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Stray Voltage in the Water *The Danger You Don't See*

(Smith Mountain Lake, Virginia, June 8, 2018, UPDATED: June 11, 2018) Last fall Smith Mountain Lake Marine Volunteer Fire Rescue began offering lake residents a free check for stray voltage in and around their docks. After checking nearly 200 docks, an alarming 96% of the docks had some stray voltage detected in the water.

The most common cause of stray voltage in the water is the result of the home's electrical ground wire being connected to the dock's electrical ground wire. The electrical service from the power company is grounded and connected to the home's electrical equipment ground. However, the dock should be "independently" grounded. That means it should NOT be connected to the home's ground wire.

The simple fix would be to disconnect the ground wire on the circuit running from the house to the dock. Unfortunately, the National Electric Code (NEC) provides conflicting guidance when it comes to wiring docks and disconnecting that ground could be a violation of local electrical codes.

Until this issue is resolved and clarifying language is available for the NEC, here are a few simple safety precautions for all homeowners with docks:

- Upgrade your dock's electrical service to be compliant with the latest electric code.
- Insure ground fault circuit interrupter technology is installed on dock circuits.
- Make sure all metal parts of the boat and jet ski lifts are out of the water when people are swimming off your dock.
- Never allow people to swim near your boat or jet ski lift.
- Do not touch the boat or jet ski lift and the water at the same time.



- Never allow swimming around the slips in a marina or community dock.
- Special attention is required if you have metal pilings supporting your dock.

Neil Harrington is a volunteer with Smith Mountain Lake Marine Volunteer Fire Rescue. He has conducted a number of the dock checks looking for indications of electricity in the water. The surprising discovery is that most docks tested positive for electricity in the water. Owners were advised to call a licensed electrician to correct the problem.

James Erler of Huddleston called an electrician who advised him that his dock was not up to the latest code and that bringing it up to code would eliminate the electricity found in the water at his dock. Mr. Erler spent over \$2,000 on electrical work only to find the level of electricity in the water was worse, extending beyond the dock at least 40 feet along the shoreline.

Mr. Erler, a physicist and electrical engineer, investigated the problem and discovered that electricity in the water is caused by the grounding and bonding required by the electric code. He measured voltage levels that varied intermittently and often reached lethal levels for swimmers. Industry experts have known of this phenomenon for years, however no one has fully characterized it until now.

Mr. Erler and Mr. Harrington believe that the grounding and bonding methods required by code are responsible for most of the docks found to have electricity in the water. They are encouraging dock owners to implement safety precautions and are advocating for code variances to change the wiring and correct the problem.

Smith Mountain Lake Marine Volunteer Fire Rescue is an all-volunteer department. While there is no charge for checking docks for stray voltage, your tax deductible donation is certainly appreciated and helps off-set the costs associated with this service. To donate go to <http://smlmfr.com/donate.html>