

Jetting in shallow wells

My father and I used to jet in shallow water wells in Southeast Missouri back in the 70s and 80s. My father developed and refined a system that we eventually mechanized, but in the beginning it was all hand work. Here is the process in prose form from a story I wrote a few years ago. I have three drawings that illustrate the process, which are attached.

One thing, with pollution the way it is, test the water before using it for drinking.

With the grill needing only lighting and waiting for the charcoal to burn down to coals, Jasper put a six-pack of the beer on ice for Greg. He was pacing off the area for the future shelter area when Greg pulled up and stopped at the alley gate.

Jasper waved and headed back to open the gate. Greg backed his pickup along the rear driveway, careful not to get off of it into the new garden spot. He stopped at a likely position and got out of the truck.

Greg and Jasper exchanged hearty handshakes and Millie came over to say hello. Greg was more than a little shy around Millie, knowing he'd been partially responsible for some bad times for the couple. Her accepting his presence was reassuring.

"Let me get my rods," Greg said, going to the cross bed tool box on the truck. He returned to the area between the garden plot and the trailer.

Jasper and Millie exchanged glances as Greg began to crisscross the area near the garden with the L-shaped wires held before him. "You do want it here, near the garden, don't you?" Greg asked, stopping at a spot where the wires were crossing.

“The pump can push the water better than it can pull it. I’d kind of like the well to be closer over here...” Jasper walked over near where he’d been pacing off the shelter area.

“Oh. Okay,” Greg said. “This one was good, but there could be... yep,” Greg continued as he walked back and forth, the wires crossing and uncrossing as he weaved his way toward Jasper.

“Same stream,” Greg explained, swinging his arm in a line from the first spot he’d stopped to where he was standing. “Anywhere along this line is good.”

In Jasper’s eyes it was a nearly perfect spot. It was almost exactly where he’d wanted the well to be, without consideration of the dowsing. “It’s good,” Jasper said.

Greg headed back to the truck. “Help me with the pump, will you?” he asked Jasper. Between them they carried a five-horsepower gas engine driven two-inch self-priming water pump to the spot. It was in a cage that supported a old time red hand pump plumbed into the intake of the pump with a tee and check valve.

“You lay out the small hose from the tank in my truck and unload the pipe and strainer and stuff in the box right at the back of the truck bed. I’ll dig the hole.”

“I don’t mind helping you dig,” Jasper quickly offered.

Greg shook his head. “No offence, Jasper, but this has to be just so. I know exactly how to dig it.”

“Okay,” Jasper replied, going to the truck to take the two twenty-foot sticks of Schedule Forty PVC pipe off the pipe rack of Greg’s truck. The ten-foot long slotted PVC strainer was in the bed of truck, over the wheel well on one side of the water tank.

Jasper looked into the box sitting behind the tank. It contained some two-inch pipe fittings and cans of pipe cleaner and solvent welding cement. Greg looked up from his digging. "Bring over the drill stems and the two-inch hoses."

The drill stems were five-foot lengths of more two-inch schedule forty pipe with a male adapter on one end and a female adapter on the other.

After he'd carried the things over Jasper watched Greg finish up the hole. There was a short, shallow trench connecting a hole about the sized of the shovel to one two feet square and eighteen inches deep.

Greg laid an old bent crowbar across one corner of the bigger hole and set the pancake strainer that was on a short piece of pipe into the hole. The elbow at the top of the pipe rested on the crowbar, holding the strainer off the bottom of the hole about four or five inches.

Using two inch flexible suction hose with quick connects Greg attached the strainer to the pump. He laid out the second hose and connected it to the outlet of the pump. "Turn on the water at the tank," Greg said and Jasper quickly did so.

Greg opened the valve on the discharge end of the water supply hose and began to fill the hole and trench. While it was filling, Greg had Jasper help him solvent cement a cap to one end of the strainer and a coupling to the other. There was a short piece of the two-inch PVC pipe in the truck with one bell end and one smooth end. They added that two-foot piece to the strainer.

