

Stray voltage

(Continued from Page A1)

could point to stray voltage distress:

- ✓ Extreme nervousness;
- ✓ Reluctance to enter the parlor;
- ✓ Uneven milk out, milk held up in udder;
- ✓ Longer milking;
- ✓ Reduced feed intake;
- ✓ Reluctance to drink;
- ✓ Increased, incurable mastitis;
- ✓ High leucocyte counts;
- ✓ Lowered production.

McCurdy added that cows could be getting a tangle of stray voltage in the milkers, water cups, feeders, stanchions, or anything else that is metal and a good conductor of electricity. And because stray voltage is directly connected with current flows in wiring, McCurdy said the worst time for stray voltage on the farm seems to be during the evening milking—a time of peak load.

Along with the physical signs shown by the cows, McCurdy said farmers can check to see whether there is a stray voltage problem in their barns using a voltmeter. He pointed out a hand-held model manufactured by Micronta is available at a reasonable cost and could be used by the farmers themselves. Or, the utility com-

panies have more sophisticated measuring devices available.

McCurdy suggested that a representative reading be taken at the milk house drain and the bulk tank. "If this measurement turns out to be well under 0.5V, there's no problem. If it's greater than that, further study is needed."

Substituting the voltmeter for the cow, measurements would then be taken on "everything she can touch", along with the electrical service entrance to the barn, the transformer neutral, and all grounded equipment.

Once the source of the stray voltage is discovered, McCurdy cited several methods of dealing with the problem. An isolation transformer was one possibility, McCurdy said, even though it is admittedly an expensive one.

This device isolates the barn from other electrical systems on the farm, and can isolate the entire farm from the power supplier's system if it's a large enough model. Besides the expense, isolation transformers have another drawback—they lose energy to the tune of 100 to several 100 watts in 24 hours.

Another solution for stray voltage is creating an equipotential plane in the milking parlor using wire mesh in the

concrete flooring, including the pit and platform areas. Then it's a matter of welding stanchions, grates, and anything else that's metal above the floor to the wire mesh. McCurdy noted, however, that this solution does nothing for any problems existing outside the parlor and is too expensive to incorporate into old facilities.

McCurdy emphasized the fact that much more needs to be done in the line of stray voltage research, and called on electrical companies to cooperate with farmers and researchers in solving the puzzle rather than pointing fingers of blame.

"Stray voltage has been around since the first generating plant was put up in the Susquehanna River Valley," remarked REA's Bill Matson. "However, we've never really defined this natural phenomena and sometimes can't identify it."

Almost giving away his age, Matson recalled how research was being done on stray voltage at South Dakota State College 30 years ago while he was a student there. Since then his experience on the subject has been gleaned through his work with the electric cooperative.

"There isn't anything about this subject I'd stake my life on," stated Matson in a disclaiming maneuver for everything else he was about to say.

He stated that 90 percent of the causes for stray voltage can be tracked to something on the consumer's premise which has nothing to do with an electrical utility company, such as corroded wiring, snagged and severed ground wires, and even telephone lines which could potentially serve as sources for stray voltage if they do not rotate at least every mile.

Matson pointed out that farmers have become more aware of stray voltage since recent droughts brought the problems into focus. "You need deep driven grounds when the water table drops," the Midwesterner commented, sharing something he'd learned while growing up in the more arid Plain states.

Farmers are suffering from electrical shortcuts they've learned since World War I, said Matson. "Farmers learned to do their own wiring, and they learned their own shortcuts, like eliminating appropriate grounds," he said.

Since the trend to install wiring began, farmsteads have changed dramatically, with more metal buildings springing up and more wooden sheds being torn down. Grain dryers, silo unloaders, baby pig mats—the "new" farms have electricity running to almost every nook and cranny, Matson emphasized. As a result, many

modern farms are carrying heavy current loads on outdated wiring, setting the stage for stray voltage problems in the barn.

Matson stressed the elusiveness of stray voltage. He compared it to plumbing problems that disappear when the plumber finally comes to fix them. "Depending on the humidity, atmospheric conditions, the stray voltage problem temporarily disappears," he explained.

Even though it might seem like a wild goose chase, Matson said most utility companies will work with farmers to try to find where the stray voltage problem is originating and how they might work together to solve it.

Where does a person even begin to look for a stray voltage source? One place, said Matson, would be the water lines—has a corroded, rusted section of metal line been replaced with plastic? When concrete was poured on the floor of the milking parlor, were iron mesh and reinforcement bars bonded and grounded to all the water cups, gates, etc.?

Matson claimed that pipeline milkers should no longer be suspected as a stray voltage source unless the system was installed a number of years ago. He pointed out that the manufacturers and dealers of these systems learned their lessons about stray voltage during the past several years and are bonding and grounding all new installations.

The REA general manager also noted that metal buildings with improper grounds also could be a potential source. He recommended that these types of buildings be grounded at a minimum of two corners, if not all corners. And the depth of the driven ground, 4 feet, 8 feet, or 16-24 feet deep, would depend on the type of soil in the area.

How does a farmer know if there is a stray voltage problem? According to Matson, most farmers will have "gut instincts" that there's something wrong. Other times it's as obvious as squealing pigs that stick their snouts in water bowls only to get shocked.

If a farmer eliminates all the possible on-farm sources for stray voltage, and the utility company comes away from the investigation with no apparent blame, can it still

(Turn to Page A24)

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