Poultry Engineering, Economics & Management

Newsletter of the

National Poultry Technology Center, Auburn University

Critical Information for Improved Bird Performance Through Better House and Ventilation System Design, Operation and Management

Produced in cooperation with the U.S. Poultry & Egg and Alabama Poultry & Egg Associations

Issue No 79, April 2013

Water System Inspection Pays Off

By Jess Campbell, Dennis Brothers, Jim Donald and Gene Simpson
National Poultry Technology Center, Auburn University College of Agriculture

Satisfying bird water needs is crucial for top flock performance, and it takes a great deal of water. A typical updated 40 x 500 broiler house in Alabama can consume 450,000 gallons or more of potable water a year for bird consumption and operation of a 6-inch evaporative cooling system. A four-house broiler farm of these houses may require 1.8 - 2.0 million gallons per year. Satisfying water demand can be especially challenging in summertime when both birds and evaporative cooling systems are thirsty. In addition to meeting the total demand, it is critical to meet the peak flow rate needed, which in hot weather might be as much as 50-60 gallons per minute for four houses. We too often see farms that do not show obvious problems most of the time during cool and mild weather growouts – but show significant flock performance reductions in hot weather because of failing to meet the peak flow rate demand, which can be very costly to a grower.

Hot weather is fast approaching. Are your houses' water plumbing and supply systems adequate to handle summer's peak demand? If you can't answer YES, with confidence, it is time to put a water supply system inspection at the top of your spring cleaning checklist.

Broiler house water system inspections should be routinely scheduled, but there are some scenarios or situations to look for that tell you to do it NOW:

1. Can't get weight on birds and/or see higher than average mortality rates in hot weather.
2. Have experienced a drop in performance after adding additional houses on a farm.
3. Upgraded fans for higher windspeed and 6-inch cooling system without upgrading plumbing.
4. Experience low or no pressure at drinker lines and in control rooms when birds are drinking and evaporative cooling systems are filling at the same time.
5. Have trouble keeping evaporative cooling systems from running out of water on hot days.

continued on page 2

Photo by Charles Swain

A partially clogged drinker system pressure regulator can cause a loss in water flow (gallons per minute getting to the birds) before any drop in pressure becomes obvious. The only way to be sure the regulator is still delivering the water flow needed is to take it out of the line and visually inspect it. On most farms, this should be done at least once a year, and especially in the spring ahead of summer's high water demand. This regulator is definitely restricting water flow and must be cleaned or replaced. Getting enough water to birds at all times is critical for good flock performance.

Potential Dollars Saved or Lost

If any of the situations or symptoms described above apply to your farm, a water supply restriction might be the root of the problem. Identifying a water supply problem can be tricky but of utmost importance in dollars and cents. You don't want an overlooked water restriction to drop you to the bottom of the settlement sheet.

Consider two farms, each with four similar modern 40 x 500 broiler houses that require approximately 13 gpm (gallons per minute) per house at peak demand on a really hot dry day, so the total farm water supply flow rate required is 52 gpm. Grower A has an adequate water supply and routinely checks for any symptoms of water shortage on the farm and corrects them. Grower B on the other hand, has consistently had trouble with performance during hot weather. He hasn't identified the problem but notices the houses run low on pressure at times. The truth is that Grower B's water supply system is either partially clogged or undersized, and can deliver only 40 gpm, not 52 gpm. That's a lot of gallons not available during crucial times of the growout when birds and cooling pads need it the most.

In this situation of hot weather water inadequacy, Grower B's flocks may take as much as a 3% hit in livability and lose as much as 0.4 pounds of potential per bird average live weight. What does this look like in dollars and cents, if each farm places 88,000 birds per growout? There are many other factors to consider, but let's keep it simple:

	# birds placed	Livability %	# birds sold	Avg lbs/ bird	Total lbs sold	$0.056/lb sold	Income difference
Grower A	**88,000**	**97**	**85,360**	**8.5**	**725,560**	**40,631.36**	
Grower B	**88,000**	**94**	**82,720**	**8.1**	**670,032**	**37,521.79**	**- $3,109.57**

Grower A, having an adequate water supply, received a check for approximately $40,631.36 with a good average weight and good livability. Grower B, having an inadequate water supply, sent fewer birds to the plant with poor livability and a much lower average weight and brought home $3,109.57 less for the same number of chicks placed. Grower B could easily find himself in this scenario for at least two hot weather flocks and see an estimated $6,219.14 in less income compared to Grower A, simply due to water inadequacy.

Cost of fixing a plumbing or other water supply problem on the average poultry farm varies greatly depending on the particular situation, but $6,000 would certainly go a long way toward fixing the problem.

