

# Rapid Method for Low Level $^{90}\text{Sr}$ Determination in Seawater by Liquid Extraction Technique

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**Abstract**—Determination of low level  $^{90}\text{Sr}$  in seawater has been widely developed for the purpose of environmental monitoring and radiological research because  $^{90}\text{Sr}$  is one of the most hazardous radionuclides released from atmospheric during the testing of nuclear weapons, waste discharge from the generation nuclear energy and nuclear accident occurring at power plants. A l

iquid extraction technique using bis-2-ethylhexyl-phosphoric acid to separate and purify yttrium followed by Cherenkov counting using a liquid scintillation counter to determine  $^{90}\text{Y}$  in secular equilibrium to  $^{90}\text{Sr}$  was developed to monitor  $^{90}\text{Sr}$  in the Asia Pacific Ocean. The analytical performance was validated for the accuracy, precision, and trueness criteria. Sr-90 determination in seawater using various low concentrations in a range of 0.01 – 1 Bq/L of 30 liters spiked seawater samples and 0.5 liters of IAEA-RML-2015-01 proficiency test sample was performed for statistical evaluation. The results had a relative bias in the range from 3.41% to 12.28%, which is below accepted relative bias of  $\pm 25\%$  and passed the criteria confirming that our analytical approach for determination of low levels of  $^{90}\text{Sr}$  in seawater was acceptable. Moreover, the approach is economical, non-laborious and fast.

**Keywords**—Proficiency test, radiation monitoring, seawater, strontium determination.