

Tracer For Determining Water Age and Retention Time in a Water Distribution System

OTT ID# 1175

TECHNOLOGY

Dr. James Waples has invented a new water tracing method which relies on the change in activity ratio over time of two radium isotopes with different half lives. If Ra-224 (half-life 3.64 days) and Ra-226 (half-life 1600 years) are measured at any node or tap in the distribution system and then measured again at a second node/tap downstream, the water age can be calculated. This new continuous tracer avoids all regulatory compliance and customer perception problems associated with currently used tracers. Waples' method could provide utilities with a more affordable and accurate way to quickly ascertain the range of water ages in their distribution systems.

Water age is typically defined as the time from when water is treated to when it reaches the customer. Retention time more specifically refers to the time of travel through a specific asset or segment of a water distribution system. Water distribution centers periodically test their systems to determine the length of time that water takes to reach the consumer after it has been treated. Problems associated with "water age" include disinfection byproduct (DBP) formation, nitrification, and microbial survival, all of which have adverse effects on human health, as well as pipe corrosion that can increase system costs. Current methods of determining water age depend on sending pulsed tracers (salts or dyes) through the distribution system and measuring tracer levels at various nodes in the system. The drawbacks to the current tracer systems include: only one measurement of water age per chemical pulse, frequent tracer usage can be potentially unhealthy, signal fade out if the tracer is over-diluted, and high cost and effort to staff testers at many nodes in the system.

INTELLECTUAL PROPERTY

This technology is available on an exclusive or non-exclusive basis

FEATURES/BENEFITS

- **Less Expensive** – Less staffing required; all equipment and supplies can be bought off the shelf for a low start-up cost (detector and supplies <\$6K)
- **More Versatile** – Can be used in systems testing ground water or surface water
- **More Accurate** – Minimal wall effects (where tracer binds to pipe walls skewing apparent age)
- **Flexible** – Can measure water age at any point during distribution and at any time

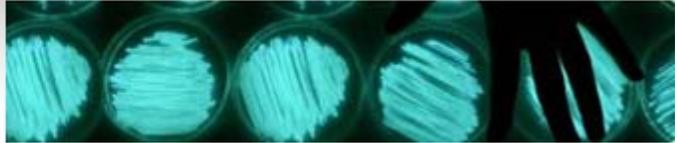
INVENTOR(S)

James Waples

James T. Waples has a Ph.D. in Biogeochemistry from the University of Wisconsin-Milwaukee. He currently holds the position of Shaw Associate Scientist at the Great Lakes WATER Institute and specializes in the application of naturally occurring radionuclides as tracers of processes in natural and artificial aquatic systems.



Technology Overview



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Please reference: OTT ID. 1175