Water Supply Inspection Points

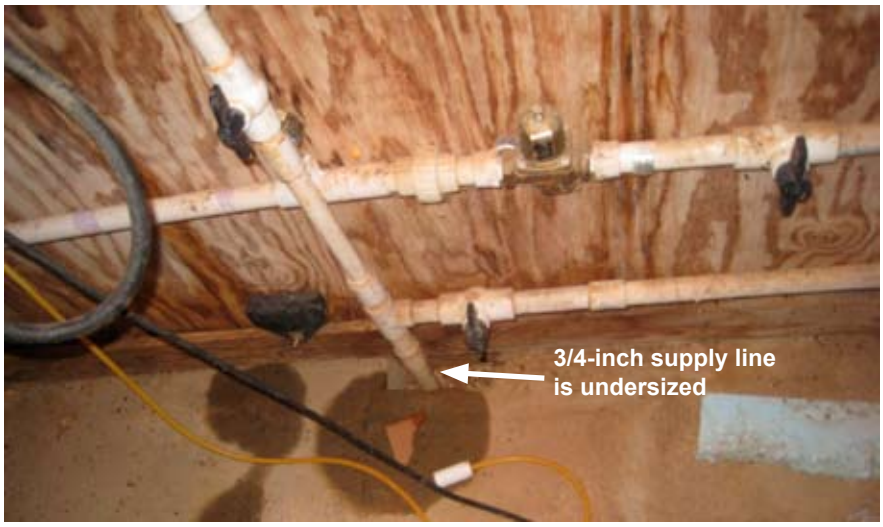
The first point to consider is that the water source used – whether a water utility or pumping from a well or pond, must be capable supplying the amount and flow rate needed. Particular poultry farm water needs vary greatly depending on location, weather conditions, number and size of houses, and number and size of birds grown in those houses. Our example farm above, typical for the lower Broiler Belt growing large birds, needs a water source capable of supplying a minimum of 52 gpm at maximum demand. Remember, that is just for the poultry farm, not a dwelling or other farm needs. Contact your company representative for an estimated per-house water requirement. See our newsletter #7, *Key Water Factors for Broiler Production*, for more information.

Following are the main items to check to assure your water system and plumbing are adequate. Examples assume the same typical four-house farm with modern 40 x 500 broiler houses, the farm requiring 52 gpm at peak demand. Note: these figures are for illustration purposes only, and may not fit your farm. Each farm must be assessed according to the location of the farm, weather conditions, type and size of birds, and amount and type of equipment installed.

1. Undersized Water Meter: Undersized water meters can significantly reduce the amount of water pressure and flow that a farm receives during hot weather. The meter might be sufficient to supply a residential home but not a poultry farm. Our example farm requiring 52 gpm will need a 1.5-inch diameter municipal water meter to adequately supply the farm. The typical ¾-inch water meter is rated for up to 30 gpm and a 1" meter up to 50 gpm, each restricting 15 psi at given water flow. These are American Water Works Association (AWWA) standard pressure loss ratings. Specific meter ratings should be confirmed with the water supplier and meter manufacturer.

2. Undersized Main Plumbing Line(s): Undersized main water supply lines are often found to be the root of a water problem. A certified plumber should be consulted to determine if a farm's main line is undersized. The distance from the water source at the meter or well head to the farm's control room determines the amount of pressure (friction) loss that will occur. Also, major changes in elevation contribute to pressure loss. For example, a 21.7 psi pressure loss will be felt if the farm is only 50 feet above the meter or well head. Our example four-house farm would need a 2-inch diameter PVC main water line and would have 20 psi of friction loss if the farm was 1,000 feet from the point of supply on level grade. If the farm water system was installed using only a 1.5-inch

Can't Cut Corners: Often we find that the entire plumbing system from the meter to the control room needs to be upgraded. Electing to upgrade the meter only will not fix the problem when the entire system is undersized. This new 2-inch meter will not overcome the restriction caused during peak demand by the existing undersized plumbing line to the houses.



Plumbing into Control Room: The ¾-inch supply line in this picture is a problem and needs to be upgraded. Most companies require a minimum of 1.5–2-inch supply lines into each control room to serve both the birds and pads. Also, don't reduce the supply line at the floor. It should extend up the wall to the last tap or end of the header.

main line the friction loss would be approximately 60 psi (3 times more) measured 1,000 feet away. A new 2-inch main water meter won't fix the problem of an undersized main supply line on the farm.

3. Stopped Up Filters: The great thing about water filters is the fact that they are disposable just like the air filters in our homes. The problem is sometimes we forget to change them and even if we have a regimen we follow to change them once per flock, that might not be enough during summer months when we are using more than average water. Each farm is different and the rate of filter changes is based on quality and quantity of water used. It is imperative to have water pressure gauges installed on both sides of the filter so the grower can tell if and when the filter is restricting water pressure. This really needs to be checked when a significant number of the birds are up and drinking. If no water is flowing through the filter then there will not be a pressure drop even if the filter needs to be changed. The poorer the water quality the more time and effort a grower will have to spend keeping filters clean.

