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# Frost-free Nose-pump Solves Water Problems

by HEATHER SMITH THOMAS

**C**old weather can present challenges for watering cattle, especially in climates where water sources freeze up, or in areas with no access to electricity for utilization of pumps or tank heaters. Jim Anderson, a rancher at Rimbey Alberta (northwest of Calgary), solved this problem by creating an innovative water system in which cattle pump water for themselves from shallow wells, ponds or underground storage tanks — water that never freezes even at 40 below zero.

Anderson's innovation is a piston pump, like the old-fashioned well in which a person works the handle up and down to lift water. "We modified this so cattle could push a lever with their nose. This operates the piston pump by raising and lowering the piston in the cylinder, the same as a handle used to do," he explains.

"Like the old hand pump, we have a 3-inch cylinder down inside the well. We capture enough geothermal heat from the ground, and contain that heat all the way up to the surface, to keep water in the pipe from freezing up," he says.

The waterer is a small, enclosed basin on the top end of a vertical culvert, with a lever at the back. The culvert has two feet sticking above ground, going down to whatever depth is required to make use of ground water, or water from the bottom of a pond or dugout nearby. Water from the pond is piped horizontally underground to the bottom of the culvert, where it rises to the same level as the pond surface — but will not freeze. A buried collection tank from a spring would work also. A regular well can be used, as long as the water level comes up to within 50 (and preferably 30 or less) feet from the surface. The nose pump can be adapted for an existing well if it meets these criteria. On a drilled well, each nose pump requires about two gallons per minute in order to water a large herd of cows.

"Some ranchers use big pipes, but the typical installation is a road culvert at least 24 inches in diameter, set in the ground at least 20 feet. The two factors that determine how much geothermal heat you'll gain is how deep you go, and how big a diameter pipe you take to that depth. The bigger the pipe, the more opportunity for heat to rise, to keep the water pipe in the center warm enough," explains Anderson.

Kip Panter, who works for USDA-ARS Poisonous Plant Research Laboratory in northern Utah, owns cattle and has used a nose-pump on his ranch for two years. "A creek runs through my ranch and the NRCS was helping ranchers get cattle away from streams, offering a cost-share program. They had information about nose-pumps and asked if I'd be willing to be a test case," says Panter. He installed it himself, using a 20-foot well, dug with a backhoe a short distance from the creek — which he then fenced off.

His cows learned to use the nose pump very quickly. "It doesn't take cattle very long to figure it out, but Jim Anderson told me, 'Don't stand around and watch them trying to learn, because it will drive you nuts. Just fill the pan, so they know that's where the water is, and go do something else for awhile and then come back to see how they are doing.' I just filled it a couple times and walked away, and when I came back one cow had figured it out and she was showing the rest of them how to do it," says Panter.

He likes this system because water is always fresh and clean. "The pan is empty except when

or algae in the summer, and no water left in it to freeze in winter," he says. Even when his creek goes dry in summer, the perforated pipe for the well picks up plenty of water to service the nose pumps, and when the creek is frozen in winter, the cattle have water whenever they wish.

"These systems are very strong, I've had 2,000-pound bulls using them and they've rubbed and played with them and never hurt them. These pumps are fool-proof," says Panter. He put a 20-by-20-foot concrete pad around his, so cattle are never standing in mud, and the pad helps insulate the ground around the pump.

Lowell Thorson, a rancher in North Dakota, has been using two nose-pumps for his cattle for four years. One is located in a pasture he purchased a few years ago from a neighbor. "The pasture has a water hole and the farmer who had it previously let his cows drink in it. They often got stuck in the water hole and one of them drowned. I put a fence around that and keep cattle out. It's much safer to have them drink from the nose-pump than go into the pond," says Thorson.

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If you can keep cattle out of a pond that supplies your water, it never becomes polluted. Also, grass and vegetation grows around it and

acts as a filter system for the runoff that fills the pond, keeping the water clean.

Mike Nichols, a rancher in eastern central Alberta, has used these pumps for several years and loves them. "I have three now. I mounted two together on the same culvert and these water my stock with all winter. I fenced off a dugout, and poured a cement pad around the culvert like Jim Anderson suggested. We've had really good luck with them. They are not totally maintenance free, but I'd rather spend five minutes with a rubber hammer now and then to break ice loose than worry about having to chop ice on my pond," says Nichols.

He gave Anderson the idea about using a rubber hammer if the lever freezes up. "He'd told me that if ice builds up you just take a hammer to break it free. I said, why not use one of those shockless hammers — a rubber hammer filled with lead shot. It has the weight you need, yet it has a soft surface and won't mark the drinking basin. All I do is knock the sides a little to break ice that builds up on the sides, and then scoop that ice out," he says.

"I have to hand it to Jim Anderson for his invention and his commitment to keep improving it. My father and I have one of his first pumps. I use ours in the summer, too. You can set it so it doesn't drain back down the pipe so far since the pipe doesn't have to be kept from freezing, and have water in the bowl all the time if you want. Then the cows only have to pump it once to have water come into the bowl. But I don't bother with that summer setting. The cows have to push the lever about four or five times to bring the water up the pipe," explains Nichols.

