



DETERMINATION OF FISSION RADIONUCLIDES SR-90 DAN PU-242 IN WATER SAMPLES

I. Rosianna, E. Nugraha, Y. Nurdin, A. Warsana

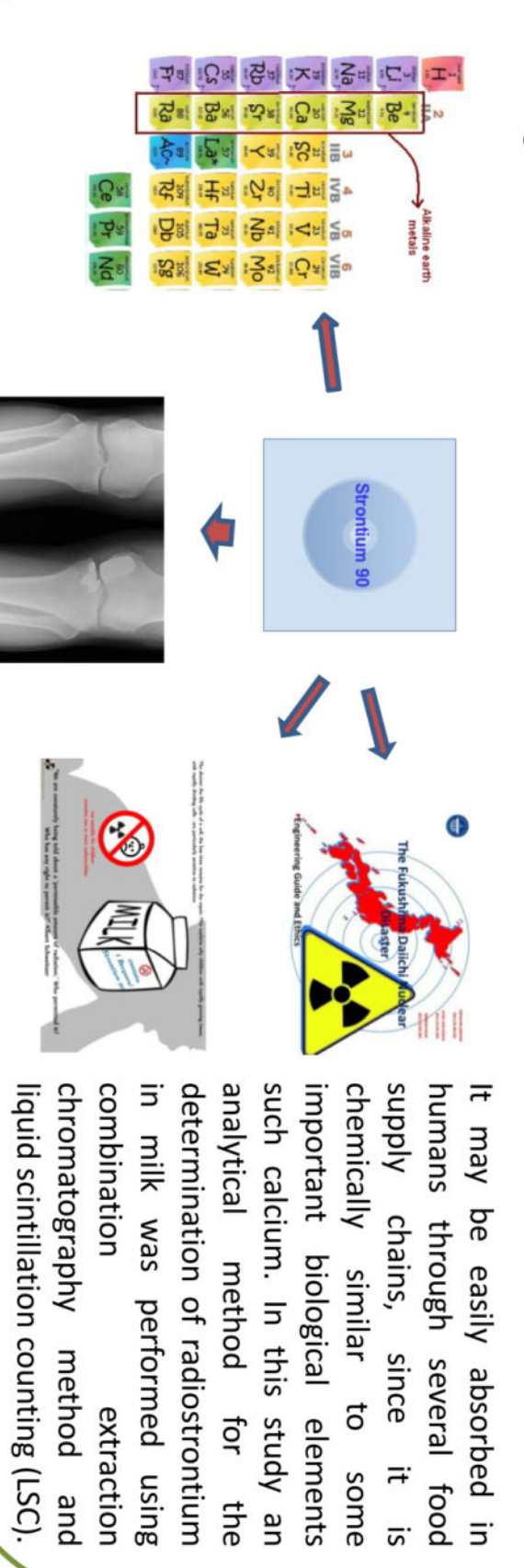
Geochemistry Departemen-National Nuclear Energy Agency of Indonesia (BATAN)

eka.dj:n@batan.go.id / iisa.r@batan.go.id

Radionuclides have been conducted to determine the fission products Sr-90 and Pu-242 in water samples. Radionuclides are very much in nature, one of which is -90 strontium (Sr-90) and Plutonium - 242 (Pu-242) which is a specific radionuclide fission product. Sr-90 and Pu-242 from environmental samples is determined using the method of chemical separation. There are three steps to determine Sr-90 in water samples are preparation, isolation of radionuclides and determination of radionuclides by using nuclear spectroscopy. For Sr-90 were analyzed by Liquid Scintillation Counter (LSC) and Pu-242 using Alpha Spectroscopy.

