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**STATE OF MINNESOTA
IN COURT OF APPEALS
A17-1963**

George Lanoue, et al.,
Appellant,

vs.

Better Water Industries, Inc.,
Respondent,

Thein Well Company,
Respondent.

**Filed June 4, 2018
Reversed and remanded
Bratvold, Judge**

Kandiyohi County District Court
File No. 34-CV-16-395

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Considered and decided by Florey, Presiding Judge; Larkin, Judge; and Bratvold,
Judge.

UNPUBLISHED OPINION

BRATVOLD, Judge

In an appeal from summary judgment entered in favor of respondents Better Water Industries, Inc. and Thein Well Company in a negligence and products-liability action, appellants George and Peggy Lanoue challenge the district court's determination that one aspect of their expert's evidence lacked foundational reliability. Appellants do not dispute that expert testimony is required to establish that damage to their dairy goat herd was caused by exposure to excessive and harmful chlorine resulting from respondents' negligence and the defective design of their water-treatment system. Because appellants' expert opinion had sufficient foundational reliability for his estimate of the amount of chlorine in the goats' drinking water, the district court erred in granting summary judgment. Thus, we reverse and remand.

FACTS

Appellants George and Peggy Lanoue have farmed livestock for most of their lives. In 2014, the Lanoues transitioned from raising hogs to goats. By the end of 2014, the Lanoues had purchased approximately 400 dairy goats from several sellers. The Lanoues became concerned about water quality. Their farm relied on a well and their water contained methane and iron, which affected the water quality. The Lanoues sought to improve water quality so the goats would drink more water and increase milk production.

Around August 2014, the Lanoues contacted respondent Thein about improving water quality. Thein sold one water-treatment system to the Lanoues, but they were not

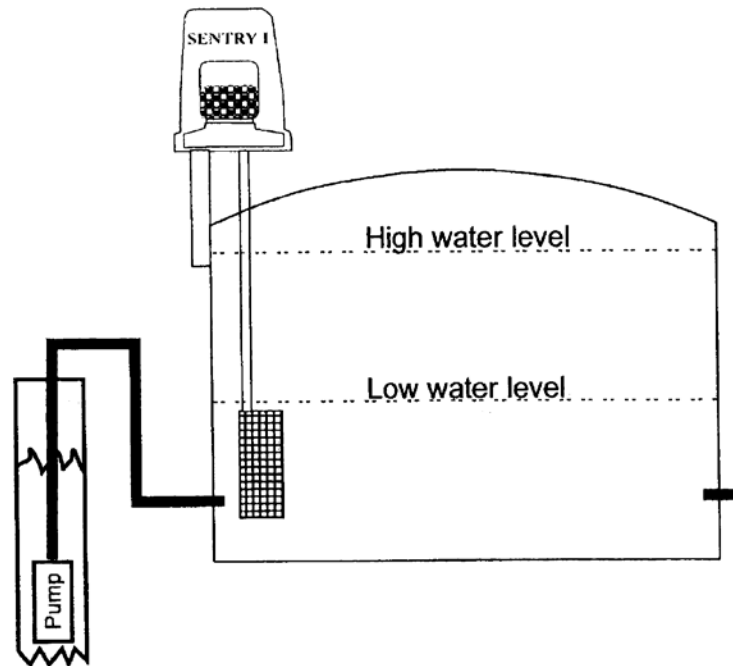
satisfied after installation because it did not remove enough methane and iron from the water.

In February 2015, Thein submitted a sample of the Lanoues' water to Chandler Systems, Inc. (CSI) for analysis. CSI recommended a liquid chlorine-based water treatment system. Preferred Pump, Inc., Thein's distributor, purchased a Sentry I Open Air System (the Sentry system) from respondent Better Water Industries (BWI), sold it to Thein, and Thein then sold it to the Lanoues. On May 18, 2015, Thein installed the Sentry system at the Lanoues' farm. Before installation of the Sentry system, about fifteen goats had died and the herd experienced an outbreak of coccidiosis, a protozoan parasite.