They cleaned the smooth ends and the bell ends of the two twenty-foot pieces of two-inch PVC and Greg laid them out the way he wanted them. The hole was full of water and Greg put a little water in the hand pump and pumped it until he had water up to the intake of the engine

driven pump, explaining to Jasper, “It’s a self priming pump, but this is quicker and easier.”

Picking up one of the five-foot long drill stems, that had a home made sand bit on it, Greg had Jasper screw it into the threaded elbow on the end of the long flexible hose. “Okay, Jasper. Crank the pump.”

The pump engine started on the first pull and water began to flow through the system. When it reached the bit a bit of water sprayed, but not much. Jasper and Millie, who had come out to watch, were amazed as Greg lifted the drill stem, pushed it down and turned it one-quarter of a turn to the right. He lifted the stem and turned it back left before pushing down again and turning it to the right. It was only a couple of minutes before stem was all the way down in the ground.

“Kill the pump.” Jasper did so and Greg lifted the drill stem back up. “Unscrew it.” Jasper did and Greg then had him hold the first stem down low as he screwed another five-foot length of the drill stem onto the first. Jasper stood up and screwed the assembly into the elbow while Greg held it. “Crank her up.”

Jasper started the pump again and Greg began to repeat the process of push and turn, lift and turn back. “Okay, Jasper,” Greg said as soon as he was back in rhythm, “You need to use the square point shovel there and clean out the bottom of the hole. That’s what is coming up out of the drill hole.

It took a few shovel attempts but Jasper soon had the technique of lifting out the cuttings slowly and letting them drain a little before dumping them beside the hole, in a different pile as instructed by Greg. Jasper also adjusted the water flowing into the hole to keep it full, but not running over.

They were on the fifth drill stem, about twenty-two feet down when the discharge from the drill hole changed. Before the cuttings had been

pretty much basic dirt. Now there was a significant amount of sand mixed in. Greg had Jasper start a new pile.

During the sixth drill stem the sand became coarse and more predominant. Greg asked Jasper to start yet another pile of the drill cuttings. "See how the water drains out of that, instead of pooling on top like the early stuff?" Jasper nodded. There was a significant difference in the soils.

"We could probably stop here," Greg said when he had the sixth drill stem all the way into the ground, but I'd like to go at least another five feet. Perhaps ten."

"What ever you think best," Jasper said.

They went the full ten feet. Jasper saw the cuttings turn back to fine sand. The water wouldn't drain out of it. "That's it," Greg said. "Kill the pump."

The two began to lift and remove the drill stem a piece at a time. "What's going to keep the hole open?" Jasper asked, beginning to get worried.

"The water. Or, more accurately," Greg said, "The sediment and water. It's why I re-circulate the water rather than use all fresh. Beside it taking way too much water to do using fresh and making a royal mess, fresh water simply doesn't hold the hole open very well. That's why regular drillers use a 'mud' when they drill. For these shallow wells just the sediment from the surface is enough to keep the hole open. If need be I have some Quickgel in the truck. I'd add a cup or two of it if we were going through all coarse sand. Now we don't want to wait too long though, before we put in the screen and pipe."

Jasper nodded and picked up the prepared well screen and lowered it into the drill hole when directed by Greg. "Hold that sucker tight," Greg

warned. He spread solvent cement on the smooth end of one of the twenty-foot pieces of pipe, and the bell end of the screen assembly. Then with a motion that Jasper found amazing, Greg hoisted the pipe to a vertical position and slipped the end of it into the bell of the pipe Jasper was holding. He gave it a slight twist as he seated the pipe in the bell.

He began to lower the pipe down slowly and then gave it to Jasper to hold again, down low. He added the second piece of pipe, which stuck well above the ground when the strainer hit the bottom of the drill hole.

