

BROOME COUNTY FIREFIGHTERS' ASSOCIATION

BROOME COUNTY, NEW YORK

CORRECTION ON SOLAR PANEL INFORMATION

Note: There was an article in the January 2009 "Fire News" which has been making the rounds with some scary information about solar panels (see original article below). Firefighter close calls has issued information about these because the original article contained a lot of "misinformation".

From www.FireFighterCloseCalls.com

Regularly, "stuff" floats around the internet that is less than technically accurate. Surprise. But it happens. This time it is about solar panels and firefighting operations.

While we didn't originally send anything about this on The Secret List, we did have some information that was sent to us as a submission that we posted on the website-and the info was inaccurate. Many of you probably saw the e-mail "floating around" on the "solar panel" issue as well. Due to the amount of submissions that come into www.FireFighterCloseCalls.com, it is impossible to not have something slip through once in a while, albeit rarely. We have always taken technical accuracy extremely seriously since we started The Secret List and the FFCC website 11+ years ago and we do our best.

We are fortunate and appreciative to have a lot of readers. One of them is a San Jose (CA) FF who teaches classes on FF Safety related to PV (photovoltaic) systems, who has a degree in Solar Technology, and is also a member of the California State Fire Marshals PV Task Force. While we heard from many in the manufacturing community about this issue, we were very glad to hear from Fire Engineer Matt Paiss of the San Jose FD who wanted to offer some "firefighter" clarity to this discussion. It is an area we all need to be aware of, but as is often the case; a few misconceptions can create miscommunication.

We will turn this over to Matt so he can provide his training and knowledge to address the issues one by one so you can develop your own FD SOP:

1. Panels are only energized in daylight. Overcast days too, but NEVER at night. Scene lights will NOT energize the panels.
2. If the panels, or the roof are on fire, you will not get shocked by spraying water on them. Put the fire out.
3. The voltages of panels are anywhere from 24-48 volts each and generate from 125 to 200 watts in optimal conditions.

These panels are "strung" together in series to increase the voltages to 120 vdc to 400 vdc. While 600 vdc is possible, it is pushing the UL ratings of the enclosures, etc.. The current of these strings is usually from 5-9 amps. And that is only when there is a load (or put more simply, the inverter is sending the power back into the grid). If the inverter is off, there is no current only voltage, i.e. open circuit.

4. The inverters that change the power from DC to AC, are powered by AC. If you shut off the main service breakers, the inverter is OFF and there is NO AC power being sent into the structure. There are capacitors in the inverters that can hold a charge for about 5 min, but in the daytime the panels are producing power anyway. When the sun goes down....everything is de-energized.

FIREFIGHTER WARNING:

There is ALWAYS energized DC power in the conduit from the panels to the inverter IN THE DAYTIME. So, secure all utilities (per SOP's) and stay away from the panels and the conduit in the daytime. That is the danger.

5. Do not break a panel with your axe or related forcible entry tools. Each panel in the string could be carrying the FULL VOLTAGE of that string (120-400 VDC), not just one panel, so if you put a tool through it, you will very likely be getting the rest of the shift off...so don't do it....there is no need to do it, vent somewhere else, and kill the utilities at the main panel based upon your SOP's.
6. There are often junction boxes on the roofs (residential systems). If they do have fuses (not all do), and you pull a fuse while under load, you will very likely cause a fire. Not to mention the time it will take to open the box and do this. Bad idea-leave it alone.
7. In California, we will not let a house burn because it has PV Panels on the roof. I may not be able to put my hole in the best place, but I will put one in where I can when required.

THE ORIGINAL ARTICLE (Which contains inaccurate information)

The thing to know with solar panels are that **they cannot be shut down - they are ALWAYS ENERGIZED**. And they are energized with up to 600 volts of DC current. For example, you cannot put an ax through them to open up a roof to vent - your putting the ax through 600 volts. If fire is infringing upon solar panels on the roof it will compromise the integrity of the panels. You then have 600 volts of live electrical energy - and what don't you do when you have live electrical energy? - you don't put water on it. Even if the roof burned through and the panels fell into the structure, unless the panels were destroyed (de-energized) by the fire and/or falling into the structure, they can still have the potential to be live, they have to be treated as such and have the potential of 600 volts of DC current.

A basic solar system consists of: The solar panels themselves; a combination box; a disconnect box; and an inverter. The panels all feed into a combination box. The combination box (which is almost always located on the roof) takes in all the energy and sends it to a disconnect box. The disconnect box takes the energy and then sends it into the inverter which converts the DC current into AC current. From there the AC energy "pushes" into the structure's normal electrical system.

The combination box has fuses in it that come from the solar panels themselves. If you access that box, you can pull all the fuses inside and "kill" anything after the combination box. But remember the panels are still live and have up to 600 volts in them. If you "kill" the energy at the disconnect box - anything up to that box is still energized - the solar panels, the combination box, the line going from the combination box into the structure and into the disconnect box are all still energized. The power company pulling the meter for normal service has no effect whatsoever on the solar panel system - it is all still live and has up to 600 volts of DC current. The only "good" thing when it comes to the disconnect box and the inverter is that they need to be co-located with the normal service panel for the structure and each should be marked as appropriate.

Even if it's nighttime and the solar panels have not been exposed to direct sunlight for several hours, they still are energized and can kill you. It is estimated that the panels would need to be covered with an opaque tarp for 7-10 days before the panels will "de-energized" down to minuscule levels. (although the handouts specify that this is an option for safety steps - it is not accurate per the presenter)

In closing there are people who have greater minds and resources than we do in developing a process to safely handle fires which may involve these systems - such as the NFPA, OSHA, etc. Per the presenter, the situation - and these organizations, are now starting to become aware of the potential problems. So far in the State of NJ, there is no recorded injury to a Firefighter being caused by coming into contact with a solar panel system. Ironically, New Jersey comes in 2nd when it comes to solar panel system installations in the nation, behind California.

The final question which was asked really put things in prospective - someone asked that since California is number one when it comes to Solar Panel System installations, "...what do their Firefighters do when a structure fire involves these systems?" Answer was "... they let it burn!"

Please, I'm not suggesting that we adopt this strategy. But the reality is - I really don't have an answer and it seems as if the Fire Service industry, nor the Solar Panel Companies, don't either.

Just - please be aware and please be careful if you roll up to a structure where a solar panel system is installed - bottom line, it can kill you