The Sentry system is designed to oxidize and sanitize the water, in part, by opening the water lines to the air, which also releases and dissipates the methane. Because opening the water lines to the air increases the risk of contamination, Thein recommended chlorine to sanitize the water. Chlorine treatment also removes iron, manganese, algae bacteria, and tannins from the water. In the Sentry system, chlorine "pellets" drop into the tank from a "rotating gear." The amount of chlorine is controlled by the gear setting, which ranges from A-L. For example, setting G delivers a chlorine pellet every two minutes and six seconds. The pellets drop through a tube into a basket; water passes through the basket when the water pump is running, dissolving the pellets.

Chlorine demand, as well as the desired chlorine residual, indicate the proper gear-setting.¹ The Sentry system manual describes how to calculate the chlorine demand and recommends a chlorine residual of 1.5 to 2.5 parts per million (ppm). The manual also recommends that, after chlorine treatment, water should be filtered through a carbon filter or an Ag filter. A carbon filter will eliminate chlorine residual. BWI does not include a filter with the Sentry system, and it does not make or sell them. They installed a carbon filter on the Lanoues' system.

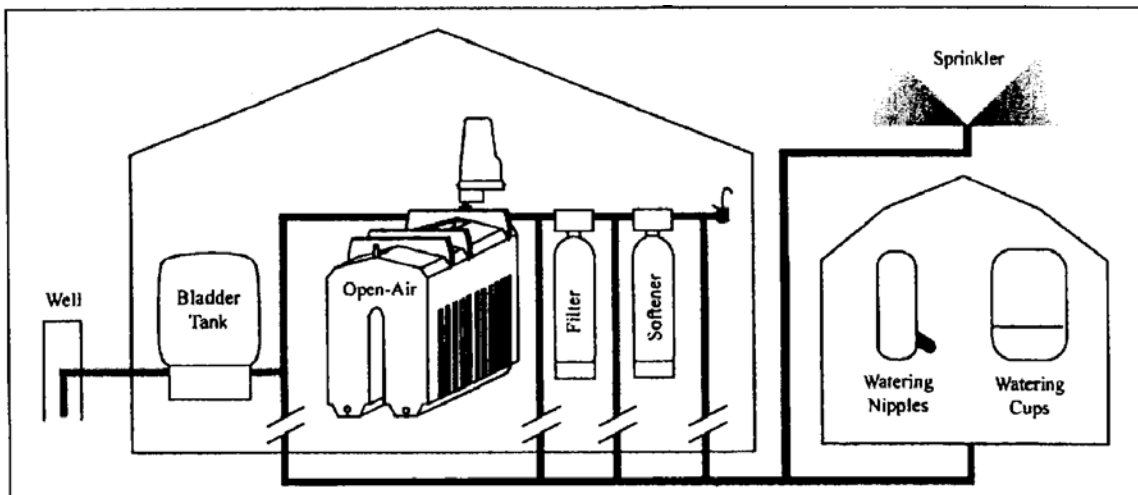
The chlorine tank is depicted in the following diagram:



They installed a second tank next to the chlorine tank to allow a greater volume of water to be treated. The water flowed from the first tank into the second tank, which

¹ The chlorine demand is created by iron, manganese, algae bacteria, and tannins, and varies with the amount of these elements present in the water. Any chlorine that is not “used up” by these elements is chlorine residual.

contained a pump. Next, the water passed through a carbon filter and a water softener, and was delivered to the barn for the goats to drink. The Sentry system layout is depicted in the following diagram:



After the Sentry system was installed it “flushed nonstop;” the Lanoues shut it off and informed Thein of the problem. Thein decided to replace the “brains” of the system, and the system was restarted in June 2015. Peggy testified in her deposition that she noticed that some of the goats suffered “diarrhea and some bloating.” The Lanoues again shut off the system on June 23, 2015, because they believed it was causing health problems in their herd by providing too much chlorine. A total of 7 goats—3 kids and 4 does—died shortly after the Lanoues started using the Sentry system.

The Sentry system was not used again until January 6, 2016, when it was restarted. At that time, Mike Rivers, a Thein employee, replaced the carbon filter with an Ag filter, which does not remove chlorine from water. Rivers tested the chlorine residual using “little litmus paper test strips” on at least three occasions in January 2016, and testified in his deposition that he found no chlorine. It is undisputed that Rivers did not “follow the testing

procedure” for using the testing strips.² On January 20, Rivers increased the amount of chlorine being delivered to the tank by changing the gear setting.

