position most of the time, the level of protection offered by any particular design will vary depending on the dielectric strength between the contact points in the open position. A typical electrical relay may only provide protection up to a 2 kV surge whereas disconnect assembly **94** may provide protection up to several hundred kV if the contact points are several inches apart in the open position.

[**0092**] It should also be appreciated that a disconnect assembly can also be used to prevent damage from surges when the RMU is installed at the rectifier site and the RMU not only measures the pipe-to-soil potential **74** or pipeline current **76** but also the output current **70** and voltage **72** of the rectifier. By routing all connections to pipeline **10** or ground bed **30** through disconnect device **94** and by keeping disconnect device **94** open during times when the RMU is in a standby mode and actual measurements are not being carried out, the possibility of damage to the RMU by surges from the pipeline, the ground bed or other sensors **70** to **80** is significantly reduced.

[**0093**] When an RMU is installed at a rectifier, AC power is typically available and it is therefore convenient to power the RMU from this AC source. This permanent connection to the AC power is a possible source of surges which could damage the RMU. However, disconnect device **94** combined with back-up battery **88** provides a unique means for protecting the RMU from damage by electrical surges through the AC circuit **86** while still maintaining the benefit of the convenient AC power through the AC circuit **86**. The control of disconnect device **94** afforded by control circuit **110** or by measurement and control circuit **84** or by communication module **64**, provides a means of keeping the AC power disconnected most of the time (preferably at least 80% of the time) during which time battery **88** remains sufficiently charged to operate the RMU. In this application, the AC supply will be connected to the remote monitoring device and/or to other associated devices through disconnect assemblies **94**. When disconnect assembly **94** closes to make a measurement, the AC power is connected, allowing battery **88** to be recharged. In addition, the RMU or associated electronic devices senses the battery **88** voltage continuously, so that when the battery **88** voltage drops below a pre-set value, disconnect assembly **94** automatically closes. This connects the AC supply **86** allowing recharging of battery **88**. The possibility of damage to the remote monitoring device or other associated electronic equipment by surges on the AC circuit is therefore limited to the time that measurements are taken or to the time that recharging of battery **88** occurs.

[**0094**] The level of surge protection provided to the RMU at a site where AC power is available may be increased even further by using both AC power **86** and solar panel **92** to recharge battery **88**. By connecting solar panel **92** permanently to battery **88**, most of or all of the power required to recharge battery **88** is provided by solar panel **92**. Connection to AC power **86** through disconnect device **94** is now only required when the power supplied by solar panel **92** is exceeded. The total time that the RMU is connected to AC power and therefore the total time that the RMU is exposed to surges on the AC circuit has therefore been reduced even further by incorporating solar panel **92**.

[**0095**] It should further be appreciated that disconnect assembly **94** can be used to protect any device from electrical surges where the device only needs to be connected to the source of the surge for short periods of time. Furthermore, disconnect assembly **94** can be used in other applications which are otherwise prone to damage by electrical arcing across contact points.

[**0096**] Referring now to **FIG. 9A**, there is shown a typical CP configuration like that of **FIG. 2**. The example CP configuration includes three cathodic protection circuits **20***a,b,c* with rectifiers **24***a,b,c* and 8 test stations **40**, TS**1** to TS**8**.

[**0097**] To determine the "interrupted off" or "instant off" pipe-to-soil potential of the three cathodic protection circuits **20***a,b,c* with rectifiers **24***a,b,c*, the pipe-to-soil potential is measured at each of the test stations **40**, TS**1** to TS**8**, within approximately 1 second after all of the rectifiers **24***a,b,c* have been turned off in unison. To determine the "on" pipe-to-soil potential of the three cathodic protection circuits **20***a,b,c* with rectifiers **24***a,b,c*, the pipe-to-soil potential is measured at each of the test stations **40**, TS**1** to TS**8**, while all of the rectifiers **24***a,b,c* are turned on. This measurement procedure is achieved by installing current interrupters **25***a, b,c* into each influencing rectifier **24***a,b,c* and programming these interrupters **25***a*, **25***b*, and **25***c* to switch off and on at the same time so as to allow pipe-to-soil measurements to be taken during the "off" and "on" intervals. Synchronization of the various interrupters is achieved through synchronizing their internal clocks, often using satellite time signals. It is also typical for such interrupters to have a common known reference point, or point of zero time. This ensures that if any one interrupter within a group of operating interrupters is arbitrarily turned off and on again during an interruption cycle, that particular interrupter will actually resume its interruption cycle in unison with any other interrupters already operating. Typically, the top of the hour or the top of the day are used as the common known reference point, and when an interruption cycle is initiated, the interrupter calculates at which point in time it needs to initiate a particular interruption cycle so that it switches on and off in unison with any other interrupters operating at the same interruption cycle. U.S. Pat. No. 4,356,444, hereby incorporated herein by reference, describes a plurality of interrupters which switch rectifiers on and off in unison. Each interrupter is synchronized with a clock reference unit.

[**0098**] **FIG. 9B** shows the typical prior art "on" and "off" cycles that are generated for three interrupters that are presently commercially available. Some of the available interrupters only have fixed "on" and "off" cycles while others are programmable and the length of the "off" and of the "on" cycle can be adjusted. Some models have the ability to also program the start and stop time for the interruption cycle. In all the equipment currently available, all the interrupters switch on and off at the same time.

[**0099**] In the prior art, in order to evaluate the pipe-to-soil influence from each rectifier **24** in this example, it is necessary to switch each of the rectifiers **24** off, while the remaining rectifiers are left on, and measure the pipe-to-soil potential at each test station **40**. For example, a rectifier **24** is switched off, while the remaining rectifiers are left on, and the pipe-to-soil potential is measured at a test station **40**. The rectifier **24** is then turned back on and the pipe-to-soil potential is measured again at the test station **40**. The shift of the pipe-to-soil potential from off to on at each test station can then be determined.