AREA 6 – CANBERRA SOLUTION 1
ON-LINE WATER MONITORING SYSTEM FOR SR90 MONITORING

FORM 2
(to be reported to Committee on Countermeasures for Contaminated Water Treatment and to be disclosed to public)

Technology Information	
Area	**6 Understanding the groundwater flow** 6.1 Simple measuring techniques besides the boring system 6.2 Analyzing radioactivity material density (tritium and strontium) within a couple of hours **NOTE: Technology also applicable for Area 1, 2, 3, 4, and 5.3**
Title	On-Line Water monitoring system for Sr90 monitoring
Submitted by	CANBERRA

Overview of Technologies (features, specification, functions, owners, etc.)

Objective:

Continuously monitor groundwater quality by analyzing radioactivity material density (strontium) within a short amount of time.

Proposed Solution:

On-line water monitoring system that can detect low levels of Sr90 in rain-water flowing off of the concrete area surrounding the Tanks filled with water, where those tanks have high concentrations of Sr90. This solution is also applicable to measuring Sr90 radioactivity levels in water sampled from Logging wells.

Main specifications:

-Type: On line Monitor (Off-line also possible)

-Emitters: β

-Detector: Thin plastic scintillator (Canberra technology)

-Sensitivity: 30 Bq/kg of Sr90 within 20 minutes, and can detect higher levels much more quickly.

Description:

Group multiple tanks together and surround them with a low wall to force the rainwater to exit at a common location for that group of tanks. Install a sump at the exit to allow collection of a representative sample of the rainwater runoff from that group of tanks.

Install a Sr-90 beta monitoring station near each sump. If one of the water tanks in the group feeding this Sr90 monitor was leaking, the initial burst of rainwater would allow it to be detected. The Operator would then promptly know which group of tanks to further investigate. But the water with elevated Sr90 could then be diverted to a holding tank, and not released to the environment.

This instrument can also be adapted as an off-line sample measurement system. The sample of water [~2 liters] is brought to the counter and manually fed into the instrument.

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Owners: All of the key elements are manufactured by Canberra.

Note: More detailed description are available in Private appendix (Not to be disclosed to Public)

2. Notes (Please provide following information if possible.)

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Technology readiness level (including cases of application, not limited to nuclear industry, time line for application)

The critical element in the success of the radioactive water leak detection instrument is the radiation sensor. The sensor proposed is a plastic scintillator beta module from our Argos Total Body Contamination Monitoring system. Many hundreds of the sensors have been provided. The technical software is the same as in the standard Argos product, so no new technology to be developed. All of the key elements are manufactured by Canberra.

More information on the Argos technology available from the under link:
http://www.canberra.com/products/hp_radioprotection/pdf/Argos-PB-SS-C40004.pdf

Demonstrations could be made of the key elements of the system in as little as 90 days.

Challenges

There are no major technical challenges. Computer simulations have been performed and these were used to predict the performance. These simulations need to be validated with Traceable radioactive sources to document the accuracy of the calibrations.

We also need to understand the background doserate where the units will be placed and design the appropriate shielding.

Others (referential information on patent if any)

Patent pending on the beta/gamma discrimination.