After the amount of chlorine was increased, the Lanoues reported on January 22 that the goats became progressively more ill based on the following symptoms: “[d]iarrhea, bloating, definitely off feed, cutting back on milk.” On January 26, Rivers added a carbon filter and tested the water. Rivers testified that he again tested the water with strips and found little to no chlorine residual at this time. On January 27, Peggy tested the water using the same litmus strips, and found that the chlorine residual level was “3 to 5 parts per million total chlorine and 1 part per million free chlorine.” As a result, she decreased the amount of chlorine by altering the gear setting.

On January 28, the goats were vomiting, foaming at the mouth, suffering from diarrhea, and staggering, and a veterinarian was called to treat them. The Lanoues turned off the Sentry system, and have not used it since that day. In the following weeks, the Lanoues reported that their goat herd suffered from bloating, acidosis, diarrhea, vomiting, pain during urination, loss of bladder control, polio, abortions, and thinning of hair. In February 2016, Dr. Ryan Tollefsrud, a veterinarian, euthanized one goat, sent samples to

² The district court stated in its “findings of fact” that Rivers did not use the correct type of “test strips,” because the test strips that Rivers used were instead “designed for use in pools and spas.” The district court also found that Rivers did not follow the manufacturer’s testing procedure because “the strips were dipped in the water only once, rather than being dipped twice as the instructions directed.” We note that on a summary judgment motion, it is inappropriate for the district court to make factual determinations. *See State ex rel. Hatch v. Allina Health Sys.*, 679 N.W.2d 400, 406 (Minn. App. 2004). Because respondents conceded at oral argument that this fact was not disputed, we include it in our summary of the record.

the University of Minnesota diagnostics lab, and the lab reported that the goat suffered from laminar neuronal necrosis, which can be caused by “ischemia, heavy metal toxicity (e.g., lead) and by nutritional factors such as thiamine deficiency or excess sulfur compounds in the diet.”

In July 2016, the Lanoues sued Thein and BWI and claimed that the Sentry system added harmful levels of chlorine to their water, causing damage to their goats. The Lanoues alleged that Thein was negligent in the sale, installation, and servicing of the Sentry system. The Lanoues also alleged that BWI was negligent in the designing the Sentry system, preparing the instruction manual, and in training Thein on how to install and service the Sentry system. Finally, they alleged that BWI and Thein breached express and implied warranties.

The Lanoues disclosed four expert witnesses: Peter Cartwright, a chemical engineer and expert on water-treatment systems; Dr. Tollefsrud, the treating veterinarian; Dr. Sandra Solaiman and Carol Delaney, each of whom opined on the goats’ health problems and the Lanoues’ farm management.

BWI filed several motions, including a motion for summary judgment. BWI argued that summary judgment was appropriate because the Lanoues’ expert opinions lacked foundational reliability, and without expert evidence, the Lanoues were unable to establish that chlorine caused damage to their goat herd. In their response, the Lanoues disagreed, but also withdrew their claim for breach of express warranty. To show that their expert evidence was sufficient to survive summary judgment, the Lanoues submitted several affidavits from their disclosed experts.

On October 31, 2017, the district court granted BWI's motion for summary judgment based on its review of the affidavit of Cartwright, the water-treatment expert. The district court recognized that Cartwright offered five opinions, but concluded that the Lanoues' case "hinges" on proof that "an unhealthy chlorine residual was present in the actual drinking water of [the Lanoues'] goats." Because Cartwright's expert affidavit lacked foundational reliability, and expert testimony was required, the district court concluded, "[t]here is no reliable evidence that a chlorine residual was present in [the Lanoues'] goats' water." The court did not consider the Lanoues' other expert evidence offered to establish the impact of chlorine exposure on goats, nor did it decide BWI's other motions.

Finally, although Thein did not file its own motion for summary judgment, or timely join BWI's motion, the district court granted summary judgment to Thein because the Lanoues had a meaningful opportunity to respond.³ Thus, the district court granted summary judgment in favor of BWI and Thein and dismissed the Lanoues' claims with prejudice. This appeal follows.

