[0115] In a preferred embodiment of this invention, the duration of unison switching cycle **112** is programmable so that the amount of "on" and "instant off" data that is collected during unison switching cycle **112** can be adjusted. For example, when conducting a CIS survey using the combined cycle described in **FIG.** 9D, unison switching cycle **112** can be programmed to be 5 minutes. The resulting switching cycle will then consist of 5 minutes of regular "on" and "off" switching followed by consecutive switching cycle **114**. In practice, the CIS surveyor will therefore manually progress along the pipeline **10** for 5 minutes, as in a normal CIS, taking "on" and "instant off" readings at the appropriate distance interval, typically every 2.5 feet. The surveyor is then alerted when consecutive switching cycle **114** is about to occur (audibly and/or visually) and the surveyor then remains stationary with the reference electrode **46** contacting the ground **48** until consecutive switching cycle **114** is completed. For the next five minutes unison switching cycle **112** occurs and the surveyor continues walking, taking "on" and "instant off" readings at regular intervals until the next consecutive switching cycle **114** is about to occur, and so on. In this example, the influence from rectifiers **24***a,b,c* will therefore be measured at various points along the pipeline **10** at 5-minute intervals. The distance between the locations where the influence from rectifiers **24***a,b,c* is recorded will vary according to the rate at which the surveyor walks along the pipeline **10** and also by the programmed duration of unison switching cycle **112**.

[0116] The methods described above is not limited to 3 rectifiers, but can be expanded to any number of rectifiers. A sufficient number of rectifiers can therefore be interrupted so that a survey can be carried out for at least one day without moving into the influence area of an uninterrupted rectifier. Due to the fact that the internal clocks of all interrupters are accurately synchronized and that the actual times during which the time periods (a) to (d) occur are known, it is also possible to relocate interrupters during a survey without reprogramming all the interrupters, provided the surveyor knows the location of each interrupter. For instance, interrupter **25***a* in **FIG. 9A** can be moved from rectifier **24***a* to a fourth rectifier (not shown) without reprogramming any of the interrupters.

[0117] It is possible to read the pipe-to-soil values manually while carrying out the interruption cycles shown in **FIGS. 9C and 9D** but it is preferable to use a data logger. By synchronizing the internal clock of the logger with the internal clocks of the interrupters, for instance through a global positioning system interface, the logger can be programmed to record pipe-to-soil potential values during the appropriate time within the interruption cycles shown in **FIG. 9C** or 9D. Referring again to **FIG.** 9C, the logger is programmed to read, display and store the "on", "instant off", "influence from rectifier **24***a*", "influence from rectifier **24***b*" and "influence from rectifier **24***c*" values automatically. Referring again to **FIG.** 9D, the logger is also programmed to read, display and store each of the "on" and "instant off" values for the duration of time period (b) and to then read, display and store the "influence from rectifier **24***a*", "influence from rectifier **24***b*" and "influence from rectifier **24***c*". Because the internal clock of the logger is synchronized with the interrupters, the logger can also be programmed to alert the surveyor when unison switching cycle **112** has elapsed.

[0118] A system has therefore been described that allows the measurement of CP influence in conjunction with routine CP measurements without substantially increasing the time or effort required. The CP influence results can then be used to position RMUs along the pipeline. It should be noted that use of this system is not limited to studying the influence from rectifiers installed on pipeline **10**, but it includes studying the influence from foreign rectifiers, i.e. rectifiers supplying current to other pipelines in the vicinity which may influence the potential profile on pipeline **10**. This information is also important for placement of RMUs and it also assists in evaluating possible detrimental influences from foreign rectifiers. Normally, a separate study is carried out to assess the possible detrimental influence from foreign rectifiers. Additionally, this information allows the surveyor to create a more detailed influence curve, exemplified in **FIG. 6**, because more data points are known.

[0119] Because the detailed rectifier influence data greatly increases the flexibility of positioning a remote monitoring unit along pipeline **10**, additional parameters, other than just pipe-to-soil potential and/or pipeline current may be measured on the pipeline **10**. The placement of a remote monitoring unit for these additional parameters alone may not have been economically viable, but combined with the pipe-to-soil potential and rectifier status monitoring, measurement of these additional parameters add significant value. In essence, the placement of the remote monitoring units may be determined by the cathodic protection circuit influence alone, or in combination with other influences, described below, when there is a need for additional monitoring at specific points on the pipeline **10**.

[0120] Referring now to **FIG. 10**, the method and apparatus of the present invention may also be used to measure the pipe-to-soil potential of a casing **116** that surrounds the pipeline **10**. Often, when a pipeline **10** passes underneath a roadway, railway, or other obstacle **118**, a casing **116** is placed around the pipeline **10**. Typically the casing **116** around the pipeline **10** includes an air gap **120**. The casing **116** has end seals **122** between the end of the casing **116** and the pipeline **10** to keep water from passing into the air gap **120**. If the air gap **120** fills up with electrolytes, such as water, there is a possibility that corrosion can occur. It is also important that there is no metal contact between the casing **116** and the pipeline **10**. Thus, it is important to monitor the pipe-to-soil potential of the casing **116** since it will be different from the pipe-to-soil potential of the pipeline **10**. As their potentials become similar in value, this is an indication of either a metallic short between the casing **116** and pipeline **10** or an indication that electrolytes have entered the air gap **120**.

[0121] The method and apparatus of the present invention may also be used to monitor the hydrocarbons in the casing **116**. The casing **116** has a vent **124** that extends from the air gap **120** between the casing **116** and pipeline **10** to above ground **48** such that a transducer (not shown) may be placed at the vent **124** to detect whatever hydrocarbons are released by the pipeline **10**. If there is a leak in the casing **116**, the leak will be detected.

[0122] Referring now to **FIG. 11**, there is shown the method and apparatus of the present invention being used to monitor a bond between two pipelines **10**, **11**. For example, referring back to **FIG. 6**, RMU2 may be placed at milepost