Report on the Effort to Unplug the Bottom End of the Pump Casing – 2026-10-03

Three years or so ago, the annual spring test run of the emergency pump failed. The pump started built pressure and within a few seconds lost pressure. From the top of the casing, the operator could hear the pump sucking air about the same time the pump lost pressure. The team theorized that the bottom end of the casing was at least partially plugged limiting the amount of water allowed to flow to the pump suction. The pump was cavitating and therefore could not build sustainable pressure.

At 9:30 am on 2026-10-03 J. Schreiber, J. Command, and N. Kelly set about to remedy the problem with the emergency pump's inability to pump water. A procedure to remedy the problem by flowing mainline water backwards down the casing to push the plug out of the bottom end was developed as attached. The procedure was implemented. A towel was pushed into the top of the casing to limit fluid overflow from the top of the casing in the hope that would enable more pressure to be exerted at the bottom to wash out the plug at the bottom. Water was directed from the mainline down the top of the casing. Water appeared at the top of the casing almost immediately with a small leak around the towel plug. In about 30 seconds, the towel was dislodged and water poured out of the casing with little resistance. The team let the water run for 2 hours from 11:30 though 13:30. The flush water was shut off. The towel was removed from the top of the casing. A significant volume of vegetative debris was noted at the top of the casing. The water level was not visible at the top of the casing indicating the flush water had subsided, at least some. The debris had been blocked by the towel plug. It was decided to flow the debris out the top of the casing. The backflow water was restarted and the debris was flushed from the top of the casing within a few seconds.

It was evident that the plug at the bottom of the casing was not removed. It was decided to try to increase and change the direction of the pressure differential at the bottom of the casing by starting the emergency pump and allowing it to pump the water level down in the casing. The pump started and flowed water out the valve station at the bottom of the hill back into the lake. The pump cycled from a few seconds flowing to a few seconds making a sucking sound then taking suction for a few seconds and on and on. The pump removed the water from the casing annulus and the casing slowly appeared, floating on the surface. We estimated 100+ feet of casing was floating on the surface. No improvement was evident and the pump was shutdown. This might indicate the pump is landed about 120 ft from the top of the casing. Unfortunately, we were not able to find documentation on the installation of the pump so we don't know for sure where the pump was landed nor how long the casing is.

The team decided to let the facility rest in the condition as is to provide some time to brainstorm "next steps".

At that time the options were thought to be:

- hire a diver to clear the plug
- Back flow through the pump. (It is noted that this is not recommended by the pump manufacturer.) The notion that the pump would be closer to the plug than the pipe installed to provide back flow water and may provide more force to remove the plug. This notion was not held by all present.
- Consciously assess the real value of the emergency pump to decide how much more money should be invested in making it operable.

After some time letting the matter rest, it was recognized that the emergency pump was cycling between flowing and cavitating indicating at least some water was flowing into the bottom end to provide "some" source water. This meant the bottom end of the casing was not completely plugged. Perhaps, in the spring, when the creek runs full, we could put the casing reverse flow flush water back on and let it run for a week to see if that might wash the plug out.

No improvement was realized from the exercise. The emergency pump is not currently operable.

Other observations arising during the test:

