

Nov 18, 2014

The pool solar heating system was installed by the HOA and since the natural gas costs are completely reflected in the HOA fees, there is a huge incentive to be as frugal as possible. Therefore the solar runs all the time, and only when someone requests the heater be turned on, do we go online and enable it. Here are some of the things we do to keep the pool costs as low as possible.

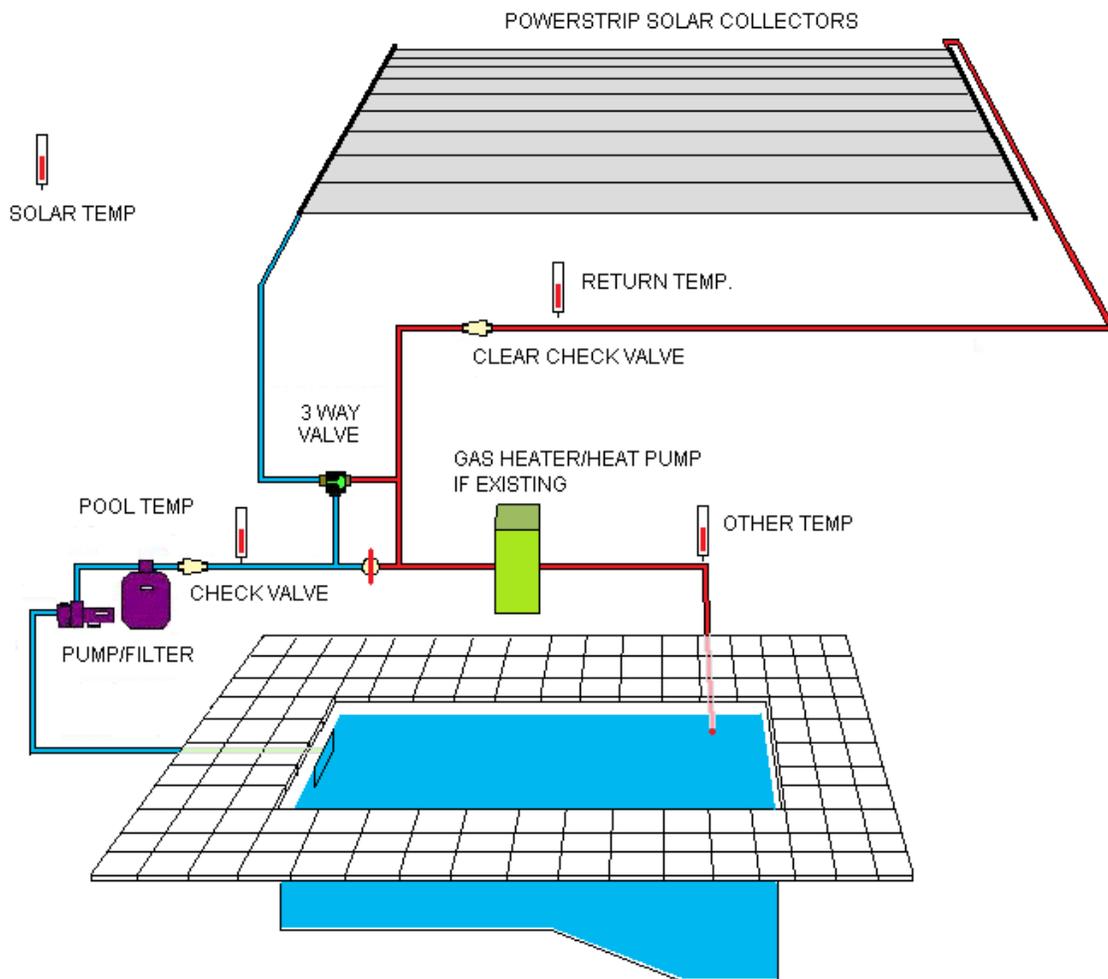
From October-April, a pool cover is used except when the pool is in use.

We use a variable speed Pentair pump and use it to control the system pressure when the solar is active (and all other times). We use a low speed for background sanitation, a medium speed to boost the water pressure to get the water to flow to 28' above ground where the solar mats are, and a higher speed for the cleaning/stirring cycle.

We use the solar to heat the pool as much as possible and only enable the gas heater when someone calls ahead of time to boost the temperature up.

We have a sign on the gate that states a pool cover is in use and must be removed before using the pool. Plus the phone number to call to turn the gas heater on.

We find that everyone wants to conserve, therefore is OK with calling ahead when they are going to use the pool.

