

Chapter 3

GOOD MANAGEMENT PRACTICES

FOR

FARMER STOCK STORAGE AND HANDLING

Revised July October 2009

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These Good Management Practices are not standards nor are they mandatory, but represent consensus thinking on best practices in each area and it is strongly recommended that they be followed.

A. PROCESS DESCRIPTION

Farmer stock peanuts are stored in large warehouses holding approximately 5000 tons of peanuts. Peanuts are stored 12-18 months depending on crop size and sheller capacity. Due to the length of time peanuts are stored, it is critical to maintain adequate conditions to minimize losses in quality.

B. CRITICAL AREAS

1. Preparing the Warehouse System for Storage

Prior to storage of farmer stock peanuts, the warehouse system including all handling equipment facilities and grounds should be prepared according to the following guidelines:.

- Thoroughly clean all dust, dirt and peanut residue from the entire warehouse (inside and out) and handling equipment including but not limited to conveyor belts, boots, elevators and farmer stock peanut cleaners. Caution must be used when utilizing water in a peanut operation. Dry cleaning is recommended.
- Inspect and repair all openings to prevent entrance of insects, birds and rodents. A method of bird control is recommended in the dump pit area to prevent birds from landing, roosting and nesting. Any existing bird nests need to be removed and the area properly cleaned.
- Check and repair all fan belts, fans, vents, elevators (including speed), dump pit and trippers to ensure proper operating condition.
- Inspect and repair all roof and wall structures to prevent the entrance of moisture into the warehouse.
- To destroy insects that were not removed by cleaning, treat the warehouse with an appropriate pesticide according to directions on the label.
- Pesticide application should be made by trained personnel using labeled and recommended chemicals.
- Inspect lighting system to ensure that lights are enclosed in structures to prevent broken bulb fragments from falling into peanut storage bins.
- Examine complete electrical system wiring to ensure compliance to safety codes.
- Survey and repair warehouse ventilation system to ensure rapid exchange of over space air to dissipate heat and moisture from curing. Fans should be of adequate size and motors of adequate horsepower to maintain a velocity sufficient to completely exchange the over space air every 2-3 minutes in a full warehouse. Fans should be enclosed on all sides and eaves tightly closed to ensure air movement from the opposite end of the structure.

Warehouses with natural ventilation should be routinely checked carefully to ensure that the inlet and outlet spaces are completely open. As a rule of thumb, an 80' wide warehouse should have a 12" opening in the ridge and the total eave intake area should equal two times the ridge exit area. The disadvantage of naturally ventilated warehouses is that the exhaust can not be readily discontinued. As such, the effectiveness of the insect control program from the aerosol canisters is diminished since insecticide fogs may be swept away in the exit air stream thus losing their effectiveness.

Openings with shutters should be inspected to ensure they will not allow moisture from rainfall to enter the structure. Hooded vents with ½ inch hardware cloth should be used to cover all outside openings of peanut storage structures to ensure continual airflow capability. This will minimize the risk of rainstorm moisture and bird entrance.

2. Warehouse Ventilation System

The primary objective of the warehouse ventilation system is the removal of heat and excess moisture from the peanuts as they cure and reach moisture equilibrium. If the temperature of the over space air is allowed to become elevated, condensation on the lower surface area of the roof is likely to occur. This will become especially critical during periods when large fluctuations in day/night temperatures occur. The following actions will greatly reduce the opportunity for heat build up and condensation occurrence:

- Fill the warehouse carefully. The pile should be kept as level as possible. This can be expedited by periodic moving of the tripper as the peanuts are being unloaded into the warehouse. Avoid overfilling. The peanut pile should be at least 12” below the roof at the eaves (sidewalls). Upon completion of filling, the piles should be leveled to prevent peaks and pockets. The natural angle of repose of the peanuts should not result in peanuts touching the roof at any point.
- Close doors during the filling operation to aid over space air exchange. If the doors remain open during filling, the air movement will be short-circuited and will not remain "in motion" from end to end in the house.
- Fans should be actuated continually during filling (except when insecticides are in use). This will ensure continual air movement and heat exchange thus keeping the temperatures of the over space air in equilibrium with ambient.
- Hooded vents equipped with screens should be in place at the end of the warehouse opposite the fans. Intake vent area should be equal to two times the fan area to secure adequate air movement through the top of the warehouse. Area should be great enough so that inlet velocity does not exceed 800 fpm. Inadequate ventilation capacity that results in incomplete heat removal and condensation is connected with insufficient intake area more often than deficient fan capacity.
- A warehouse monitoring program should be "in place" to allow weekly inspections of all storage systems. A formal report indicating whether insects or damage are observed, whether condensation is occurring, as well as the general condition of the peanuts and storage structure should be filed and promptly acted upon as changing situations dictate. The report should also document corrective action recommended and corrective action taken.
- Ensure in-floor ventilation is used adequately, running either to push air up through the pile or pulling air down through the pile, and only when ambient temperature and humidity allow to maintain an appropriate moisture level and temperature through the pile.

3. Preparing the Farmer Stock Cleaning System

The farmer stock cleaning system is defined as all processes designed to remove objectionable, or potentially objectionable, material from farmer stock peanuts prior to storage or entry into the shelling system. Included may be sand screens and/or cleaners capable of removing sticks, rocks, gherkins, treadsalve balls, nutgrass, as well as loose-shelled kernels and small, immature pods.

- Prior to admission of farmer stock peanuts into warehouse storage facilities, or into the shelling system, those loads with excessive troublesome foreign material (>4%) or with excessive (>5% suggested) Loose-Shelled Kernels (LSK's) should be passed through the cleaning system.

Special attention should be given to the removal of LSK's, high moisture components and dirt since these materials will likely increase the risk of insect damage and mold contamination leading to aflatoxin development during storage. LSK's removed from the farmer stock peanuts at this point may meet edible quality requirements, however, after a period of storage, they may not.

4. Pest Control System

The goal of the pest control system as it relates to the storage phase is to prevent infestation and damage to the product from any pest. The following guidelines are intended to aid success:

- Place 1/2" mesh hardware cloth over all openings. This will greatly reduce the risk of rodents and/or birds gaining entry into the building. Install and maintain bait stations as needed. Place bait stations at approximately 50' intervals.
- Remove all debris, weeds and residue from the outside of the warehouse. Peanut residue which is allowed to build up along the outside of the house serves as a "breeding ground" for insects, "food" for rodents and a "wick" for moisture migration into the facility.
- Eliminate all residue piles from the grounds and yard within 50 feet of the warehouses. Insect infestations inside warehouses often begin unnoticed in piles of peanut sweepings and cleanings on the yard. Clean all pits and elevators immediately after filling warehouse.
- All pest control must be performed or supervised by personnel possessing a valid commercial applicators license. This person should have direct responsibility for regular inspection of the storage structures and provide reports to the appropriate authorities that have responsibility to act as warranted. Control must be maintained over all on-site chemicals. A designated locked area with limited access by personnel is recommended.
- Use of pesticides should be minimized and used as required to maintain farmer stock storage. Use only labeled pesticides and apply them according to federal, state and local requirements.
- All pest control devices such as bait stations should be strategically located and maintained to maximize effectiveness.
- Bait stations should be placed outside around the perimeter of the buildings and along fences at approximately 50-foot intervals. Wind up or snap traps should be utilized on the interior and placed at approximately 25-foot intervals. Glue boards may also be useful in controlling crawling insects and mice.
- All pest control operations should be conducted by certified/trained personnel or outside agencies certified and licensed to do the work.

5. Mold Prevention System

The goal of the mold prevention system is to ensure that conditions do not exist in the handling and storage of peanuts that would lead to the formation of molds. The following practices should be followed to minimize or eliminate the risks of mold formation in peanuts.