D E C I S I O N

A motion for summary judgment shall be granted "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that either party is entitled to a

³ At the hearing on BWI's motions, Thein requested that "if BWI's motion for summary judgment is granted, we would also be granted judgment based on the Court's own motion." On appeal, the Lanoues do not challenge Thein's failure to timely join the motion for summary judgment.

judgment as a matter of law.” Minn. R. Civ. P. 56.03. On appeal from summary judgment, this court reviews de novo whether there is a genuine issue of material fact and whether the district court erred when it applied the law. *STAR Ctrs., Inc. v. Faegre & Benson, L.L.P.*, 644 N.W.2d 72, 76-77 (Minn. 2002). We “view the evidence in the light most favorable to the party against whom summary judgment was granted.” *Id.*

I. The district court erred in granting summary judgment based on its conclusion that Cartwright’s expert opinion lacked foundational reliability.

Causation is an essential element of each of the Lanoues’ negligence and warranty claims. *Driscoll v. Standard Hardware, Inc.*, 785 N.W.2d 805, 816 (Minn. App. 2010) (causation is an essential element of an implied warranty claim), *review denied* (Minn. Sept. 29, 2010); *Gilmore v. Walgreen Co.*, 759 N.W.2d 433, 435 (Minn. App. 2009) (same regarding negligence), *review denied* (Minn. Mar. 31, 2009); *J & W Enters., Inc. v. Econ. Sales, Inc.*, 486 N.W.2d 179, 181 (Minn. App. 1992) (same regarding negligent design).

The Lanoues offered expert testimony to meet their burden in response to BWI’s summary-judgment motion. Because what is a harmful chlorine level and what caused the damage to the Lanoues’ herd is outside common knowledge, expert testimony is required. *Gross v. Victoria Station Farms, Inc.*, 578 N.W.2d 757, 762 (Minn. 1998) (“Expert opinion is required to prove causation if the issue is outside the realm of common knowledge.”). The Lanoues submitted Cartwright’s affidavit to prove the chlorine level or concentration in the goats’ drinking water, among other issues. The district court rejected Cartwright’s opinion on chlorine concentration as lacking foundational reliability. The Lanoues argue that the district court erred because Cartwright’s estimates of the chlorine level in the goats’

drinking water relied on the Sentry system's specifications (i.e., the tank volume), independent tests of water composition to determine chlorine demand (e.g., iron concentration), and the chlorine content of the BWI pellets, as described in deposition testimony and in the manufacturer's information.

We review the district court's evidentiary rulings, including rulings on foundational reliability, for an abuse of discretion. *State v. Loving*, 775 N.W.2d 872, 877 (Minn. 2009); *Jacobson v. \$55,900 in U.S. Currency*, 728 N.W.2d 510, 525 (Minn. 2007) (stating that a district court's determinations regarding foundation for expert witness testimony will not be reversed absent abuse of discretion). Expert testimony is admissible under Minnesota Rule of Evidence 702 if, (1) the witness qualifies as an expert; (2) the expert's opinion has foundational reliability; and (3) the expert testimony is helpful to the trier of fact. *Doe v. Archdiocese of St. Paul*, 817 N.W.2d 150, 164 (Minn. 2012). If the testimony involves a "novel scientific theory," it also must satisfy the *Frye-Mack* standard. *Id.*

Here, the district court limited its analysis to the second element, foundational reliability, which required the court to: "(1) analyze the proffered testimony in light of the purpose for which it is being offered, (2) consider the underlying reliability, consistency, and accuracy of the subject about which the expert is testifying, and (3) determine if the proffered evidence is reliable." *Pfeiffer ex rel. Pfeiffer v. Allina Health Sys.*, 851 N.W.2d 626, 638 (Minn. App. 2014), *review denied* (Minn. Oct. 14, 2014).

In his affidavit and report, Cartwright, a chemical engineer with 43 years of experience in water treatment, estimated the chlorine concentration in the goat drinking water by analyzing the volume of water in the Sentry system tanks, the chemical

composition of the water to determine chlorine demand, and the amount of chlorine added to the water based on the number of chlorine pellets dropped into the water, depending on several different gear settings. According to his affidavit, Cartwright estimated that when the gear was at a G setting, the chlorine concentration in the goats' drinking water would have been between 7.2 and 7.9 ppm; at the K setting, the chlorine concentration would have been between 21.9 and 25.6 ppm; at the intermediate setting between K and L, the chlorine concentration would have been between 35.0 and 38.7 ppm. Each of the settings that Cartwright considered came from deposition testimony stating the setting was used in the Lanoues' Sentry system.

