

**GEORGIA FARM\*A\*SYST**



*FARM ASSESSMENT SYSTEM*

## **BROILER LITTER MANAGEMENT**

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### **PRE-ASSESSMENT:**

#### **Why Should I Be Concerned?**

Broilers are Georgia's largest single agricultural commodity, with farm gate value of more than \$4 billion annually and production in over 3/4 of Georgia counties. Poultry litter is very valuable to farmers as an organic fertilizer and also as a commodity for sale to other farmers. Despite its benefits, farmers also have to be concerned about soil and water quality associated with litter application and should ensure that their land and waters are protected for future generations. To maintain soil and water quality, it is essential to properly utilize operation by-products, such as litter and mortalities.

Poultry litter should be applied based on manure nutrient testing, soil testing and crop nutrient requirements. Application amounts that exceed recommendations for optimal crop growth can increase the risk of nutrients affecting ground and surface water. To prevent exceeding nutrient recommendations, proper nutrient management planning and record keeping should be used on the farm. The manner in which litter is stored and applied to land can also make a difference in the litter's value as a fertilizer and whether farm water sources are threatened or not. This assessment tool will help determine your risk of future environmental quality problems with regard to broiler litter management.

#### **How Does This Assessment Help Protect Drinking Water and Environmental Quality?**

- This assessment allows you to evaluate the soundness of your farm and operational practices relating to your litter management.
- The assessment uses your answers (rankings) to identify practices at risk that may need to be modified to prevent pollution.
- The litter management facts gives an overview of sound environmental practices that may be used to prevent pollution caused directly by litter application practices.
- You are encouraged to develop an action plan based on your needs as identified by the assessment.
- It is recommended that you involve your broiler company in this farm assessment. Your company has recommendations on dead bird disposal and litter clean out pertinent to this process.
- Do not make any management changes based on this assessment that may affect your birds without consulting your flock supervisor.
- You are encouraged to work through the entire document and use all 11 areas when completing the assessment.
- The assessment should be conducted by you for your use. If needed, a professional from University of Georgia Cooperative Extension or one of the other partnership organizations can provide assistance in completing the assessment.
- No information from this assessment needs to leave your farm.
- Farm\*A\*Syst is a voluntary program.

## ASSESSMENT:

### Assessing Your Litter Management Practices.

For each category listed on the left, read across to the right and circle the statement that best describes conditions on your farm. If a category does not apply (for example, if you always spread litter immediately after cleanout and thus never store litter), then simply skip the question. Once you have decided on the most appropriate answer, look above the description to find your rank (4, 3, 2 or 1) and enter that number in the “RANK” column. The entire assessment should take less than 30 minutes. A glossary is on page 13 to clarify words found in italics throughout this assessment.

<b>BROILER LITER MANAGEMENT PRACTICES</b>					
	<b>LOW RISK</b> (rank 4)	<b>LOW-MOD RISK</b> (rank 3)	<b>MOD-HIGH RISK</b> (rank 2)	<b>HIGH RISK</b> (rank 1)	<b>RANK</b>
<b>LITTER STORAGE AND DEAD BIRD CARCASS DISPOSAL</b>					
<b>Litter storage</b>	Litter is stored in a stacking shed; storm water is diverted from the facility.	Litter is temporarily stacked on a restrictive surface (concrete, 6-mil plastic, clay, etc.) never within 100 feet of a well or surface water. Stacks are protected from rainwater by a 6-mil plastic cover. Surface water is diverted around the stacks.	Litter is routinely stacked at least 100 feet from a well, but is less than 100 feet from surface water and is exposed to rain.	Litter is stacked less than 100 feet from a well and surface water and is exposed to rain.	
<b>Dead bird carcass disposal (mortalities)</b>	All dead bird carcasses are collected and treated in a well designed and functioning composter.  <i>See Dead Bird Carcasses Composting Assessment</i>	Dead bird carcasses are disposed of by an approved method other than composting according to guidelines provided by the Georgia Department of Agriculture.	Dead bird carcasses are disposed of in burial pits.	Dead bird carcasses are disposed of by a non-approved method.**	
<b>LAND APPLICATION OF LITTER OR COMPOST</b>					
<b>Application rates</b>	Litter and compost applied to fields at rates that meet crop nutrient requirements based on a nutrient management plan (NMP). Litter and soils are tested.	Litter and compost applied to cropped fields at rates that do not exceed 2.5 tons/acre/application, and do not exceed 5 tons/acre/year. Soils in application areas are tested.	Litter and compost applied to cropped fields at rates that do not exceed 2.5 tons/acre/application, and do not exceed 5 tons/acre/year. Soils in the application areas are not tested.	Litter and compost applied to cropped lands at rates that exceed 2.5 tons/acre/application, or exceed 5 tons/acre/year or materials applied to uncropped lands at any rate.	