- Peanut handling/curing practices enumerated in the Good Management Practices for Buying Point Operations should be followed.
- All moisture collecting in elevator pits should be removed immediately following rains or seepage. All peanut buying points should be equipped with Sump Pumps or other type pumps to remove water from elevator pits. Caution must be used when water is present in a peanut operation.
- Should loads of farmer stock become wet from rainfall prior to unloading, they should be examined and re-dried prior to dumping. All wet peanuts and trash should be removed from the premises and destroyed. Such peanuts should not be placed with other peanuts either on trucks or in warehouses.
- All conveyor buckets and belts should be checked, cleaned and dried following rain. They should be checked often for old peanuts, foreign material, etc., including during the off-season when such equipment is not being used. Immediately prior to load-out, elevator buckets and elevator pits should be re-checked to make certain they are completely free of moisture, old peanuts, refuse and trash.
- Peanuts in storage should be routinely checked for evidence of mold. If mold is evident, the reason for mold formation should be immediately determined and corrected. Moldy peanuts must be removed from edible use.
- Warehouseman should check regularly for leaks in roofs, walls and around doors and ventilators. Such an inspection should also be made while rain is falling on the building.
- All down spouts into buildings should be periodically checked to see that their points of spout entry are securely closed and sealed to prevent entry of moisture during and following rain.
- Check your ventilation system for proper operation with emphasis on belt tension and speed. (See Preparing the Warehouse System for Storage).
- Special attention should be given to proper ventilation of tank type storage structures. Regular checks for condensation are extremely important.
- Handling equipment should be checked regularly to see that it is properly adjusted to prevent the shelling, cracking or damaging of peanut hulls that will permit mold invasion of the kernels.

6. Peanut Transfer System (From Storage to Shelling Plant)

The goal of the peanut transfer system is to facilitate the movement of farmer stock from the warehouse to the shelling plant. This is accomplished in a variety of ways. Some warehouses are equipped with unloading tunnels that facilitate unloading with a minimum of handling. This is desirable, because the less the peanuts are handled during unloading, the fewer LSK's are generated, minimizing the loss. If front-end loaders are required to unload the warehouse, personnel with brooms should be provided to keep the peanuts cleaned up to minimize crushing by the wheels of the equipment. Unsuitable material generated by the process should be treated as oil stock and handled separately. The following precautions should be taken when loading peanuts out of warehouses:

- Uncovered loading out of peanuts from the warehouse should cease during periods of precipitation.

- Peanuts spilling in area of loading operation should be immediately cleaned up and disposed of by placing on truck or back in warehouse before such peanuts are damaged or begin to collect moisture. If this is not done, such peanuts should be completely removed from the premises and destroyed.
- Peanuts in transit should be protected from weather.
- All trucks and rail cars should be carefully inspected for undesirable odors or material residues that might affect flavor and quality of peanuts. They should be checked for weather-proofness and should be swept clean prior to use. Vehicles that are objectionable from these standpoints should be rejected.
- Temporary storage facilities at outside buying points should be adequate to protect peanuts from:
 1. Inclement weather
 2. Insects, rodents, birds, and bird droppings
- Peanuts in drying trailers waiting to be dumped or transported should be protected from inclement weather by shed, roof, tarp, or other cover.
- When unloading or emptying the warehouse of peanuts, particular attention should be paid to moldy, wet or hot spots which may have previously gone unnoticed. These peanuts should be handled separately.
- When loading peanuts out of a warehouse, buying point operators should avoid overloading trucks, causing spillage. Also, the following guidelines should be followed:
 1. Keep loader tires out of peanut pile.
 2. Do not overfill the loading bucket to avoid peanut spillage when backing out of the pile.
 3. Keep blade on the bucket in good shape to avoid peanut damage.
 4. Keep loader belt adjusted and skirting replaced to prevent peanuts from getting under the skirting and being crushed by the rollers.
 5. Loading equipment must be properly maintained to prevent oil leaks. Clean up of any leakage is required to minimize the potential for product contamination.