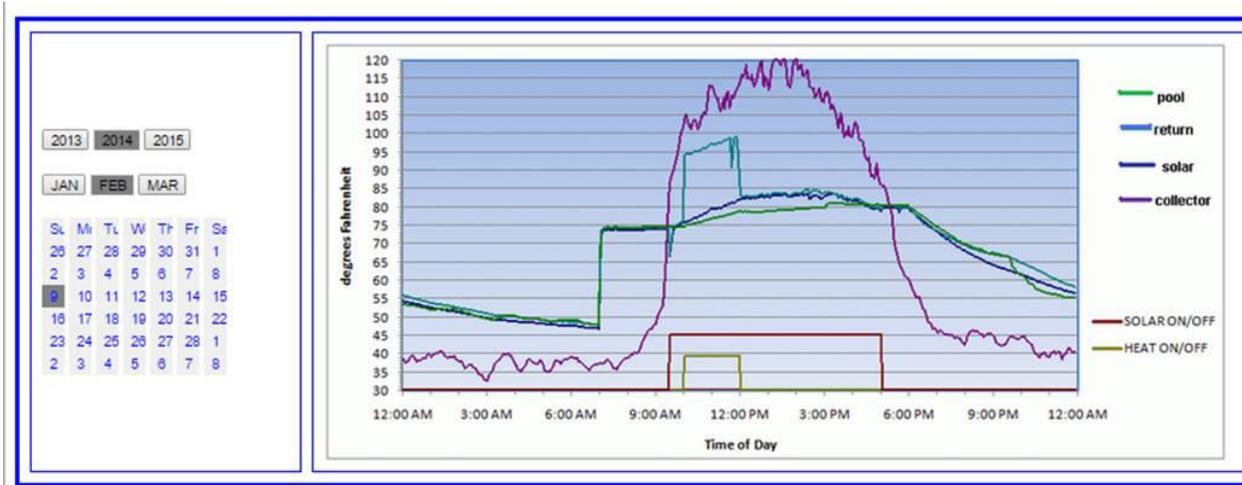


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### Charts

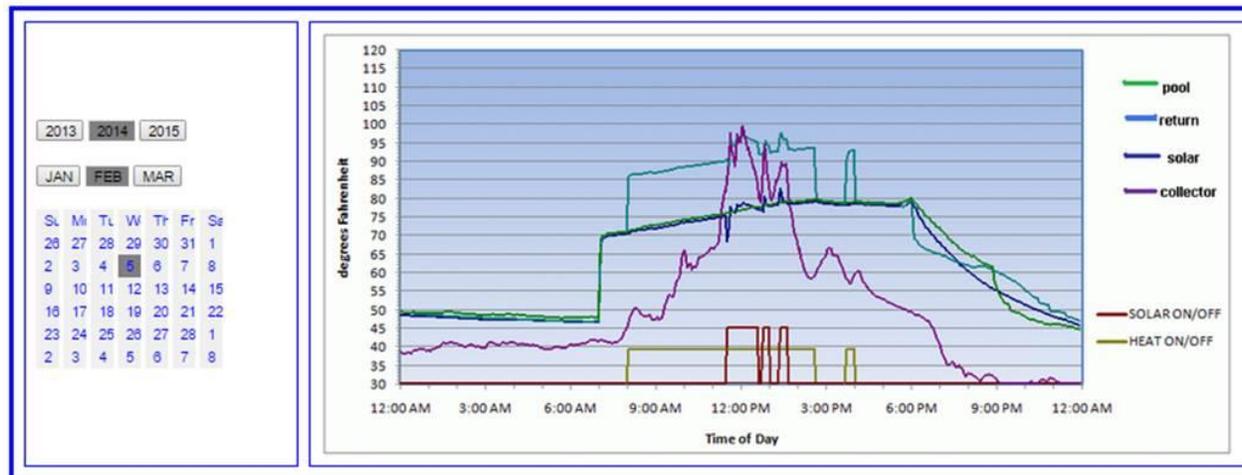
The solar kicks in when the solar mat temperature is 20 degrees above the pool temperature. The pool pump shuts off at 6pm so you can see the temperature of the stagnant water decrease in pipes down to 47F in the early AM. The solar mats being a black body radiator are colder than the ambient air temperature which looks to be about 45F for the nightly low. The pump turned on at 7AM, therefore the pool temperature shows 75F. A pool cover was used therefore the pool only lost 5F from 6pm the evening before to 7AM. If a cover is not used, this temperature drop can be easily 10-15F depending on the wind and the nightly low temperature. The natural gas heater kicked in at 10AM because the goal was to reach 78 for the afternoon. We have people from the north country so don't mind swimming 78-80. You can see the pool temperature ramp rate with both the gas heater and the solar from 9:30-12:00. After that you can see the ramp rate

from just the solar. The solar radiation was reasonably good this day. There are 3 temperatures, the lowest being the inlet temperature, the middle temperature being from the solar, and the highest being after the gas heater. The heating loop runs the water through the solar, then through the heater.