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## BROILER LITTER MANAGEMENT PRACTICES

	LOW RISK (rank 4)	LOW-MOD RISK (rank 3)	MOD-HIGH RISK (rank 2)	HIGH RISK (rank 1)	RANK
<b>Soil testing of litter and compost application sites</b>	Yearly	Every 2 years.	Every 3 years.	Less frequently than every 3 years.	
<b>Nutrient (N,P,K) budgeting</b>	Based on analysis, soil test, and crop nutrient utilization information or done according to NMP.	Soil test used. No analysis. Nutrient value based on published estimates.	No analysis or soil test. Nutrient value based on published estimates alone.	No analysis or soil test or effort toward nutrient accounting.	
<b>Record keeping</b>	Complete records kept on farm applications and nutrients leaving farm through sales or giveaways.	Partial records kept on farm applications and nutrients leaving farm through sales or giveaways.	Partial records kept on farm applications but no records on nutrients leaving farm.	No records kept.	
<b>Application timing</b>	According to accurate nutrient accounting or NMP. Never applied in wet conditions.	Based on when crop is at growth stage that usually needs fertilizing. Try to avoid applying in wet conditions.	Based on convenience or when manure is cleaned out of houses and compost is available. Try to avoid applying in wet conditions.	Based on convenience or when manure is cleaned out of houses and compost is available. Often applied to wet soil.	
<b>Application areas</b>	All areas are more than 100 feet from surface water sources, wells, dwellings, or sinkholes and have slopes of 15% or less. All areas are approved by NMP.	Most areas are more than 100 feet from surface water sources, wells, dwellings, or sinkholes and have slopes of 15% or less. Most areas are approved by NMP.	Litter is occasionally spread over areas that are less than 100 feet from surface water sources, wells, dwellings, or sinkholes and have slopes of 15% or more.	Litter is routinely spread over areas that are less than 100 feet from surface water sources, wells, dwellings, or sinkholes, or that have slopes greater than 15%.	
<b>Spreader calibration</b>	Nutrient application equipment calibrated to proper application rate before each application. Uniform application over the area is ensured.	Nutrient equipment calibrated at least once a year. No effort to ensure uniform nutrient application over the area.	Use custom nutrient hauler and applicator and assume equipment is calibrated, or calibrate equipment once a year.	Never calibrate nutrient application equipment or ask custom applicator about calibration procedure.	
<b>Litter analysis</b>	Litter collected from sub-samples after cleanout. Samples sent to laboratory as soon as possible.	Litter collected from broiler house floor prior to cleanout.	Litter is applied based on previous analysis taken more than one year ago.	Litter is not analyzed prior to application.	

**BROILER LITTER MANAGEMENT PRACTICES**

	LOW RISK (rank 4)	LOW-MOD RISK (rank 3)	MOD-HIGH RISK (rank 2)	HIGH RISK (rank 1)	RANK
<b>AREAS AROUND POULTRY HOUSES</b>					
<b>Drainage and areas around broiler houses</b>	All areas without vehicle traffic have more than 90% vegetative cover. High traffic areas are paved or graveled. No visible soil erosion or surface drainage problems.	More than 50% of the area has established vegetative cover. Traffic areas are graveled. Few erosion or drainage problems.	Less than 50% of the area has established vegetative cover. Erosion and drainage problems are evident in traffic areas.	Area around broiler house has less than 25% vegetative cover. Erosion gullies are evident in many areas.	