While Jasper steadied it, Greg used a hacksaw to cut the pipe off several inches above the ground. Jasper put the piece of pipe back in Greg's truck as Greg cleaned the upper end of the well pipe and solvent welded a threaded male adapter to it. Greg took the elbow, detached it from the hose and screwed it onto the well, using RectorSeal #5 pipe dope.

"The other long hose," Greg said. "Connect it to the valve on the tank and bring it over to the pump."

Jasper hooked the second long two-inch flexible suction hose to the intake of the pump. "Isn't this the wrong way?" Jasper asked. "We'll be pumping out of the tank into the well, won't we?"

"Yes," Greg replied with a big grin. "But believe me, this ain't no well yet. Just a pipe in the ground with a screen. We're going to make it into a well. Now, fire up the pump at an idle."

Jasper did so and saw the water slowly boil up out of the ground much as it had when they were using the drill stem. "Start backfilling, using the coarsest sand," Greg said as he watched the flow. Jasper wasn't too sure how much of the sand was going back into the hole, but Greg kept him after it until all the sand that had come out of the hole was back in it.

Greg stopped the pump and changed the elbow on the top of the well for a threaded cap. He had Jasper put the next best sand in the drill hole, and then the dirt. Greg began removing hoses from the pump and Jasper got a little worried.

“Okay, that’s good,” Greg said when all the drill cuttings were back in the hole. He put the elbow back on the well and connected it to the intake of the pump, moving the discharge hose away from the pump area.

Using the hand pump, Greg primed the well and then started the engine driven pump. He had Jasper move over to it and when Greg gave him the signal, Jasper killed the engine and Greg turned a ball valve mounted on a tee in the intake line of the pump. Jasper could easily hear the air whoosh as the water drained back down into the well.

Thankfully, Greg explained. “We pumped clean water in slowly while we put the coarse sand back. That filtered any fine stuff out of the screen and up while the largest particles of sand kept falling. We have the coarsest sand available around the screen for best water flow. I capped it while you refilled the hole so it wouldn’t drive the dirty water back into the screen.”

Greg closed the valve and had Jasper start the pump again. It took a few seconds to prime since Greg hadn’t used the hand pump to prime it. They did the same thing several times and Greg said, “This is making a well out of a hole in the ground. Some of the guys around here just punch the hole, put the screen and pipe in, and backfill. They don’t flush it or prep it in any way. Maybe you have a well and maybe you don’t. I don’t walk away until she’s pumping the best I think she can. This pump and release surges the formation kind of like a frac process does on an oil well. Okay. Let’s see what this thing can do.”

This time when Jasper started the pump Greg walked over to the discharge hose. A full two-inch diameter stream was coming out of the hose for an inch or so before falling to the ground.

“The bucket,” Greg said, nodding toward the bucket in the back of his truck. Greg filled and emptied the bucket a few times, running a stop watch each time. The bucket was filling in six to seven seconds. “Over twenty-five-hundred gallons an hour,” Greg said. “Not the best I ever got... That was a full thirty-six-hundred gallons. But this is a good well.” Greg brought the hose up to his lips and took a sip of the water. “Not too bad tasting.”

Jasper tried it and agreed.

“Have Millie make some sun tea with it. If it’s nice and clear it’s really good water. If it’s dark, well, I’d have it tested, but I doubt you’ll want to treat it for irrigation use. If you ever want it for drinking water, I’d see what the tests say and act accordingly.”

“Thanks, Greg,” Jasper said, shaking his hand.

“Let’s get this cleaned up. I’ll be ready for that barbeque by the time we’re done.”

It took a little while to get everything loaded back on Greg’s truck and the holes filled up. “You say you have a pump to use?” Greg asked after he closed and latched the tailgate of his truck.

“Yep. In the shed.” Jasper showed Greg the three-horsepower gas engine Sears lawn pump he’d picked up at a garage sale and rebuilt. “It pumped out of a tank after I fixed it,” Jasper said.