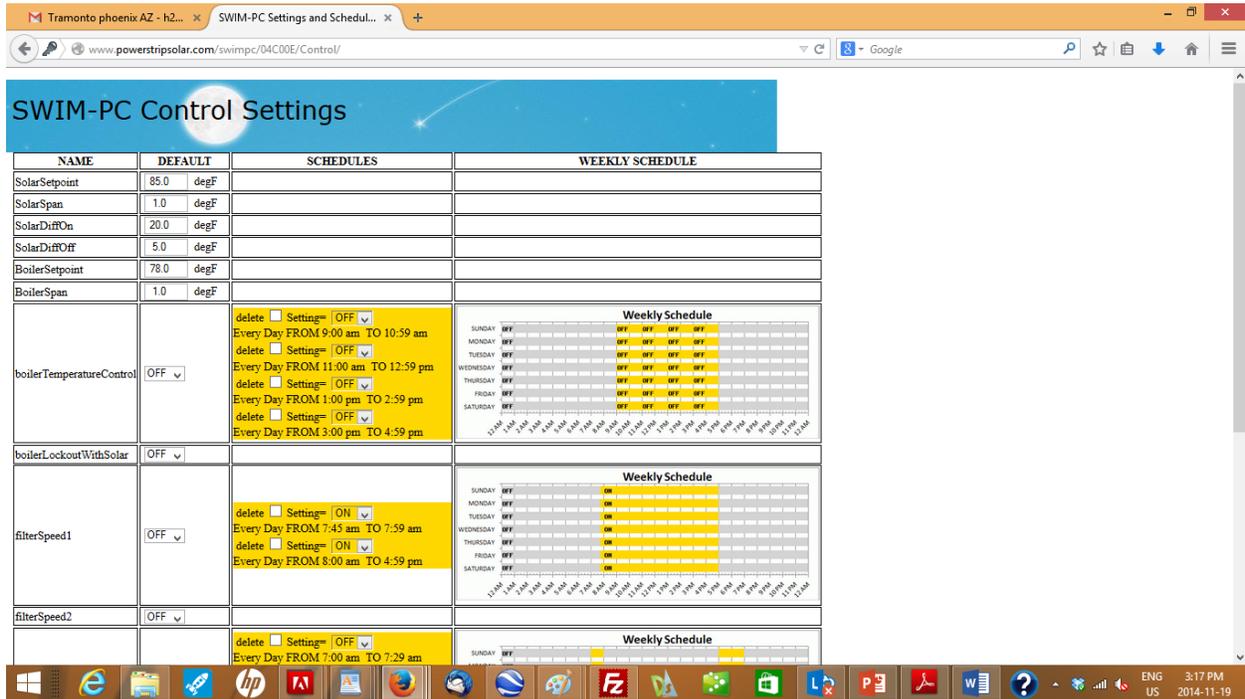


Documents/customers/

This chart shows the heater schedule turning on at 8:30 and the day is a very poor solar radiation day (overcast). Even though the solar did kick on a couple of times, it didn't do much. 20/20 hindsight we would have run the heater because no one uses the pool on overcast days. Note the pool temp and the solar return are almost the same. The blips that occur are from the solar valve opening and closing so the warm water that was sitting in the collector raises the temperature in a spike.



Here is what the control page looks like (it is password protected for security):



NAME	DEFAULT	SCHEDULES	WEEKLY SCHEDULE
SolarSetpoint	85.0 degF		
SolarSpan	1.0 degF		
SolarDiffOn	20.0 degF		
SolarDiffOff	5.0 degF		
BoilerSetpoint	78.0 degF		
BoilerSpan	1.0 degF		
boilerTemperatureControl	OFF	delete <input type="checkbox"/> Setting= OFF Every Day FROM 9:00 am TO 10:59 am delete <input type="checkbox"/> Setting= OFF Every Day FROM 11:00 am TO 12:59 pm delete <input type="checkbox"/> Setting= OFF Every Day FROM 1:00 pm TO 2:59 pm delete <input type="checkbox"/> Setting= OFF Every Day FROM 3:00 pm TO 4:59 pm	<b>Weekly Schedule</b> SUNDAY OFF MONDAY OFF TUESDAY OFF WEDNESDAY OFF THURSDAY OFF FRIDAY OFF SATURDAY OFF
boilerLockoutWithSolar	OFF		
filterSpeed1	OFF	delete <input type="checkbox"/> Setting= ON Every Day FROM 7:45 am TO 7:59 am delete <input type="checkbox"/> Setting= ON Every Day FROM 8:00 am TO 4:59 pm	<b>Weekly Schedule</b> SUNDAY ON MONDAY ON TUESDAY ON WEDNESDAY ON THURSDAY ON FRIDAY ON SATURDAY ON
filterSpeed2	OFF	delete <input type="checkbox"/> Setting= OFF Every Day FROM 7:00 am TO 7:29 am	<b>Weekly Schedule</b> SUNDAY OFF MONDAY OFF TUESDAY OFF WEDNESDAY OFF THURSDAY OFF FRIDAY OFF SATURDAY OFF

The products (controller, solar headers, solar mat) from Hot Sun are very reliable. I'm actually amazed that the headers, couplings and solar mats have not noticeably degraded after 5 years in the Arizona sun. I don't see any reason why our system won't last 15 years. The web based controller has worked out very well for us. As I explained we use the gas heater sparingly, and from anywhere in the world, we can enable or disable it. Ken Wright principal of Hot Sun knows his stuff forwards and backward and a great engineer. Me being an engineer, I really appreciate this.

You can call me if you have further questions.

Regards,