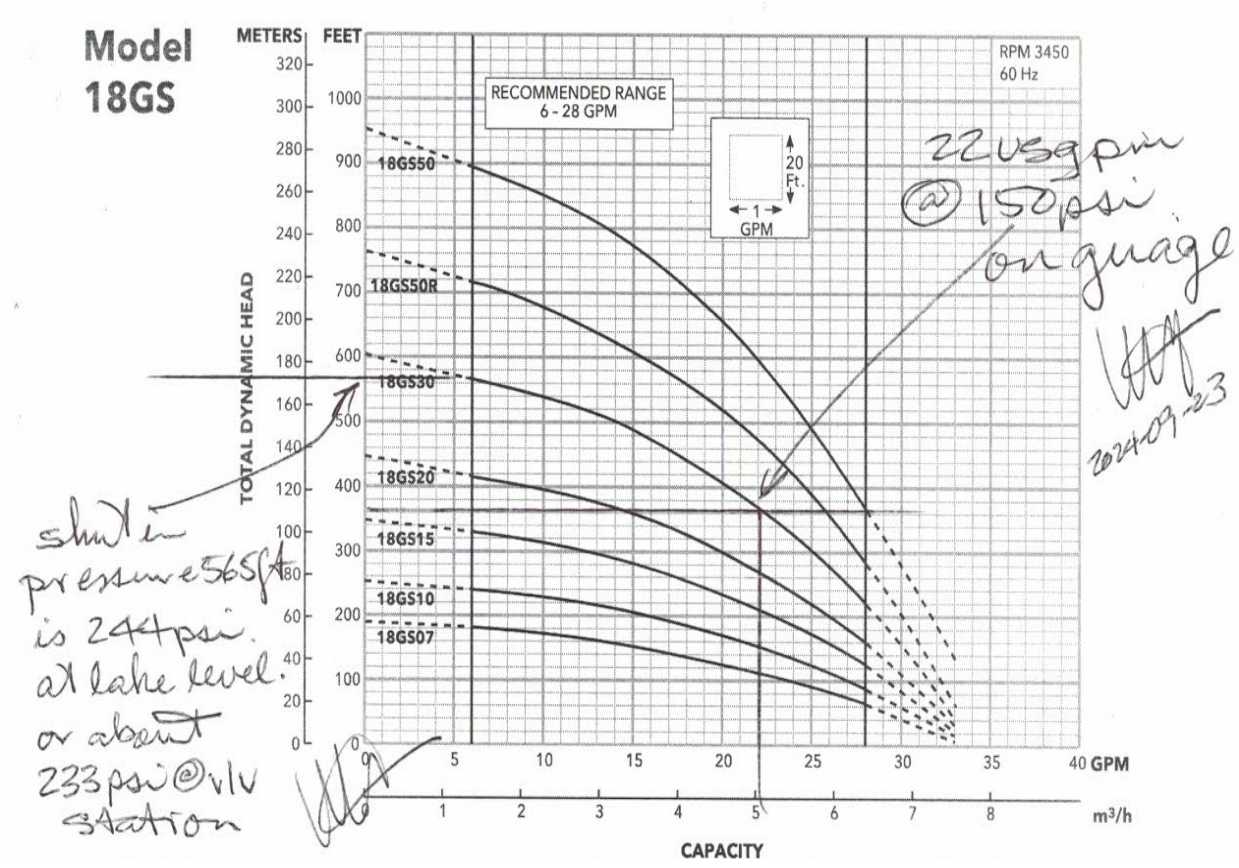
- The vacuum breaker in the valve box at the top of the hill needs replacement. It is suggested that a guarded check valve be installed in its stead. This can wait until the system returns to operation.
- The open ended casing collected vegetative debris. A rag was attached to eliminate debris falling into the open casing.
- The electrical cable needs an abrasion resistant cover installed from 1 ft down the casing to 10 ft along the cable on the rock. Make this a priority.
- The thermal insulation in the valve box is in need of replacement. This can wait until the system returns to operation. It is drained so no threat of rupture due to freezing exists. Because the system is drained after each use, the thermal insulation is useful only when the pump is in operation during winter.
- The 2" check valve and the 1-1/2" gate valves are rated "200 CWP" meaning 200 psig maximum working pressure at 72^{o}F. The shut in pressure of the pump is 565 ft, or 244 psig at lake level which exceeds the safe working pressure of the check and manual valves in the piping leading up to the mainline. This MUST be remedied before the system is returned to operation. There is a chance that the pump does not perform in accordance with the manufacturer's expectation but it is doubtful. The small tubing fittings and valves should also be checked for adequate allowable working pressure. (If it were up to me, I would change out all the plumbing components for components with adequate specified working pressure.)
- The FCID member charged with the initial installation of the emergency pump recalled the events as follows:
    - A 150-200 foot 6" line, that is, the "casing" was filled with air and floated on the surface at the public beach.

- Using a boat, this assembly was towed to the shoreline location where the installation was to take place. The pump and 2" line were run into the casing and all connections, valves etc. completed, including the power cable.
- **An air valve was opened**. The air was released and the pump settled to the bottom at approximately 150 feet down. This depth was determined using a "fish finder" on the boat.
- The lake bottom at this point is almost straight down.

Of particular interest at this time, is the reference to "An air valve was opened." There is no sign of "an air valve" at the top end and this makes sense as the pipe and cable protruding through the top end of the casing would make it impossible to seal against escaping air. The top of the casing must have been open to the atmosphere. The "air valve" may not have been installed to flow air but rather flow water into the bottom end of the casing. If that was the case, I speculate that valve would not have been full 6" size. In a smaller size, it would be more prone to plugging than we had expected. It is recommended by the writer that the FCID hire a diver to remove the air valve by cutting the end of the pipe off to make the open inlet end full diameter or, if the bottom end has no plumbing restrictions, the bottom end should be cleaned out.

Reported by Neil Kelly 2026-10-08

The pump performance curve appears here for ease of reference.



2026 OCTOBER 3 CLEARING THE EMERGENCY PUMP SUCTION

1) Acquire proper valve key (blade with confining ring)

2) Change check valve direction and close the gate valve in the valve box at top of hill

3) Tie pump discharge piping at bottom of hill to tree so that it can't slip away, down the casing, when you undo the compression fitting.

4) Install 1-1/2" tee and 1-1/2" poly pipe in between gate valve and 1-1/2" pipe going up hill from valve station at the bottom of hill

5) Plug annulus around 1-1/2" poly and 6" casing. (use a rag and 10 rolls of electrical tape...just plug it.)

6) Close 1-1/2" gate valve at bottom of hill and top of hill

7) Open curb stop. Check for leaks

8) Open gate valve at top of hill, check for leaks. Water is now flowing into the casing. Let it run for "20 minutes".