“Should work fine, if you got the seal in properly. You want to hook it up now?”

“Don’t have the stuff. I’ll get it next week and hook it up next weekend. I like that flexible suction hose you use. Where’d you get it?”

“TSC. I use it for both suction and discharge, because I use the hoses interchangeably. You don’t really need it for discharge, though I would suggest you get it for the intake.”

Jasper nodded. “I’ll make a manifold and run a bunch of water hoses.”

“You need plenty of discharge. Run the pump at slow speed if you’ve only got a couple of hoses going. If the pump housing starts getting even warm, you aren’t getting enough flow to keep the pump cool. Really have to watch this kind of pump using garden hoses.”

“I’ll keep that in mind. Here’s the money for the materials.” Jasper took out his wallet and gave Greg the cash he’d promised for Greg’s out of pocket expenses. “Come grab a beer, Greg. I’ll get the steaks on the grill.”

“Steaks! I was expecting brats or chicken. Not steak.”

“Means a lot to us to get this well in,” Jasper said quietly.

“Aw! No big deal. I punch these in all the time.”

Millie took out a bottle of Greg’s favorite beer from the cooler, opened it, and handed it to Greg when he walked up to their small patio at the back of the trailer.

“Thanks, Millie,” Greg said shyly.

“That is quite a process you’ve come up with,” she said, fussing a little over the food set out on the picnic table.

“Once I figured it out, it is pretty easy. There’re lots of guys doing it. But I think I do it better than anyone else.” There was no false modesty there. Greg had a point. He did have a good system. He’d never had a failure. At least, not when he’d been allowed to drowse.

Jasper and Millie were surprised and pleased when Greg limited himself to four beers while he was there. He seemed to thoroughly enjoy the steaks, baked potatoes, and boiled corn, helping himself a little sheepishly to a second steak.”

“That’s fine, Greg,” Millie assured him. “I got two for you.”

Jasper yawned about that time and Greg finished up his meal. “Thanks for having me over, guys,” Greg said, turning to the couple. They’d carried the leftovers and the rest of the beer out to the truck. Jasper was standing with his left arm around Millie.

“No,” Jasper said. “You’re a good friend. Thank you for helping us out.” Jasper grinned then. “We’ll save a bean or two from the garden for you.”

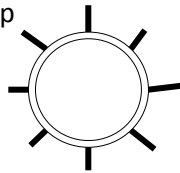
Greg laughed and climbed into the truck. Jasper closed and locked the alley gate when Greg pulled out. He yawned again as he and Millie walked back to the trailer to begin that cleanup. Jasper marked off one more project on his mental list. Getting that well was a key element to their continuing preparations.

Just my thoughts on the matter.

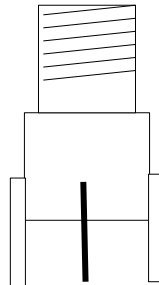
All hoses have cam-
lock fittings

Pump and tank have
camlock fittings

Bit - 3 to 8 fingers
welded to 2" black
iron coupling with
nipple screwed in
top



Pancake
strainer



2" schedule 80 threaded elbow
with 2" male Camlock

Up -
counter clockwise

Down -
clockwise

2" valve with 2"
male quick
coupler
Adapter down to
1" for fill hose

Fresh water tank
250 - 350 gallon

Fill hole and keep
adding water as
hole deepens

3hp - 5hp self-priming
2" intake & 2" discharge
gasoling engine pump

Bit

5' drill stem of 2"
schedule 40
plastic pipe with
male adapter on
top and female
adapter on
bottom

