

The background features a light green color with a large, stylized graphic. On the left, there is a leaf-like shape with a central vein. On the right, there is a gear-like shape with a central square hole. The text is centered over these elements.

# **Crop & Environmental Management**

**HOW YOU GROW MATTERS**

# HOW YOU GROW MATTERS: CROP MANAGEMENT

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## NUTRIENT MANAGEMENT

### PRINCIPLE

A desirable nutrient management plan meets the needs of the crop, minimizes the costs to the grower, and minimizes the impact on the environment. Recording information about fields and applications helps to plan an effective nutrient management strategy.

### CRITICAL STANDARDS

- Sample soils where hemp is grown, at minimum, every three years. Soil test should include tests for:
  - Heavy metals (at minimum, for arsenic, cadmium, mercury, and lead)
  - pH
  - Crop Protection Agent (CPA) residues (as required by your contractor or buyer)
  - Soil nutrient profile
- Laboratories conducting soil analysis must be accredited to ISO 17025.
- Have a soil management plan that determines fertilizer applications according to soil sample results.
- Keep records of all nutrient applications- greenhouse, transplant water, and field (soil and foliar), which includes date of fertilizer application, application timing (pre-plant, side-dressing, transplanting, or foliar), type of fertilizer applied (N-P-K), and rate of application. This includes lime applications.
- If using animal manure or litter for fertilizer, have it tested for nutrient content and heavy metal levels to determine appropriate rates.
- If required in your watershed, comply with nutrient management regulations as applicable such as having a nutrient management plan.

### ADDITIONAL STANDARDS

#### High Risk

- Sample soils where hemp is grown every year. Soil test should include tests for:
  - Heavy metals (at minimum, for arsenic, cadmium, mercury, and lead)
  - pH
  - Crop Protection Agent (CPA) residues (as required by your contractor or buyer)
  - Soil nutrient profile

## INTEGRATED PEST MANAGEMENT

### PRINCIPLE

Growers should implement diverse methods of pest controls, paired with monitoring to reduce unnecessary pesticide applications to decrease potential human health risks and adverse environmental effects. CPAs should be used after other practical alternative pest, weed, and disease management measures have been utilized. Given the hazards associated with CPA use, it is important that the people who use them are informed and trained.

## CRITICAL STANDARDS

- Keep field/tract records of all CPA applications, including in the greenhouse, transplant water and field. This includes:
  - CPA common name
  - Active Ingredient
  - Application date
  - Application method (transplant water, hand sprayer, overhead sprayer, etc.)
  - Rate
  - Name of Applicator
  - Field name and location
  - EPA Number
  - REI
  - Pest targeted or reason for application

Note: Growers may use a reference sheet such as the “CPA Reference Sheet” found in the GAPC records to record brand name, EPA registration number, active ingredient, and REI to avoid writing this information for each individual application. This reference sheet must be kept with the records of the individual CPA applications.

- All CPA applications, restricted or non-restricted, should be completed or supervised by a licensed CPA applicator. This includes organic growers using only non-restricted CPAs.
- Use only CPAs that have been approved by the EPA for use on hemp (labeled). Always refer to your grower contract; some buyers may prohibit use of CPA’s which are labeled for hemp.
- Maintain CPA application records for the previous five growing seasons as well as the current season

## ADDITIONAL STANDARDS

### High Risk

- Maintain calibration records for current year

### Medium Risk

- Have a documented scouting program for pests and record the scouting information by field/tract following GAP standards. Records should include the following:
  - Date of scouting
  - Pests observed
  - Percent of plants affected/infested
  - Crop protection agent applications made by field and date
  - Conduct a follow-up of your pest control practices to determine the effectiveness of the action taken
- Using the documented scouting program, scout hemp crop weekly.
- Use appropriate methods such as washing, steaming, bleaching, or use of commercial tray cleaner to clean or sanitize transplant trays in the production of seedlings.

## CROP AND OPERATIONS MANAGEMENT

## PRINCIPLE

Implementing acceptable agronomic and industry requested practices from planning to post harvest will help achieve industry acceptable and quality production. Observation and records of variety disease resistance, yields, and other characteristics will assist in planning future quality and productive crops.

## CRITICAL STANDARDS

- Direct the day-to-day activities involved in producing the hemp sold under your name, the name of an associated grower, employee, or the name of the farming operation.
- Follow all federal and state laws related to the transport, import, and/or export of hemp seed and hemp plants for planting.
- If you import and/or export seed, hemp biomass, or any derivatives ensure that a copy of the import and/or export permit and any declarations as required by the operator's legal jurisdictional authority(s) is maintained on the farming operation.
- Keep the purchase receipts for hemp seeds and/or plants that include source, variety and amount.
- Keep copies of analysis done on seed on file such as results from crop improvement programs or seed provider.
- Whether you produce or purchase your hemp plants, keep records of transplant/greenhouse seed origination, seeding dates, varieties, and seed lot numbers by field/tract.
- Keep hemp types and varieties strictly separated from each other during seeding, drying, and market preparation
- Keep records of transplanting by field/tract
- All equipment involved in production, harvesting, and transportation must be properly cleaned so as to avoid contamination of the crop by unintended materials.