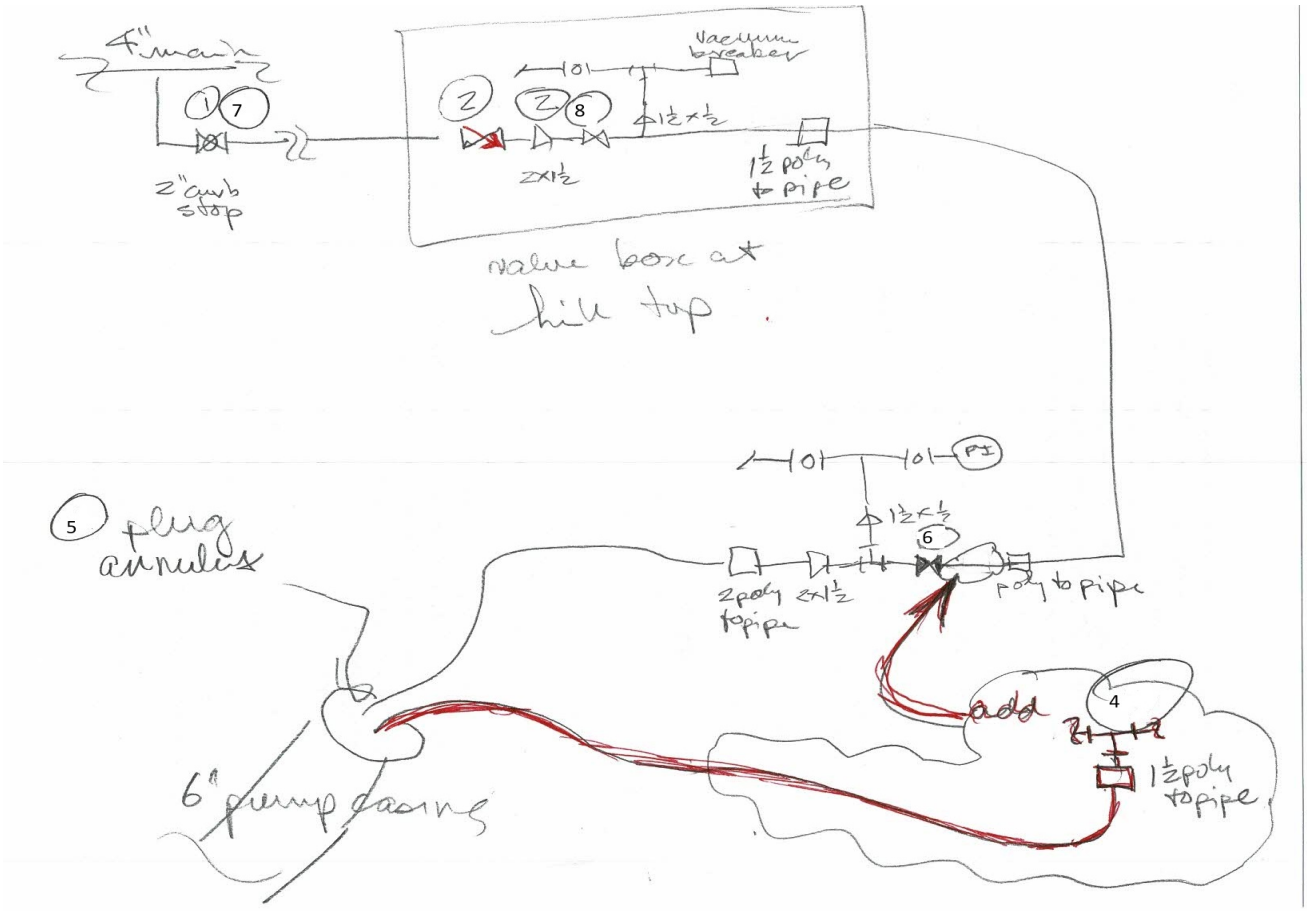
When you think you have the suction end of the casing cleared.....

A) Close the curb stop.
B) Remove the 1-1/2" poly pipe from the top of the casing so that water from it can flow to the lake without eroding the bank.
C) Open the ½" ball valve bleed at the bottom of the hill just upstream of the closed gate valve. When the pump starts, pressure will build quickly. Be ready to open the 1-1/2" gate valve at the bottom of the hill. Water will flow to the lake via the temporary 1-1/2" poly pipe.

If the pump stays running without cavitating, let it run until you are confident the inlet throat of the casing is cleared. If it cavitates, configure the piping to blow back ward thru the casing. Start at step 1 repeat the procedure again, and again until the pump runs continuously without cavitating.

Once you are satisfied the underwater inlet of the casing is clear, shut down the pump, and remove the temporary poly pipe. Install a 1-1/2" plug in the tee, change the check valve back to flowing uphill, leave all valves except the curbstop in the open position. Remove all hardware from Mr. and Mrs. Bell's property. Tape rubber inner tube to the electrical cable where it is badly chafed. Your neighbours love you.

See over for plumbing diagram.


4" main
1
7
2" curb stop
2
2
8
vacuum breaker
10
1½ x ½
2 x 1½
1½ poly to pipe
valve box at hill top
10
10
PI
1½ x ½
6
2 poly to pipe
2 x 1½
poly to pipe
5
plug annulus
add
4
2
1½ poly to pipe
6" pump casing