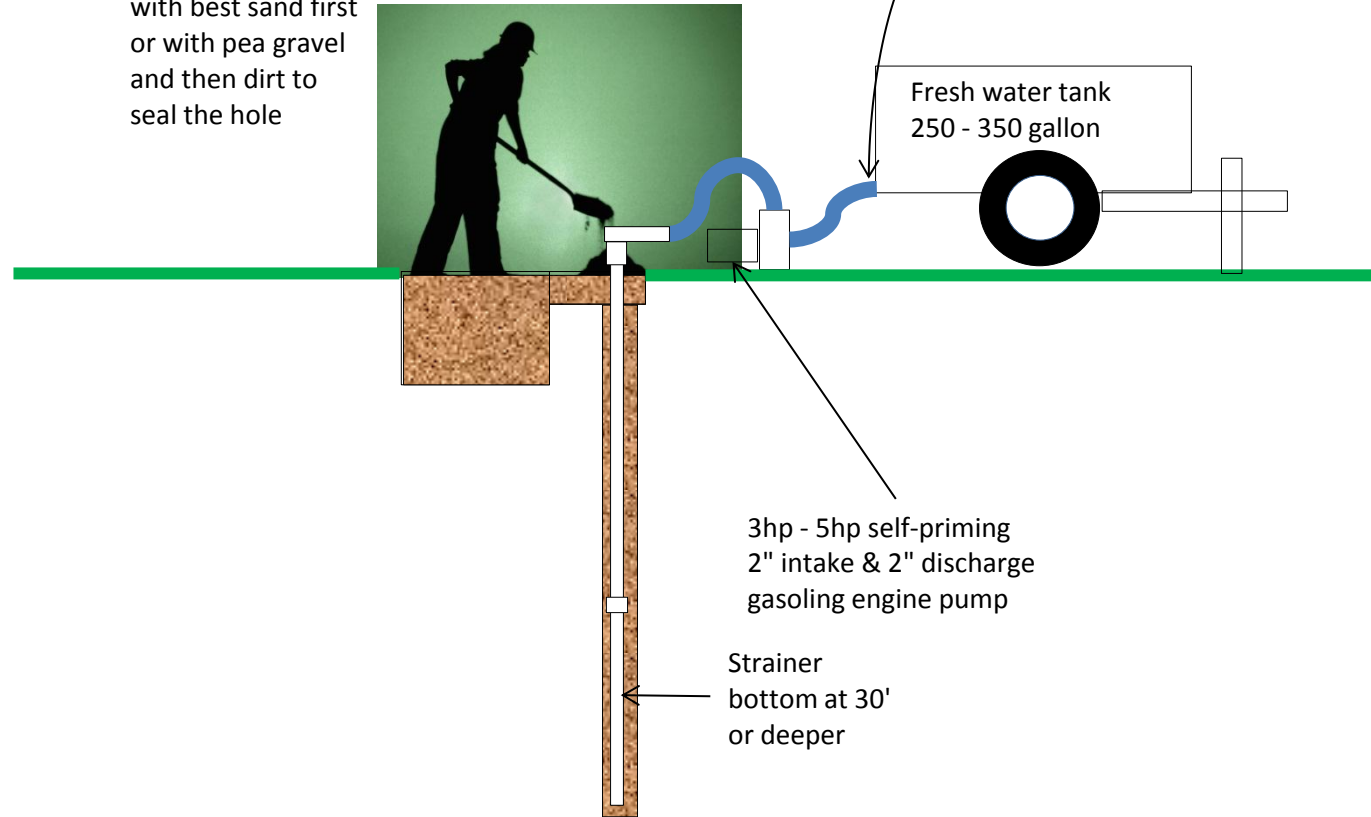
Pump slowly into well from tank while back filling with best sand first or with pea gravel and then dirt to seal the hole

2" valve with 2" male quick coupler

Fresh water tank
250 - 350 gallon

3hp - 5hp self-priming
2" intake & 2" discharge
gasoline engine pump

Strainer
bottom at 30'
or deeper



Pump from well for a minute or so, disconnect the hose from well to allow water to fall into well

Repeat several times until well has good flow.