## ADDITIONAL STANDARDS

### High Risk

- Keep records of plant and row spacing / plant population maintained by field/tract.

## SAMPLING HEMP FOR ANALYSIS

### PRINCIPLE

Growers shall comply with applicable local, state and federal laws relating to hemp production and maintain documentation to verify compliance.

### CRITICAL STANDARDS

- The grower shall refer to the authority having jurisdiction to determine and document timeline for sampling.
- During the sampling, the grower or an authorized representative shall be present at the growing site.
- Grower should have a documented procedure for pre-harvest sampling.
- Grower should provide the number of testing results given jurisdiction standards on adequate number of samples and proper locations.
- Grower must have a pre-harvest analysis result that attests to THC levels bring 0.3% or less on a dry weight basis.

- Growers shall refer to the authority having jurisdiction for regulations regarding the disposal of non-compliant material.

## HARVEST AND STRUCTURE MANAGEMENT

### PRINCIPLE

Proper harvesting and barn management including monitoring the curing atmosphere, is critical for maximizing both yield and quality, impacting crop value. Inspecting and maintaining barns and structures allows for safe and efficient labor housing the crop and the efficient use of fuel to cure the crop. Traceability provides transparency and integrity to your crop, operation, and brand in the market and an added reassurance to purchasers.

### CRITICAL STANDARDS

- Have a documented safety program for drying structures that includes inspection of tier rails and support beams for soundness, inspection of general barn soundness, removal of stored machinery, lumber and other items from barn floors that could enhance injury in falls. Ladders or steps should be installed and maintained to reach tiers.
- Record the date that hemp was placed in the drying structure and the date it was removed.
- Keep records of harvesting dates by field/tract or production structure
- Maintain records of the type and number of drying structures or barns.
- Maintain documentation on the drying structure or barn used for hemp from each by field/tract or production structure for traceability purposes.

## NON-HEMP RELATED MATERIAL (NHRM)

### PRINCIPLE

Providing a product that is free of NHRM is critical in producing a quality crop at time of delivery. By eliminating sources of NHRM or physically removing NHRM operations are increasing crop value.

### GUIDANCE

Market preparations (market prep) is defined as all preparations of hemp for delivery and sale.

### CRITICAL STANDARDS

- Clean harvested hemp to remove any Non-Hemp Related Materials (NHRM).

### ADDITIONAL STANDARDS

#### High Risk

- Have at least one trash can in market prep areas. If market prep area is not currently in use, the trash cans that will be used need to be visible.

- Regularly inspect market prep area and remove NHRM and other potential sources of taint that could contaminate the hemp, keeping records of weekly inspection dates when in use. If market prep area is not currently in use, a documented inspection program including an inspection checklist and log of dates needs to be available from previous year or plan for current year.

### Medium Risk

- Do not use brooms with synthetic bristles in market preparation area.
- Have designated break areas away from market prep area
- Do not have tools with plastic handles in market prep area

### Low Risk

- Have a dedicated market prep and baling area with concrete, wood or asphalt floor

## POST HARVEST PROCESSING, STORAGE AND TRANSPORTATION

### PRINCIPLE

On-farm storage is often necessary to hold hemp from the time it has completed curing through market preparation until it is ready to be delivered. Proper conditions help to avoid deterioration in quality and loss of yield.

### CRITICAL STANDARDS

- Keep records of cleaning, cutting, grinding, packing and storage by field/tract and drying structure (i.e. activity, date, individual doing task)
- Any water used during harvesting, post-harvest handling, or storage of hemp not from a public source must be tested for E. coli using the EPA Method 1603: Escherichia coli (E. coli) in Water by Membrane Filtration Using Modified membrane-Thermotolerant Escherichia coli Agar (Modified mTEC) which includes the following equivalent testing methods:
  - TECTA EC/TC medium and instrument
  - Modified Colitag, ATP D05-0035
  - IDEXX Colilert test kit
  - IDEXX Colilert-18 test kit
  - IDEXX Colisure test kit
  - E\*Colite Bag or Vial test
  - ReadyCult Coliforms 100
- Monitor for mold risk by maintaining frequent checks for heat and moisture content.
- Storage of hemp shall be properly inventoried and labeled at each stage of processing and at all times to prevent adulteration, contamination and unintended comingling.
- Labeling of hemp shall at a minimum include information representative of:
  - Variety
  - Field/Growing Location
  - Lot number and/or Harvest date
  - Grower Name