4. Clogged Regulator: Water pressure regulators are a great way to restrict water pressure to the drinker systems inside the house but they too can be a water flow restriction. This regulator takes the pressure down from supply pressure at 40-100 psi to approximately 25-40 psi, depending on company preference. These regulators have a wire mesh screen inside of them to keep trash from damaging the regulator but can restrict water flow as contaminants build up over time. Regulators should be removed from the line and inspected each year at minimum. Water meters and medicators can also become clogged with trash in the system.

5. Kinked Drinker Supply Hoses: Also known as drop hoses, these connect the water supply plumbing to the drinker lines. The most frequent problem we see with drop hoses is that they become easily kinked and partially or totally stop water flow. Common household or "garden" water hoses are not good options for supplying water to

drinkers as they are often very easy to kink. Even if higher quality hoses are used, they too can become kinked. If small diameter drop hoses are used, be aware that if biofilm builds up in these hoses, they too can become a source of water restriction.

6. Contaminated Nipple Drinkers: While modern nipple drinkers usually work well to supply birds with adequate water, they can become partially clogged with biofilm and other contaminants and functionally restrict water. This is not just a hot weather problem. It can occur at any time of the year, and is most often a problem with young chicks, resulting in high 7-day mortalities. Young chicks are often not strong enough to break the drinker pins free if they are stuck. Activating nipple drinkers prior to bird placement is a must! As nipple drinker technology has evolved, there are several different types of nipple drinkers on the market, designed for the different types and size of birds. Make sure the nipple drinkers in your lines were designed for the birds you are growing. If you have questions about what nipple drinker is right for the flocks being grown, ask your company representative about approved drinker types and options. For more information on drinker line maintenance, see our Newsletter #78, *Is Poor Drinker Management Costing You Fuel Dollars?*

Make Sure Your Backup Water Source is Ready

Water plays an extremely important role in growing a good healthy flock of chickens, so making sure the farm has a good clean abundant source of water from day one to catch is imperative. Just as you need a backup generator, you need a fall-back water source. If your primary water source fails for any reason, your secondary source must ready to take over and carry the farm until the primary water source can be restored. See our newsletter #7, *Key Water Factors for Broiler Production.*

The Bottom Line

It is very difficult to maintain a competitive edge growing chickens on farms that have water supply problems, especially during hot weather growouts. Water restrictions can develop slowly over time and go unnoticed for years, but will have been robbing performance all that time. A little time spent on preventative maintenance on the farm's water system can pay dividends by the end of the summer. We have received many calls and reports back from growers and company representatives that have basically "turned problem farms around" simply by identifying and successfully repairing water supply problems. This is not to say that this will fix every problem, but it is certainly worth a grower's time this spring to pay some attention to his water supply system. If it is decided that a plumbing upgrade is in order for your farm and you are not comfortable or experienced in plumbing work, please contact a company representative and a local reputable plumber and come up with a plan together. There is never enough money for a redo and fixing mistakes in an emergency can be costly.

Thanks to the following for their support of Extension poultry engineering, economics and management programs at Auburn University:

Diamond

Aerotech/Munters	888-335-0100
Agrifan	800-236-7080
Cumberland	217-226-4401
Hired Hand, Inc.	800-642-0123
Port-A-Cool	800-231-9940
Porter Insulation Products	800-999-0430
Poultry Litter Treatment-PLT	800-379-2243
Reeves Supply	888-854-5221

Platinum

DIVERSIFIED / ROTEM	800-348-6663
Pro-Tech, Inc.	www.pro-techinc.com
Tabor Group Inc./aglights.com	540-989-7383
VALCO	www.val-co.com

Gold

Chore-Time	574-658-4101
J&R Builders/Farm Systems	205-594-5994

Silver

Alabama Farm Credit	877-681-6087
Aviagen	800-826-9685
CoolAir	904-389-1469
Dandy/G&M Sales	800-222-4166
Detroit Radiant Products Co.	800-222-1100
Double L Group	800-553-4102
Ellison and Ellison	770-427-8929
First South Farm Credit	800-955-1722
IVESCO	800-643-3064
Multifan/Vostermans Ventilation, Inc.	800-458-5532
Lewis Brothers	912-367-4651
Space Ray	800-438-4936

The Poultry Engineering, Economics and Management Newsletter provides up-to-date information on topics of interest to poultry production personnel, focusing on most effective and efficient uses of modern technology and equipment, with a special emphasis on economic implications. The Newsletter is published six times a year, or as needed to address emerging or special issues. Contact: Jess Campbell, National Poultry Technology Center, 226 Corley Bldg., Auburn University, AL 36849-5626, (334) 844-3546, fax (334) 844-3548, jesscamp@aces.edu. Published by:

Jess Campbell, Poultry Housing Specialist, National Poultry Technology Center

Dennis Brothers, Poultry Housing Specialist, National Poultry Technology Center

Jim Donald, Professor and Extension Engineer

Gene Simpson, Professor and Extension Economist