Information from Kendrick Astro Instruments:

LOW VOLTAGE CUT-OFF

Firstly, Kendrick does not use Deep Cycle Marine Batteries (DCBs from here-on) in our products but many of our customers do use them in the field.

Some of our customers who use DCBs have asked us to lower (or disable) the Low Voltage Cut-off (LVC) of our dew heater controllers so that they can get deeper into the cycle of these batteries. Some have complained that the LVC feature cuts in too early for their type of battery. There is the belief that there is no harm in taking down a DCB below our controllers 11.6 volt cut-off function.

The truth is that any lead acid battery, be it a Gel Cell, AGM or flooded batteries such as DCBs, should be cut-off at 11.6 volts. Not doing so increases the risk of damage to the battery and if taken down deep enough into the batteries charge, will ruin the battery. Having said that, the absolute lowest level a lead acid battery can be discharged to, **UNDER LOAD**, is 10.8 volts but this is not recommended (more on this below).

There is the mistaken belief among many that a DCB can be taken deeply into its charge cycle simply because it is a "deep cycle" battery. This is not true. What "deep cycle" really refers to is the availability of current in situations demanding higher amperage. The user of a deep cycle battery will have an easier time drawing higher amperages (ie: when starting a motor) from a DCB than he would from a gel cell or an AGM. At the amperages used by amateur astronomers, the discharge curves of these batteries is virtually identical and both should be cut-off at 11.6 volts to maintain long term viability of the battery in question. The only advantage to a deep cycle battery is that they tend to come in larger amp hour configurations than AGMs or gel cells.

Also, it is important to note that deep cycle batteries do require regular maintenance that AGMs and gel cells do not. A DCB should be tested weekly with a hydrometer to make sure the specific gravity of the battery is 12.85 and the cells must be inspected regularly to maintain fluid levels in the cells. In situations where access to a high amperage battery is important and safe transportation of the battery can be accomplished without spilling acidic electrolyte from the battery, a deep cycle battery makes sense. In any other case, an AGM or gel cell would be the preferred battery. Kendrick uses AGMs in our power packs, which are non-spillable.

Lastly and very importantly, when any lead acid battery, regardless of type, gets below it safe useable voltage (11.6 volts), the amperage will increase to keep up with the wattage demands of the equipment being used.

For example, let's assume you have a system that requires 50 watts of power and are using a deep cycle battery. At 12 vdc, you will require a current draw of just over 4.1 amps to produce that 50 watts. If you take that DCB down to 6 volts and still need 50 watts of power, you will now force the battery to push out 8.33 amps. More than double the amperage! A situation like this, even though you are still drawing only 50 watts, those extra amps can destroy the fine copper traces on your circuit boards as well as the transistors, diodes and ICs in many of the electronic devices used by amateur astronomers, especially the astro-imagers out there. BE CAREFUL!

If you value your electronics and your battery, do not bypass the Low Voltage cut-off function of our dew controllers with the use of DC to DC converters which step up voltage to 12 volts dc from voltages lower than 11.6 volts dc.

In Closing

Anyone with a battery that appears to be cutting off too early may be damaged through too deep discharge (even once), damaged from poor electrolyte maintenance or is old and no longer serviceable. A battery that is discharged to 10.8 volts regularly and then recharged can expect to get 354 charging cycles out of the battery. A battery that is discharged to 11.6 volts regularly and then recharged can expect to get 900 to 1000 charges out of the battery. A properly maintained battery will last many years.

If you value your electronics and your battery, do not bypass the Low Voltage cut-off function of our dew controllers with the use of DC to DC converters which step up voltage to 12 volts dc from voltages lower than 11.6 volts dc.