"Our cows play with it and pump it very aggressively and it was splashing water out and around. Sometimes our temperature drops down to minus 25 degrees Fahrenheit. If we got a howling wind at those temperatures the splashing created ice on the inside of where the pendulum swings. My father and I came up with a deflector to protect it from the splash, and mentioned it to Jim. We made one and sent it to him, and he incorporated this improvement in his newer pumps," says Nichols.

"I used to water out of dugouts. One winter I'd

Continued on page 20



saying that if you don't clean it out every year with a vacuum truck, it becomes quite disgusting down in that culvert. All the bacteria from the cows drinking goes back down the hole when it stops pumping, because it has to drain the bowl to keep from freezing. By contrast, with the nose-pump, the cow drains the bowl. There's no water left to contaminate anything and nothing goes back down the hole." The cows always have clean, fresh water.

"The water from my dugout is crystal clear. When I was setting up the nose-pump I landscaped it so any runoff drains away from the dugout through a ditch into another field. It never goes back into the dugout, which is 100 feet away. Any spring runoff or anything from the cows drains away the other direction," he says.

Before he put in the nose-pump, when cows had access to the dugout, it was always brown and murky. Within a year after fencing it to keep the cows out, and having them drink from the nose-pump, the water cleared up completely.

**A great design**

"Jim Anderson has everything figured out. The instructions and dimensions he gives are perfect. For instance, he gives directions on how to insulate the culvert by lining the inside of it with Styrofoam. If you cut the Styrofoam at the angle/degree he specifies, it will be exact and fit perfectly into the culvert," says Nichols.

When Anderson goes to trade shows to demonstrate the nose-pump, at his booth he utilizes a full-size mechanical cow that's always drinking out of the nose-pump. "It is always moving, pushing the lever, and it looks life-like. People walk by and see that cow pushing on it, and have to stop and watch!"

Nichols says his pumps have been trouble-free. "They've pumped a lot of water. When the weather gets down to minus 30 with a howling wind I may check mine twice a day, but otherwise

there's no maintenance. When I got my first one, when solar pumps and batteries, etc. were coming into the market, it was virtually the same price as the solar set-up. My father and I talked it over and decided to go with the nose-pump. Our local co-op had a solar panel along a road, and people stole the panels several times. And today those batteries aren't as good as they used to be. When they first came out you could easily get 10 years' use of a solar battery. Now you are lucky if it lasts that long. You are locked into buying something someone else has to provide, whereas with the nose-pump it's a one-time investment and the cows do all the work.

"Mine are pumping water year-round. These are as simple and durable as the old-fashioned kitchen hand pumps. The moving parts are always submerged in water and always lubricated. My grandfather looked at these nose pumps and said it was the very same system, and he remarked on the many gallons of water that were pumped with those old pumps, with no problems," says Nichols. It's very simple, and simple things have less to go wrong.

just chopped a new ice hole and we had a bad snowstorm afterward and the snow covered it over. The temperature dropped and I went back to check the hole. I had the ax in my hand and was out on the ice trying to find the hole I'd chopped. I was using the ax to tap in front of me and didn't check far enough to the side, and I caught the hole with one foot and went into it all the way, to my hip. Luckily I hadn't chopped a big hole and I didn't fit completely into it — and was able to pull myself out. By the time I got to my tractor cab I could hardly get myself in it. I turned the heat clear up and finished feeding and headed for home. My leg was frozen and I could hardly make it into the house with my frozen coveralls. My wife had to use a hair drier because I couldn't manage the frozen zippers to get the coveralls off! Ever since I've had the nose pumps, I have not lost another cow in the dugout, and I haven't slipped into it either," he says.

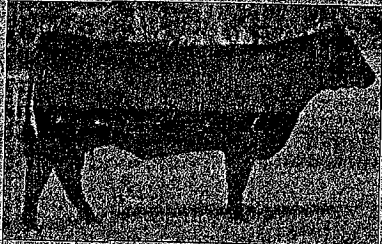
He uses another nose-pump (on another dugout) for his bulls because he keeps them separate from the cows during winter. "It's the only thing those bulls haven't wrecked. I give them 300 acres to play and fight in and they have not been able to wreck the nose pump. It's built to last," says Nichols.

He has 130 cows, and the nose pumps adequate water for the herd. "Once in a great while the lever freezes back but all you have to do is tap it and it comes loose. It's a heck of a lot easier than chopping an ice hole in a pond!" he says.

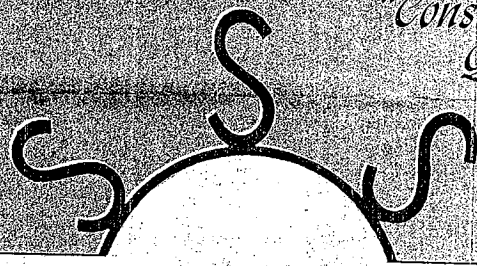
The cows seem satisfied and he no longer sees any of them licking snow. "I have driven past it at 2 a.m. on a moonlit night and you can see cows drinking. By contrast, when you chop an ice hole on a pond, by evening it's not open anymore. The nose-pump enables them to drink whenever they want." They have access to water all night long.

"I like this system because it's foolproof. It's right next to a roadway, and other types of systems (solar panels, batteries) would be at risk from vandals. I

took a pasture management course a couple years ago and learned that some people use a water system with an electric eye, with a pump down below. It pumps until the cow stops drinking. The water in that system all drains back down the culvert. People who use that system were



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