Cartwright's affidavit provided several "[o]pinions . . . based on a reasonable degree of scientific certainty." First, he opined that there was "no need for any chlorine whatsoever to be in the" goats' water. Second, he opined that the Sentry system pellet feeder was set incorrectly resulting in "excessive and harmful level of chlorine in the water fed to the goats."⁴ Cartwright concluded that the Sentry system treatment of the goat water on the Lanoues' farm resulted in chlorine concentrations of "26.5 ppm or over six times higher than the EPA limit for human consumption," and far higher than BWI's recommended residual, which is between 1.5 and 2.5 ppm, as stated in the Sentry system manual.

The district court determined that Cartwright's opinion on chlorine concentration lacked foundational reliability because: Cartwright's estimates were not reliable to

⁴ Cartwright also opined that Thein's failure to test the water "after the initial installation," to determine whether the goat water "contained excessive levels of chlorine," was negligent and that BWI's decision to "increase the level of chlorine" in January 2016, without reliably testing the chlorine concentration in the goats' drinking water, was also negligent.

establish the “actual level” of chlorine concentration in the goats’ water; Cartwright failed to reliably establish the dissolution rate of the chlorine pellets, which is affected by several variables including chlorine demand; and Cartwright failed to calculate the “amount of chlorine” that a carbon filter “might have removed from the water.” We disagree with the district court’s view of Cartwright’s affidavit. Because Cartwright’s affidavit established foundational reliability for the data he used to reach his estimate of the chlorine level in the goat herd’s drinking water, the district court erred in requiring evidence of the “actual level of chlorine” in the goats’ drinking water.

An estimate by an expert has foundational reliability, as long as it is based on data that has sufficient evidentiary support. *See State v. Myers*, 359 N.W.2d 604, 610-11 (Minn. 1984) (stating that the “cause of many physical and emotional ailments” that “cannot be demonstrated to an absolute certainty” are “nevertheless, the subject of expert testimony”). Expert testimony that offers estimates may not be excluded as conjectural simply because it is not absolutely certain. *Ingram v. Syverson*, 674 N.W.2d 233, 236 (Minn. App. 2004) (stating that an expert witness “is not required to speak with such confidence as to exclude all doubts in his mind, but may render his testimony in the form of an estimate of opinion, couched in expressions that fall short of absolute conviction of accuracy” (quotation omitted)), *review denied* (Minn. Apr. 20, 2004). Additionally, expert opinion about estimates based on a reliable method may not be excluded as speculation. *See Loving*, 775 N.W.2d at 878 (rejecting defendant’s foundational reliability challenge where the expert adequately “followed approved procedures” and both parties agreed that method was a reliable means for determining gunshot residue). The weight and credibility to be given to

expert opinions should be “decided by a finder-of-fact and not by the district court.” *Pfeiffer*, 851 N.W.2d at 639 (“The reliability of appellant’s expert opinion testimony with regard to causation goes to the relevant weight of that testimony rather than to its admissibility.” (quotation omitted)).

To estimate the chlorine concentration of the goats’ drinking water, Cartwright followed the method espoused in BWI’s manual for the Sentry system: that chlorine residual may be calculated by subtracting the chlorine demand from the amount of chlorine added to the water. Cartwright determined chlorine demand with reference to tests of the Lanoues’ water that were performed at Thein’s request in 2015 and 2016 by National Testing Laboratories, Ltd., Dairyland Labs, and CSI. After considering the known volume of the water in the two Sentry tanks (based on BWI’s specifications) and the amount of chlorine dropped in the water, Cartwright estimated the chlorine concentration of the goats’ drinking water.

The district court was understandably troubled because Cartwright stated in his affidavit that the “actual concentrations in the goats’ drinking water will never be known, and can only be estimated.” But Cartwright’s estimates of the chlorine concentrate in the goats’ water were based on known data, the foundation for which respondents did not challenge. Because Cartwright provided sufficient foundation for the factual data he used to formulate his estimates, the district court erred when it concluded that the Lanoues offered “no reliable evidence that a chlorine residual was present” in the goats’ water.

To be sure, BWI may test Cartwright’s opinions through cross-examination and the presentation of their own expert witnesses. But these matters go to the weight and

credibility of the expert opinion and not its admissibility. In fact, each of the district court's other criticisms of Cartwright's opinions identifies likely topics for attack by the respondents.

