

## **Exhibit F**

David Green, *Frank Gibbs: Liquid Manure Is Too Wet*,  
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## Frank Gibbs: Liquid manure is too wet

Written by David Green. Aug. 20, 2006

By DAVID GREEN

Don't blame tile lines for discharges of liquid manure into drains, says soil scientist and farmer Frank Gibbs, and don't blame the rich soil with its worm holes leading to the tile.

Put the blame on the watered down manure. That's where the problem lies.

Gibbs, from the National Resources Conservation Service office in Findlay, Ohio, spoke to farmers last Wednesday at the annual Center for Excellence Field Day at Bakerlads Farm north of Clayton.

Gibbs told how he came to this conclusion several years ago, after he got a call from a producer in Ohio who had a problem. He was applying manure from his swine operation at only about half the recommended rate, but it was still finding its way into tile and drains.

A DNR officer told the farmer that he wouldn't cite him for discharges this time, but it had to be stopped.

"I went down there thinking I'd see big cracks in the ground," Gibbs said, "but the soil moisture was ideal. Impeccable shape. I saw lots and lots of night crawler holes and I thought, 'My God, could this be what's going on here?'"

Gibbs got ahold of some dye—similar to the kind used to check for leaks in a toilet tank—dumped it into the manure lagoon and agitated the mixture. After he dug down to a six-inch tile, manure was injected into the soil with a drag line. The tile was dry when the experiment began.

“We wondered how long it might take to percolate down to the tile lines. Twenty minutes? Should we go to lunch?”

There was no time for lunch, Gibbs said. The dye was there within seconds, and every time a pass was made over a lateral tile line, another pulse of colored liquid came through.

Gibbs wondered if the pressure from the applicator pump was the cause, so they next tried a gravity-feed system. Same problem. One more idea came to mind. This time they avoided the watery manure from the lagoon and loaded some of the thicker slurry from the pit under the hog barn.

“It didn’t go anywhere,” Gibbs said. “It behaved like manure. We dug up some areas with a back hoe and it was laying right where it was shot.”

He knew then not to fault the tile nor the healthy soil.

“The problem is simple. We’re watering manure down to where it behaves like water. Let me repeat that. We’re watering manure down to where it behaves like water. You don’t need to be a rocket scientist to understand that.”

Gibbs has heard the suggestion that no-till soil is at fault. Get rid of the worm holes and there’s no conduit for the manure.

Not true.

“Preferential flow will occur in conventional tillage through cracks and around the soil structure,” he said. “We need to stop confusing the issue with tillage. The issue is that we’re adding too much water.”

This is a situation that needs to be addressed, Gibbs said.

“We need to keep on top of this. We really do. I think some basic research could solve the problem.”

Maybe the percentage of solids needs to be up to four or five percent, he said. Or, from what he learned in Europe, even higher.

The Dutch method

With so many Dutch farmers investing in this area, Gibbs decided to take a trip to the Netherlands to see how they farmed in that country. He was in for a surprise.

He didn't see any of the watered down manure that the large dairies are using here. The solid content was at about eight percent.

He noticed a plastic membrane spread over a storage lagoon with rain water waiting to be pumped from an overnight storm. Gibbs figured it was to keep the water out of the lagoon, but he was wrong. It was to control odor.

Gibbs watched as a farmer loaded his applicator with manure and inserted a paper form into equipment that recorded his position by GPS. Once in the field, additional data was stamped onto the form. A sample bag of manure was collected to send for analysis by a government agency.

If manure exceeds the allowable nitrate rates, Gibbs was told, the farmer receives a bill from the government.

The Dutch farmer joked about having one government official for every farmer, but it isn't the heavy regulation that's hurting agriculture in Holland, he said, it's simply a lack of space.

Gibbs returned home knowing that the practice of watering down manure didn't come from Europe.

"That's our technology," he said. "We're going to all the work of writing up Comprehensive Nutrient Management Plans and then where does it go? Into the tile. We just need a little bit of research to figure this thing out so we don't have to scrap the whole thing."

Gibbs said he's made attempts to urge agricultural agencies to study the issue, but it's never gone far.

"Everybody's going off in other directions," he said. "We need to work together. We don't have to destroy our soils. We don't need to rip our tile out.

"What we should do is look at solids. Eight percent isn't that much. I don't know why we can't tweak that."

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Stop it in the root zone

A visit to Wisconsin gave soil scientist Frank Gibbs additional hope for the future.

“They have some really good things going on there,” he said.

For example, the custom manure applicators have formed an association. They have standards and training, for those who choose to join the group. They work closely with the EPA. They practice cleanup of spills for when something goes wrong.

Gibbs was impressed with the beautiful crops growing on rolling hills. The key was the soil.

“They’ve got hay and they’ve got alfalfa and they put manure on it,” he said.

In this area, it’s almost always corn and soybeans, year after year. It’s the root system of a plant such as alfalfa that breaks up the soil to prevent compaction.

Custom applicators have to work with what they’re given, Gibbs said, and sometimes control structures are in order. Gibbs has built shut-off valves at the property line to stop the flow of liquid manure. A catch basin is added to collect the flow—a septic tank will do the job—and the manure can be pumped out and applied in a safe area between tile lines.

It’s just a Band-Aid approach, Gibbs said, not a solution, but it’s better than using rubber tile plugs in which case a farmer has no idea if the manure has left the tile. Besides, he asks, do we know where all the tile is? And if we miss one, who’s fault is it?

That’s when the arguing and finger-pointing begins. When manure flows into a drain, who is at fault—the farmer who owns the animals, the owner of the land where it’s being applied, or the person in charge of the application?

“If we do it the wrong way,” Gibbs said, “it’s going to be a mess.”

Any time manure enters a tile line, it’s wasted. At that point, Gibbs said, the nutrient is too deep to be absorbed by plants.

“We have to stop it in the root zone,” Gibbs said.

### Smoke test highlights no-till

As a long-time proponent of no-till farming, Frank Gibbs often tries to convince other farmers to give it a try.

One of his early attempts was to dig out a cubic foot of his no-till soil and place it next to a sample from his neighbor’s sugar beet field that suffered from a lot of compaction due to trucks. Then he would pour a bottle of water onto each and watch it soak into his soil and run off his neighbor’s.

“It was kind of hokey,” Gibbs said. “Farmers would say, ‘You’re from the government. You probably poked holes in it.’ I needed a different way to show the value of no-till.”

He remembered a blower contraption a friend created for planting beans—it never worked right—and as a fan of Red Green, Gibbs got out the duct tape to rig up a device for blowing smoke into a tile line.

“I could make smoke come out of millions of worm holes,” he thought.

The smoke test shows good soil conditions and at the same time, it shows the avenue that liquid manure takes to reach tile lines. It takes the easiest route, Gibbs said, the path of least resistance. Through worm holes and cracks in the glacial till, manure can quickly makes its way to tile.

To set up the Center of Excellence Field Day at Bakerlads Farm, Gibbs dug a hole to reach a tile line. He found two hand-laid tile lines, then a plastic line, then another older line. Tile is everywhere.

He set up his blower, dropped in a smoke bomb and watched for smoke to start rising out of a soybean field. Smoke started to run toward the bean field, but the line made a turn and headed back into the cornfield. That’s the trouble with tile lines, he said, you never know how many there are or where they end up.

Watching smoke rise out of the soil is a great demonstration, Gibbs said, and a real attention-getter.

“It’s hard for folks to deny this stuff happens when there’s smoke coming up under their feet.”