**Number of Areas Ranked \_\_\_\_\_**

(Number of questions answered, if all answered, should total 11)

**Ranking Total \_\_\_\_\_**

(Sum of all numbers in the "RANK" Column)

## ASSESSMENT EVALUATION:

What Do I Do with These Rankings?

### STEP 1: Identify Areas That Have Been Determined to be at Risk

Low-risk practices (4s) are ideal and should be your goal. Low- to moderate-risk practices (3s) provide reasonable protection. Moderate- to high-risk practices (2s) provide inadequate protection in many circumstances. High-risk practices (1s) are inadequate and pose a high risk for causing environmental, health, economic or regulatory problems.

**High-risk practices (rankings of “1”) require immediate attention.** Some may only require little effort to correct, while others could be major or costly and may require planning or prioritizing before you take action. All activities identified as “high risk” or “1s” should now be listed in the action plan. Moderate to High risk rankings (“2s”) should be examined in greater detail to determine the exact level of risk and attention given accordingly.

### STEP 2: Determine Your Broiler Litter Management Risk Ranking

The Litter Management Risk Ranking provides a general idea of how your broiler production practices might be affecting your ground and surface water or contaminating your soil.

Use the rankings total and the total number of areas ranked on page 4 to determine the Litter Management Risk Ranking.

$$\text{RANKING TOTAL} \div \text{TOTAL NUMBER OF AREAS RANKED} = \text{LITTER MANAGMENT RANKING}$$

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#### LITTER MANAGEMENT RISK RANKING ...LEVEL OF RISK

3.6 to 4 .....	Low Risk
2.6 to 3.5 .....	Low to Moderate Risk
1.6 to 2.5 .....	Moderate Risk
1.0 to 1.5 .....	High Risk

This ranking gives you an idea of how your litter management practices might be affecting water quality and pasture health. This ranking should serve only as a general guide, not a precise diagnosis, because it represents an averaging of individual rankings.

### STEP 3: Read the Information Section on Improving Litter Management Practices

When reading this, give some thought to how you could modify your practices to address some of your moderate- and high-risk areas. If you have any questions that are not addressed in the Litter Management Practices Facts portion of this assessment, consult the references in the back of the publication or contact your county Extension agent or NRCS District Conservationist for more information.

### STEP 4: Transfer Information to Total Farm Assessment

If you are completing this assessment as part of a “Total Farm Assessment,” you should also transfer your Litter Management Risk Ranking and your identified high-risk practices to the overall farm assessment.

## **BROILER LITTER MANAGEMENT FACTS:**

### **Reducing the Risk of Pollution by Improving Broiler Litter Management**

Broiler litter and compost from mortalities (dead bird carcasses) are nutrient-rich and can benefit the farm if they are protected adequately and land applied correctly following storage or treatment. However, storage, disposal or application of these materials pose a threat to farm water sources if not done properly.

Litter storage and land application are important management concerns for poultry producers. Sound management maximizes fertilizer value and reduces the risk of water contamination. Litter and *compost* residue materials should be sampled and tested to determine their nitrogen, phosphorus and potassium content prior to land application.

Several dead bird disposal options are available. Specific requirements and guidelines for these disposal methods can be obtained from your broiler company or the Georgia Department of Agriculture (GDA), by calling 404-656-3671.

A *nutrient management plan* (NMP) assists you in effectively using broiler waste in an environmentally safe manner. Any situation where waste is not effectively managed gives rise to potential pollution problems. Broiler litter can be a source of fecal bacteria. Runoff of phosphorus can cause excessive aquatic growth in surface water.

A sound nutrient management plan begins with the kind and number of animals in the farm operation and includes every aspect of waste handling. It includes how the waste will be gathered and stored and how large the storage facilities need to be. It specifies areas to be used for manure application, crops to be grown, the area of land needed to utilize available nutrients and the method and timing of application.

For more information and assistance in developing your nutrient management plan, contact your county Extension office, local Natural Resources Conservation Service (NRCS), or agricultural consultant.

