produce growing areas and water sources when traveling between CAFOs and leafy green fields. To deter bird movement from CAFOs to leafy green fields, consider using measures such as:
  - Sound devices
  - Reflective materials
  - Falconry

  Pest control programs for rodents and other burrowing animals in production areas should include, to the degree possible, placement of traps with regular monitoring and rebaiting as necessary as close as possible to CAFOs near production areas. Also, be aware of the potential for animal burrows to serve as conduits for surface water contamination. Consider testing trapped rodent/animal populations for human pathogens to evaluate risk potential posed by their presence in and around leafy green production areas.

SOPs for routine monitoring and preseason, pre-harvest, and harvest assessments

During preseason, pre-harvest, and harvest assessments and other routine monitoring activities, assess the CAFO-related food safety risks identified in their comprehensive risk evaluation, minimize these risks as much as possible, and make appropriate decisions to protect public health. Establish and implement a Standard Operation Procedure (SOP) to evaluate CAFO-related food safety risks identified in the comprehensive evaluation, such as the potential for contamination of equipment and water sources.

Equipment-related SOPs and SSOPs need to include practices that protect equipment from contamination and address appropriate equipment cleaning timing and methods. For example, equipment may become contaminated if it is stored in close proximity to a CAFO. Store all production and harvest equipment in a manner that minimizes the potential for it to become contaminated with human pathogens transferred from a CAFO.

It is critical to monitor ag water sources located near a CAFO to protect the integrity of a water source. Evaluate the risks of the following entering your ag water sources located near a CAFO:

- Runoff from the feedlot
- Discharge from the feedlot
- Runoff from compost operations
- Dust from traffic into and out of the feedlot
- Dust from feedlot pens
- Runoff from roads on the feedlot property

Consider the following during this evaluation:

- Recent test results for individual water samples
- Trends in water quality test results
- Whether ag water source will have contact with the harvestable portion of the crop
- The condition of the crop – damage from disease or injury
- Time interval between ag water application and harvest
- Runoff draining into the ag water source
- Recent weather such as heavy rain, wind
- Access of wildlife and fowl in the vicinity of the feedlot to the ag water source
- Dust from feedlot over water source

Document your assessment and any corrective actions. It is important to stress that distance from a CAFO alone is *not* sufficient to address and manage all potential risks that may be associated with growing leafy greens near a CAFO. A comprehensive risk evaluation is needed to guide environment and food safety assessments and monitoring throughout the growing season. Gaps in appropriate research must be filled to develop risk-based strategies that assure appropriate management of the risks through the growing season. This may include research on ag water treatment, air and soil sampling strategies and protocols, and mitigation strategies for pathogen migration from CAFOs.