For example, the district court also determined that Cartwright's estimates of chlorine demand are not reliable because Cartwright did not consider elements other than iron before reaching his demand calculations. Also, the district court found that Cartwright admitted that the amount of iron varied greatly, and any attempt to calculate the chlorine demand would "basically be a guess." Cartwright nonetheless estimated chlorine demand based on data from water tests performed by National Testing Laboratories, Ltd., Dairyland Labs, and CSI at Thein's request. Finally, Cartwright's affidavit opined that, other than iron, "[a]ll other compounds reflected in the water sample would have no effect on chlorine demand."

The district court also criticized Cartwright for failing to reliably establish the chlorine concentration of the water after it exited the Sentry system. But any difference between the chlorine concentration of the water in the tanks and in the goats' trough goes to the weight or credibility of Cartwright's opinions, not to their admissibility. Ultimately, the weight and credibility to be given to Cartwright's opinion should be decided by a finder-of-fact and not by the district court. *Pfeiffer*, 851 N.W.2d at 639.

Additionally, the district court determined, and BWI now argues, that Cartwright failed to consider the amount of chlorine that a carbon filter might have removed from the water. Several factual allegations regarding use of a carbon filter are contested. For example, the record shows that a carbon filter was used while the Sentry system operated

in June 2015, even though the goat herd became sick. Cartwright’s affidavit alleges that it is unclear whether this filter was “properly sized;” and Cartwright opines that “it is unknown if the carbon filtration would have been sufficient” to filter chlorine from the water. The record also shows that Thein removed the carbon filter from the Sentry system when it was operated in January 2016. From this, the Lanoues infer that the amount of chlorine that a carbon filter might have removed is irrelevant. Because the evidence regarding whether use of a carbon filter effectively eliminated chlorine allows “reasonable persons to draw different conclusions,” we conclude that there is a genuine issue of material fact on this issue. *DLH, Inc. v. Russ*, 566 N.W.2d 60, 71 (Minn. 1997).

Finally, the district court criticized other aspects of Cartwright’s expert opinion, such as the demonstrations that were described in Cartwright’s affidavit: (1) the restart of the Sentry to “simulate normal usage of the system;” (2) the “bucket” test; and (3) a yellow ball demonstration.⁵ Because the district court criticized these demonstrations, but did not rely on its criticisms to reach its summary-judgment decision, and Cartwright did not rely

⁵ First, in April 2017, a Cartwright representative restarted the Sentry system to “simulate normal usage of the system.” For this test, Cartwright used a K gear setting, filled the first tank with water in the evening, then removed 400 gallons the next morning, and removed 100 gallons in the middle of the day. Cartwright then measured the chlorine concentration at two depths of the tank; he found between 182 and 200 ppm within one inch of the bottom of the first tank and between 0.16 and 0.21 ppm within the top one inch of the top of the tank. In this simulation, Cartwright did not measure the amount of chlorine in water emptied from the tank. Next, the Lanoues dissolved a chlorine pellet in a bucket under a garden hose, and measured the resulting chlorine concentration. The amount of the chlorine residual increased with time, and, when measured 80 minutes after the bucket was filled “[t]he Ecolab drop test showed 16 ppm and the [litmus] strip test showed 3-5 ppm.” Finally, the Lanoues completed a “demonstration” in which they dropped a ball down the Sentry tube, and the ball fell to the bottom of the tank.

on these demonstrations to reach his estimates, we do not consider them. We merely note that experiments are admissible if they are conducted in “circumstances substantially similar to those existing in the case at issue.” *See State v. Ritt*, 599 N.W.2d 802, 812 (Minn. 1999) (quotation omitted). But substantial similarity is not required when an expert employs an approved method that the parties agree is a reliable and relevant demonstration. *See Loving*, 775 N.W.2d at 878. The admissibility of these demonstrations does not affect our decision that Cartwright’s chlorine-concentration estimates have foundational reliability.

We conclude that Cartwright’s affidavit demonstrates sufficient foundational reliability for his expert opinion that estimated the chlorine concentration of the goats’ drinking water. Thus, the district court erred in granting summary judgment.

While the Lanoues also offered expert veterinarian evidence regarding what caused the damage to their herd, we do not consider that evidence because it was not considered by the district court to reach its summary-judgment decision. Because the respondents raised separate challenges regarding the veterinarian evidence and these challenges were not decided by the district court, we remand for further proceedings consistent with this opinion.

Reversed and remanded.