### **LITTER STORAGE AND DISPOSAL OF DEAD BIRD CARCASSES**

#### **Poultry Litter Composition**

Nearly all broiler, pullet and breeder operations manage birds on earthen floors; place a 2- to 4-inch base of wood shavings, peanut hulls or other bedding on the earthen floor before the birds arrive; remove manure and used bedding and replace periodically. Most broiler operations produce 1.0 to 1.5 tons of litter per 1,000 birds. For a flock of 18,000 to 20,000 birds, this amounts to between 22 and 34 tons of litter per flock. The total nitrogen content of fresh poultry litter is usually 3 percent or more by weight on an as-is basis (25 to 35 percent water). Nitrogen contained in fresh litter can be fairly mobile and may be subject to leaching if not stored and applied properly.

#### **Litter Storage**

Not all nitrogen from a temporary litter stack would be expected to leach from exposure to rain, but surface or ground water contamination from an unprotected litter stack is possible. Stacking unprotected litter in fields, particularly during periods of wet weather, is not recommended.

If you cannot avoid temporary field storage, then protect the litter. Stack the litter on some type of restrictive surface, such as concrete, plastic, a compacted clay or other materials that limit leaching. The stack should be covered with 6-mil plastic that is securely anchored against the wind. An upslope surface water diversion (ditch, dike, grasses, waterway, etc.) should be provided to keep runoff water from reaching the stack. Locate the stack at least 100 feet from any water source and downslope if possible. Any downslope surface water source within 100 feet of the stack should be protected by a grass filter area between the source and the stack.

A *stacking shed*, a roofed structure with a concrete floor, is the safest and most effective way to temporarily store litter. Large quantities of litter can be stored and kept dry in stacking sheds, allowing easy handling and distribution.

Cost sharing for stacking sheds may be available from the Environmental Quality Incentives Program (EQIP). These funds are for farms that have an approved nutrient management plan. These plans are developed through the NRCS and include application acreage, crop nutrient requirements, litter application rates and application times. These factors are considered together with the size of the operation to arrive at the storage volume requirement and other design considerations for a planned stacking-shed. The stacking-shed design must be approved by the NRCS before CFSA acceptance.

## **Mortalities Disposal**

The GDA, which regulates the disposal of dead animal carcasses, currently approves the following disposal methods:

- *Composting*
- In-ground pits
- Incineration
- Rendering

All disposal methods require permits from the GDA, 404-656-3671. Some disposal methods require a special application form.

Composting of poultry carcasses has proven to be an effective on-farm disposal method. There are several different designs for composters available.

All must:

- Operate at a temperature high enough to destroy pathogenic bacteria (>125 degrees Fahrenheit).
- Provide for complete decomposition of carcasses (only feathers and bones remaining).
- Be adequately managed so that flies are not a problem.
- Protect the compost area from vermin and scavengers.

Some Georgia farms construct compost sheds that have primary and secondary composting bins and ample room for temporary storage of broiler litter. These facilities allow ready access to the storage and compost bins. Materials can be added or removed as often as necessary for their effective treatment and land application. Several Extension publications are listed at the end of this document that describe poultry mortality composting structures.

## **LAND APPLICATION**

### **Poultry Litter Application**

At this writing, state regulations governing the land application of poultry litter are limited to poultry operations that produce 125,000 or more birds at any given time. Some counties will also have regulations. Contact your county Extension office to see if such regulations exist. A farm nutrient management plan (NMP) should be developed with your county Extension office or NRCS conservationist.

The nutrient management plan (NMP) should identify the locations, acreage, and types of crops or pasture to which any nutrients are to be applied. An owner may have plenty of land for application of animal wastes, but some of it may be located a great distance from the poultry houses. Spreading animal

manure only on the nearest fields can result in excessive nutrient loading rates to the soil and result in water quality problems.

## **Dead Bird Compost Application**

Application and handling of compost follows the same recommendations as poultry litter. The University of Georgia Cooperative Extension, NRCS county offices and GDA can provide information on composting as well as other disposal methods.

## **Application Rates**

The best application rate depends on the crop being produced, the soil's nutrient content and the nutrient content of the applied material. Soil testing and litter nutrient analysis are recommended for best determining litter application amounts. Application equipment should be calibrated for accurate and even distribution.

Poultry litter should be evenly distributed over application sites at a rate not to exceed 5 tons per acre per year, or according to a site-specific nutrient management plan.

