a rain sensor, a light sensor, or a lightening sensor to vary the operation of the remote monitoring unit.

[0133] The data is interpreted by the central server **142** and may be graphed showing whether the pipe-to-soil potential or the pipeline current had changed from a baseline value. Software may be used to analyze the data and apply it to the calibration graphs such as **FIG. 6**. The calibration graph provides base line data for each remote operating unit that is then compared to the data received remotely from each unit over time. The software includes graphs and actually shows the schematic of the pipeline with remote operating units and cathodic protection systems on the pipeline. This data is applied to the base data to detect a variance. It may further determine the significance of any variance. Customers may be able to access the data at the server **142** using the Internet **150**.

[0134] It should be appreciated that the remote monitoring unit may also be programmed to detect and report a variance from a baseline value. This functionality may be combined with scheduled reporting of the measured value or it may also be used instead of scheduled reporting. The frequency of data transmissions can therefore be further reduced by incorporating the alarm feature described above. As a result, communication costs may be reduced. Furthermore, the total time that disconnect device **94** needs to be in the closed position may be reduced because transmission time is reduced, resulting in extended battery **88** life and a decrease in the possibility of damage by electrical surges.

[0135] While the present invention has been disclosed and described in terms of a preferred embodiment, the invention is not limited to the preferred embodiment. For example, while the present invention has been described for use in monitoring pipelines, it should be understood that it could be used in monitoring any structure susceptible to corrosion. In addition, various modifications to the preferred embodiments, among others can be made without departing from the scope of the invention. In the claims that follow, any recitation of steps is not intended as a requirement that the steps be performed sequentially, or that one step be completed before another step is begun, unless explicitly so stated.

What is claimed is:

1. A method for monitoring the cathodic protection status of a rectifier on a conductive structure comprising:

a) placing the rectifier having a first predetermined output at a first location on the structure;

b) changing the output of the rectifier to a second predetermined output;

c) measuring the difference between the first and second outputs of the rectifier at a plurality of locations on the structure, wherein the locations are remote from the rectifier at the first location;

d) recording the influence that the difference of the outputs has on the structure-to-soil potential at each location;

e) selecting at least one location on the structure remote from the rectifier where the influence from the rectifier on the structure-to-soil potential is discernable;

f) placing a remote monitoring unit at the selected remote location;

g) measuring the structure-to-soil potential with the remote monitoring unit; and

h) comparing the structure-to-soil potential measured by the remote monitoring unit with the results from step d).

2. The method according to claim 1 wherein the remote monitoring unit is capable of measuring the structure-to-soil potential value continuously, periodically, or on demand.

3. The method according to claim 1 wherein the remote monitoring unit is capable of relaying the measurements to a central location via a relay means.

4. The method according to claim 3 wherein the relay means is selected from the group consisting of a satellite, a mobile phone, a land line, and a radio.

5. The method according to claim 1 wherein the results of measurements carried out by the remote monitoring unit is transmitted to a server.

6. The method according to claim 4 wherein the results of measurements are accessible through the internet.

7. The method according to claim 1 wherein the status of multiple rectifiers are monitored at a single location remote from the rectifiers.

8. The method according to claim 7 wherein the total number rectifiers being monitored is greater than the total number of remote locations where measurements are carried out.

9. The method according to claim 8 wherein a correlation is made between the results of measurements at multiple remote locations and the known effect that a particular rectifier has at these remote locations.

10. The method according to claim 1 wherein the structure is a pipeline.

11. The method according to claim 10 further comprising measuring the return current in the pipeline at a predetermined point on the pipeline.

12. The method according to claim 11 wherein both pipe-to-soil potential and return current at a predetermined point on the pipeline are measured and compared to predetermined threshold values.

13. The method according to claim 10 wherein the remote monitoring unit further monitors leak detection devices.

14. The method according to claim 10 wherein the remote monitoring unit further monitors the output of sacrificial anodes.

15. The method according to claim 10 wherein the remote monitoring unit is used as an above ground reference for smart pigging operations.

16. The method according to claim 15 wherein the remote monitoring unit detects a pig's passage.

17. The method according to claim 10 wherein the remote monitoring unit further measures case-to-soil potential.

18. The method according to claim 10 wherein the remote monitoring unit further monitors hydrocarbon leaks in a casing vent.

19. A method for monitoring the amount of current obtained by a section of pipe comprising:

measuring the return current at one end of the pipe;

measuring the return current at the other end of the pipe;

calculating the difference in return current measured between the two ends of the pipe; and