

# TechBriefs

## Savannah River National Laboratory

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### At a glance

- > U.S. patent 7,802,470
- > Protected ultrasonic transducer
- > Top, side, bottom mount without signal loss
- > Penetrates metals or liquids
- > Audible alarm and LED indicators
- > Reduces or eliminates personnel exposure

### Contact Information

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## Self-Targeting Ultrasonic Liquid Level Probe

A researcher at the Savannah River Site has developed a device to address a unique application involving the precise filling of drums containing hazardous liquids. Unlike an aircoupled probe that measures headspace, this device transmits an ultrasonic beam capable of penetrating metals and liquids. The transducer is mounted outside of the pressure boundary and is therefore protected from the hazardous liquid.

### Background

An ultrasonic transducer is mounted on the “dry” side of a dual chamber well with the beam directed at a “target” located at the far end of the flooded or “wet” side. Internal spring loading maintains a constant level of pressure on the transducer and eliminates air gaps at the interface. When the wet side becomes fully flooded during filling operations, an ultrasonic wave is transmitted through the liquid where it reaches and is reflected by the target returning the wave back to the transducer. The

vented chamber allows for any air or gas to be readily displaced by the rising liquid. Once the desired liquid level has been reached, detection of the reflected wave generates a real time response on the test instrument where it can be readily observed with LED indicators and an audible alarm. In addition, an optional shielded plug has been developed to reduce or eliminate gamma radiation exposure to personnel.



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### Technology transfer

The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS).

With its wide spectrum and expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting edge technology delivers high dividends to its customers.

The management and operating contractor for SRS and SRNL is Savannah River Nuclear Solutions, LLC. SRNS is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

### Design features

The incorporated target reflector provides perpendicularity with respect to primary beam and minimizes travel to reduce attenuation. Use of the target as the primary reflector instead of the bottom of the tank or drum minimizes the signal dampening or attenuation effect of any sediment or sludge that may be present, and eliminates any alignment concern. This device can be mounted at the top or side of the drum or vessel, or from the bottom using signal loss as a level indicator.

### Partnering opportunities

SRNS invites interested companies with proven capabilities in this area of expertise to enter into a licensing agreement with SRNS to market this nuclear material detection system. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention.

Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.

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