Vehicles must be covered or tarped prior to transporting poultry litter on state or federally maintained roads or any public road. Your county Extension office can provide more information on soil testing, litter analysis, equipment calibration, record keeping and other areas related to poultry litter land application.

## **Soil Testing of Waste Application Sites**

Stored manure or compost residue materials from dead bird carcasses can be sampled and tested to determine their nitrogen, phosphorus and potassium content. These nutrient values applied per acre allow the determination of the amount of additional fertilizer that may be required for crop production.

## **Application Timing**

Surface land application of poultry manure and compost should not be undertaken when soil is saturated, during rainy weather or when rain is in the immediate forecast. Also, consideration of neighbors is important, not necessarily for environmental quality, but for the sake of farm-neighbor relations and their understanding of your operations. Consider contacting your immediate neighbors to let them know you will be applying litter and why you apply litter. Being considerate of neighbors' concerns will contribute to better relationships.

## **Application Areas**

Consider unique features of the farm and modify your management plan for these features as needed. Do not apply litter to the surface and subsurface of your land within 100 feet of streams, ponds, lakes, springs, sinkholes, wells, water supplies and dwellings. Grass, vegetative and/or forest buffer strips along stream, pond or lake banks help prevent nutrient runoff from adjacent fields and pastures. Nutrients should not be applied on slopes with a grade of more than 15 percent or in any manner that allows nutrients to enter the waters of the state.

## **Spreader Equipment Calibration**

Calibration of waste application equipment is needed to ensure proper distribution of waste materials. Equipment should be calibrated and rechecked at least once a year as a general rule for all operations. For more information about calibration of waste-spreading equipment, contact your county Extension office.

## **Litter Analysis**

Proper litter analysis will allow for more precise nutrient management and reduce environmental risk. The timing and method of litter sampling will determine the accuracy of your analysis and efficient use of available nutrients. For litter analysis help, contact your local county Extension office.

## **Record Keeping**

Growers who use waste materials as fertilizer or a soil amendment should maintain records of the nutrient analysis, application rates, and soil test for each application site. Record keeping is a vital part of animal waste management. Recommendations for the land application of poultry litter should be based on actual laboratory analysis from a sample of your litter or manure.

Record keeping is necessary to document your management of the waste application system. The record keeping forms provided in this publication will help you collect site-specific data. These forms will allow you to easily track your waste applications and provide you with an easy resource to ensure that you do not exceed proper waste application rates in any fields.

Keeping accurate records, along with the implementation of proper management procedure provides evidence that you are managing your animal waste at a low risk to the environment and that your practices will not cause a negative environmental impact. Assistance with record keeping can be obtained from your local county Extension agent, Natural Resource Conservation Service (NRCS), or an agricultural consultant.

**The following items should be recorded and maintained for a period of five years at the individual farm.**

- Waste application locations and rates
- Map of farm fields including waste application fields and acreage
- Nutrient Management Plan
- Litter sample analysis
- Annual soil analysis for each field receiving waste applications
- Animal production

**It may be beneficial for you to maintain these additional records for verification of the conditions on your farm.**

- Daily farm rainfall records
- Plant analysis
- Crop yields
- Surface water and ground water quality records

A template record keeping form is included on page 11. More information can be added to this form to fit your needs.

## **ENVIRONMENTAL CONTROL**

### **Air Quality**

Air quality affects the health and well being of animals and their caretakers. Odor concerns are drawing increased attention as urban/suburban areas expand into traditional agricultural areas.

Management measures to reduce or minimize odors in broiler houses include maintaining a low moisture content and chemical treatment of litter. Soil injection or incorporation of manure into the soil reduces odor problems associated with land application. Odor suppressants, counteractants, masking agents and numerous chemicals have also been used in animal production to reduce odors. Trees can also be planted to assist in diverting air that is exhausted from poultry houses.

### **ABANDONED SITES**

Under certain circumstances, abandoned chicken houses or old earthen chicken house foundations can be threats to the environment and farm water sources. Any abandoned structure should be completely emptied and the litter properly land applied or stored. The soil under the litter pack should be cored and tested for nitrogen, phosphorus, potassium, sodium chlorides, nitrates and sulfates. If any of these compounds and elements are high, you should contact your county Extension agent or NRCS for guidance in dealing with the soil.