- Have a documented program that allows for labeling and traceability of hemp from seed to farm sale or delivery.
- Packaging materials must not be coated with or otherwise contain any materials (eg. fungicides, mold inhibitors, etc.) that may contaminate the hemp.
- Storage of packaging and labels shall be under conditions adequate to prevent the packaging and labels from being adversely affected.
- Maintain a clean, dry hemp storage area when in use, with no treated wood in contact with hemp, no storage of CPAs, petroleum products, paint, stains, fertilizers or Styrofoam trays, or other sources of taint that could contaminate the hemp in storage area.
- Storage of hemp shall be under appropriate conditions of temperature, humidity, and light so that the identity, purity, strength, and composition of the components and hemp are not affected.
- Ensure that livestock are excluded from drying and storage structures
- Transportation of hemp shall be under conditions that will protect the hemp against contamination, deterioration, and adulteration.
- Any transported hemp material should be accompanied by the state or federal registration upon which the hemp was grown, a 3rd party COA stating the cannabinoid content, and a manifest stating sender contact information, type of products with a description of packaging/quantities and receiving party contact information.
- Keep records of amount sold by variety (included on the Bill of Lading or label) and amounts disposed.

## **ADDITIONAL STANDARDS**

### **High Risk**

- Store baled hemp on concrete floor, untreated wood (floor or pallets), trailers, wagons or truck beds.

### **Medium Risk**

- Have an enclosed storage area with doors and windows that can be secured, if windows present. Doors and windows can be closed.

# HOW YOU GROW MATTERS: ENVIRONMENTAL MANAGEMENT

## CROP PROTECTION AGENT (CPA) MANAGEMENT

### PRINCIPLE

Growers shall manage CPA applications using legal, safe, and environmentally friendly practices. Growers shall implement proper handling, controlled storage and proper disposal techniques of all CPA's and CPA containers used on hemp production.

### CRITICAL STANDARDS

- Have a designated, enclosed, dry (weather protected) and lockable CPA storage area with proper signage. Signage should signify "Danger", "Pesticide Storage", or "Keep Out" at a minimum, be able to withstand normal wear and tear and if exposed to outdoor conditions, be able to withstand weather. If no storage a grower must show receipts from a custom applicator or organic certification.
- Dispose of empty CPA containers by triple-rinsing and punching or removing lid AND either recycling through programs or sites designated for CPA container recycling OR disposing of them in appropriate landfill. CPA containers cannot be burned.
- Properly segregate, store, and recycle hazardous waste including but not limited to residual CPAs, fuel, oil, grease, paint, and batteries.
- Maintain SDS sheets for all CPAs used in hemp production
- Maintain copies of labels for all CPAs currently being used in hemp production either on the container in storage, or in farm files. Does not include CPAs that are no longer in use and are not on the farm.
- Ensure that CPAs are stored in original manufacturer's containers with labels attached or on file in CPA storage room

### ADDITIONAL STANDARDS

#### Medium Risk

- CPA storage with impermeable floor.  
This includes tubs, bins, or containers used to hold CPAs made of impermeable material.
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- CPA storage designed to retain runoff from spills and leakages. This includes tubs, bins, or containers used to hold CPAs made of impermeable material that can hold more than the volume of CPA being stored.
- Mix or transfer CPAs in containment areas away from runoff channels
- Ensure that greenhouse float water is properly and legally disposed of such as natural evaporation or used in transplant water (follow CPA label information at a minimum).

#### Low Risk

- Maintain an inventory of CPA stocks in storage updated monthly if changes occurred within the month.
- Have a designated, fenced or otherwise lockable storage area for empty CPA containers that have not been tripled rinsed and punched pending disposal
- Dispose of non-hazardous waste products (i.e. move wastepaper, cardboard, plastic (other than CPA chemicals) to a trash receptacle or recycle container. Burning non-hazardous waste is not acceptable.



## SOIL AND WATER MANAGEMENT

### PRINCIPLE

Soils are a dynamic, living, and fragile resource while water is a limited resource. Growers shall manage both to conserve, protect, preserve, and improve.

### CRITICAL STANDARDS

- As required by law, maintain a conservation management plan approved by the soil and water conservation district for fields that are considered highly erodible land
- Keep records of dates and amounts of irrigation water and maintain records of rainfall amounts during the growing season.

### ADDITIONAL STANDARDS

#### High Risk

- Use vegetated buffers between field and streams or lakes (minimum buffer distance is 33 feet)

#### Low Risk

- Maintain field borders/buffer strips along lower edges of fields and beside field ditches and drainage ways (minimum buffer distance is 33 feet)
- If you use irrigation, then use proper irrigation management methods, which include:
  - Maintain equipment and piping to prevent leakage
  - Maintain runoff water