



## FREQUENTLY ASKED QUESTIONS

### What is the AMR Permalog®?

- This product is the combination of either the field-proven Neptune R900® or R450 radio frequency MIU with the reliable Permalog® leak noise logger from Fluid Conservation Systems to provide utilities with distribution-side leak monitoring capabilities in their AMR/AMI system.

### Who is Fluid Conservation Systems (FCS)?

- Fluid Conservation Systems Inc. (FCS) is the North American industry leader in water leak detection technology. The company supplies highly sophisticated leak detection products. These include Permalog leak noise loggers to determine the general location of a leak; correlators that are used to pinpoint the position of leaks in underground water mains; pressure controllers to minimize leakage; and flow/pressure loggers to monitor water supply networks. Together with ground microphones for leak surveys and leak position confirmation, FCS provides a complete suite of leak detection and pressure management equipment.

### Why do utilities use leak monitoring systems?

- Implementing a thorough water system survey program using FCS equipment, water utilities across North America have been able to save time and money by:
  - Reducing and recovering Non-Revenue Water (NRW) due to system leakage.
  - Eliminating added costs from digging “dry holes” when searching for leaks.
  - Minimizing the threat of litigation resulting from catastrophic system failures.
  - Reducing man-hour expenses by localizing and pinpointing leaks more productively through state-of-the-art technology.

### Where are the Permalog units located in the distribution system?

- The Permalog unit is designed to magnetically couple to the top of the valve that is part of the distribution main. The R900 or R450 is wired to the Permalog units and placed in the valve box with the antenna mounted through the lid.

### How many Permalog units per mile are needed for deployment?

- Actual deployments will vary, but the common rule of thumb is to deploy five Permalog sensors for each linear mile of cast or ductile iron distribution main pipe.

### How does the Permalog work?

- The Permalog units are shipped from the FCS factory programmed to wake up and listen to the noise level at 2:00 a.m. (factory default). The unit listens for five minutes for leak noise frequencies. If the unit detects a constant sound noise during this time, it will wake up again at 3:00 a.m. and then again at 4:00 a.m. to determine if that same noise level is present. If the same noise level is present all three times, the Permalog units will transition to leak status mode.

### Is the Permalog compatible with my existing R900 or R450 MIUs?

- Yes. The Permalog's output protocol is fully compatible with any version of R900 or R450 MIU.

### What information is communicated from the Permalog to the R900?

- The Permalog provides both a “leak alert” and a “confidence number” for each Permalog installed. The leak alert is a discrete “yes or no” indication of a leak that is calculated by the Permalog on the pipe. The confidence number is a single-value representation of the level of certainty that the reported leak alert is correct.

### How is this information interfaced with ARB® N\_SIGHT™ Mobile software?

- Since the Permalog embeds the leak information in the output protocol, this information will look just like another 6-digit meter reading. After the capture of all the Permalog readings, a Permalog leak report can be generated within ARB N\_SIGHT Mobile software, or exported via csv file to other programs.

### Will my current version of Equinox be compatible with the AMR Permalog?

- Yes. With Equinox 2.2 or later, the AMR Permalog data can be exported from Equinox to a csv file for viewing by the Permalog software or Excel, etc. Long-term, Equinox 3.0 or ARB N\_SIGHT Mobile, scheduled for an August 1, 2008 release, will have the capability to run a specific Permalog leak report.

### What is the battery life of the AMR Permalog units?

- When used in conjunction with the R900 or R450, the battery life of the AMR Permalog is expected to be approximately ten years because the Permalog battery will only be responsible for waking up and monitoring the noise levels once a day. The R900 or R450 battery will provide the power required for RF communication.

### What are the key differences between the leak noise loggers installed on service lines and FCS Permalog technologies and why is Permalog considered to be more accurate for distribution leaks?

- There are a couple of key differences between the Permalog manufactured by FCS and the leak noise loggers manufactured by other companies. First is the method and location of attachment of the leak noise loggers. Most leak noise loggers are located on the service lines feeding into a residence or building, typically directly in front of the meter. The leak noise loggers attach to the pipe through the use of tie-wraps to sense the vibrations of a possible leak.

The Permalog leak noise loggers are normally installed inside valve chambers (valve boxes) for main line or hydrant valves and magnetically couple to the nut on the top of the gate or hydrant valves. These access points provide the best-quality connection for identifying leaks within the distribution system and are found abundantly throughout the system. While this is not the best-quality position to place leak noise loggers, the Permalog loggers can also be placed in meter pits and fire system connections. The three primary reasons why the connection method utilized by the Permalog provides the most accurate leak detection in the industry are: **(1)** Leak sound energy travels up and down the main distribution lines more efficiently than service lines. Very little energy is able to travel up the service line connection. For competitive products that mount to the service lines, this means they can only detect noises from close by (within 100 feet), whereas the Permalog detects noise from approximately 500 feet in either direction (ductile iron or other metallic pipe); **(2)** Noise loggers on service lines pick up the noise created by the water meter, which can mask a leak or cause a false alarm; and **(3)** A sensor on the service line will pick up all vibration sounds from inside the house (e.g., HVAC, appliances, etc.) causing additional false alarms.

A second reason why the Permalog is considered to be more accurate for distribution leak detection is the analysis of the actual leak noise data. The Permalog actually performs the leak analysis at the leak noise logger by communicating the leak status and leak "confidence number." By doing this, very little data has to be transmitted by the R900 MIU. This will provide the utility with immediate notification of leak status as well as improve meter reading time and efficiency due to the small amount of data transmitted.

In comparison, the leak noise logger located on a service line collects leak noise history over several days and transmits all of this data for collection and postanalysis back at the host computer in the utility office. This method has a couple of drawbacks: **(1)** A large amount of data on the MIU is transmitted and most mobile units cannot process it without a severe impact on meter reading efficiency (not to mention battery life implications); and **(2)** Leak status is not available until the analysis is performed at the host computer.

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