In the case of earthen floor facilities where floor soil is high in nutrients, remove soil to a depth of 1 foot and spread with the litter. The remaining hole should be filled and leveled.

### **NOTES:**

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## Action Plan:

An action plan is a tool that allows you to take the needed steps to modify the areas of concern as identified by your assessment. The outline provided below is a basic guide for developing an action plan. Feel free to expand your plan if you feel the need for detail or additional areas not included. Consult the list of references at the end of this publication if additional assistance is needed to develop a detailed action plan.

Area of Concern	Risk Ranking	Planned Action to Address Concern	Time Frame	Estimated Cost

## GLOSSARY:

### Broiler Litter Management

**Compost:** Organic residues that have been collected and allowed to decompose.

**Composting:** A controlled process of decomposing organic matter by microorganisms.

**Cost Sharing:** A program in which the Natural Resource Conservation Service pays a percentage of the costs of a project, facility or effort.

**Leaching:** The removal of a soluble substance from soils or other material by water.

**Mortality:** Birds that died during production.

**Nutrient:** Usually referring to those elements necessary for plant growth (Such as nitrogen, potassium and phosphorus).

**Nutrient Management Plan:** A specific plan designed to manage animal manures and mortalities to obtain maximum benefits and protect the environment.

**Stacking Shed:** A structure designed and built for the storage of poultry manure.

## REFERENCES:

<b>CONTACTS AND REFERENCES</b>			
<b>Organization</b>	<b>Responsibilities</b>	<b>Address</b>	<b>Phone number</b>
Agricultural Pollution Prevention (AgP2)	Opportunities for pollution prevention for farmers and others	Biological and Agricultural Engineering Department, University of Georgia, Driftmier Engineering Center Athens, GA 30602	706-542-9067
Poultry Science Department	Information on poultry production practices and environmental concerns related to poultry production	Poultry Science Building University of Georgia Athens, GA 30602	706-542-1325
County Extension Service	Information about beef cattle management, livestock working facilities, forage species, and nutrient and pest management planning	See local phone directory	
Georgia Poultry Federation	General information on Georgia's poultry industry	518 S Enota Dr NE Gainesville, GA 30501	706-532-0473
Georgia Poultry Improvement Association Inc.	General information on Georgia's poultry industry	P.O Box 20 4457 Oakwood Rd. Oakwood, GA 30566	770-535-5996
US Poultry and Egg Association	General information on the poultry industry	1530 Cooledge Rd. Tucker, GA 30084	770-493-9401
Natural Resource Conservation Service (NRCS)	Information on the construction of composting facilities and litter storage structures	See local phone directory	
Georgia Department of Agriculture General Field Forces	Questions regarding dead bird disposal and animal manure handling permits	Georgia Department of Agriculture, Capitol Square 19 Martin Luther King Jr. Dr. Suite 134 Atlanta, GA 30334	404-656-3649

## **PUBLICATIONS:**

### **State Soil and Water Conservation Commission**

**P.O. Box 8024**

**Athens, GA 30603**

- Best Management Practices for Georgia Agriculture

### **University of Georgia, Cooperative Extension**

**Athens, GA 30602**

- Poultry Mortality Composting Management Guide, Bulletin 1266
- Poultry Litter Sampling, Bulletin 1270
- Calculating the Fertilizer Value of Broiler Litter, Circular 933
- Calibration of Manure Spreaders, Circular 825
- Facilities for Storing and Handling Broiler Litter, Newsletter
- Poultry Litter Application on Pastures and Hayfields, Bulletin 1330
- Best Management Practices for Storing and Applying Poultry Litter, Bulletin 1230
- Litter Quality and Broiler Performance, Bulletin 1267
- Composting Poultry Mortalities, Bulletin 1152-22
- Composting 101: How to Effectively Operate a Poultry Mortality Compost Bin, Electronic Bulletin 103
- Maximizing Poultry Manure Use through Nutrient Management Planning, Bulletin 1245
- Coexisting with Neighbors: A Poultry Farmer's Guide, Bulletin 1263

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This bulletin is a revision of “Broiler Production” developed by Drs. Mike Lacy and Larry Vest.

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Bulletin 1152-11

Revised May 2009

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