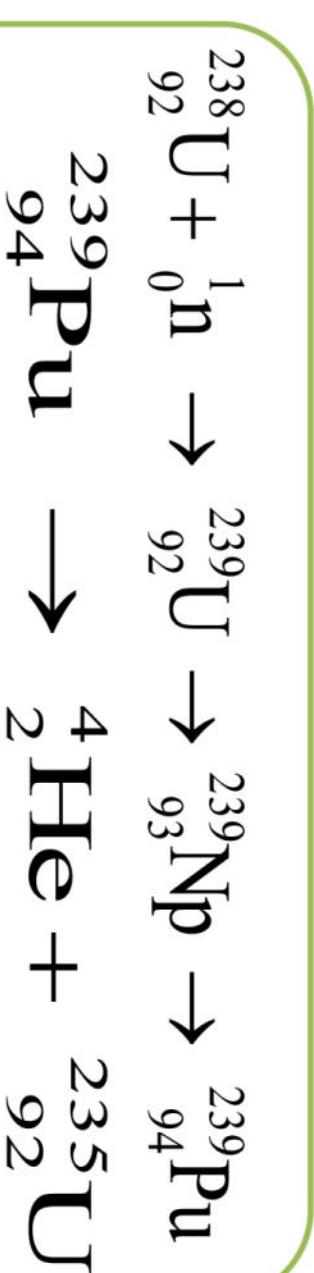
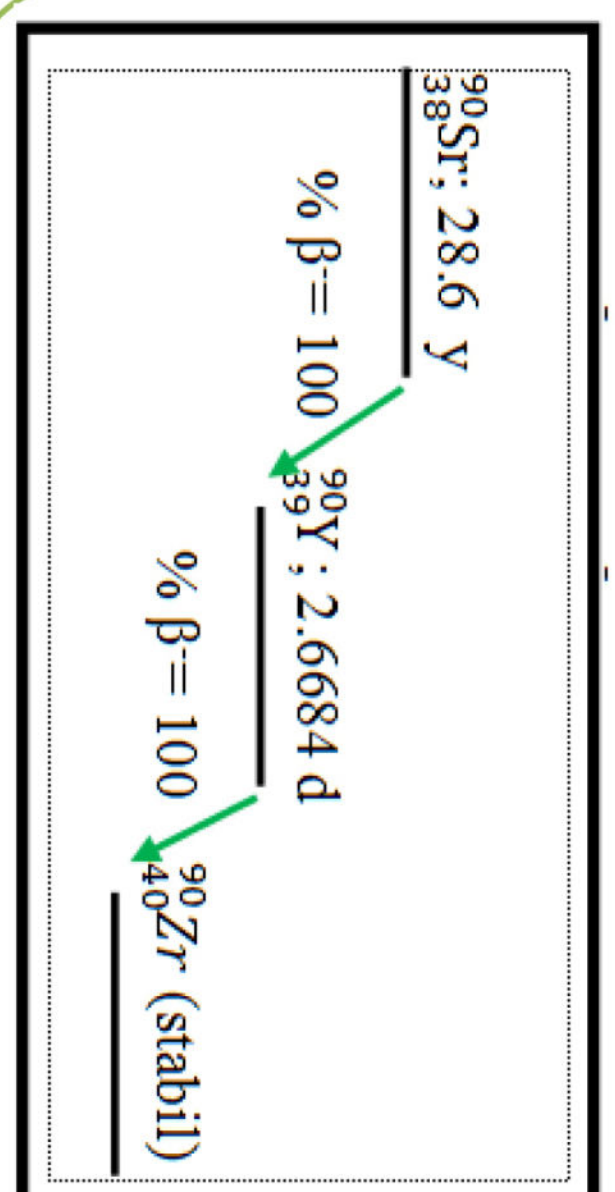
BACKGROUND

Radionuclides have been conducted to determine the fission products Sr-90 and Pu-242 in water samples. Radionuclides are very much in nature, one of which is -90 strontium (Sr-90) and Plutonium - 242 (Pu-242) which is a specific radionuclide fission product. Sr-90 and Pu-242 from environmental samples is determined using the method of chemical separation. There are three steps to determine Sr-90 in water samples are preparation, isolation of radionuclides and determination of radionuclides by using nuclear spectroscopy. For Sr-90 were analyzed by Liquid Scintillation Counter (LSC) and Pu-242 using Alpha Spectroscopy.



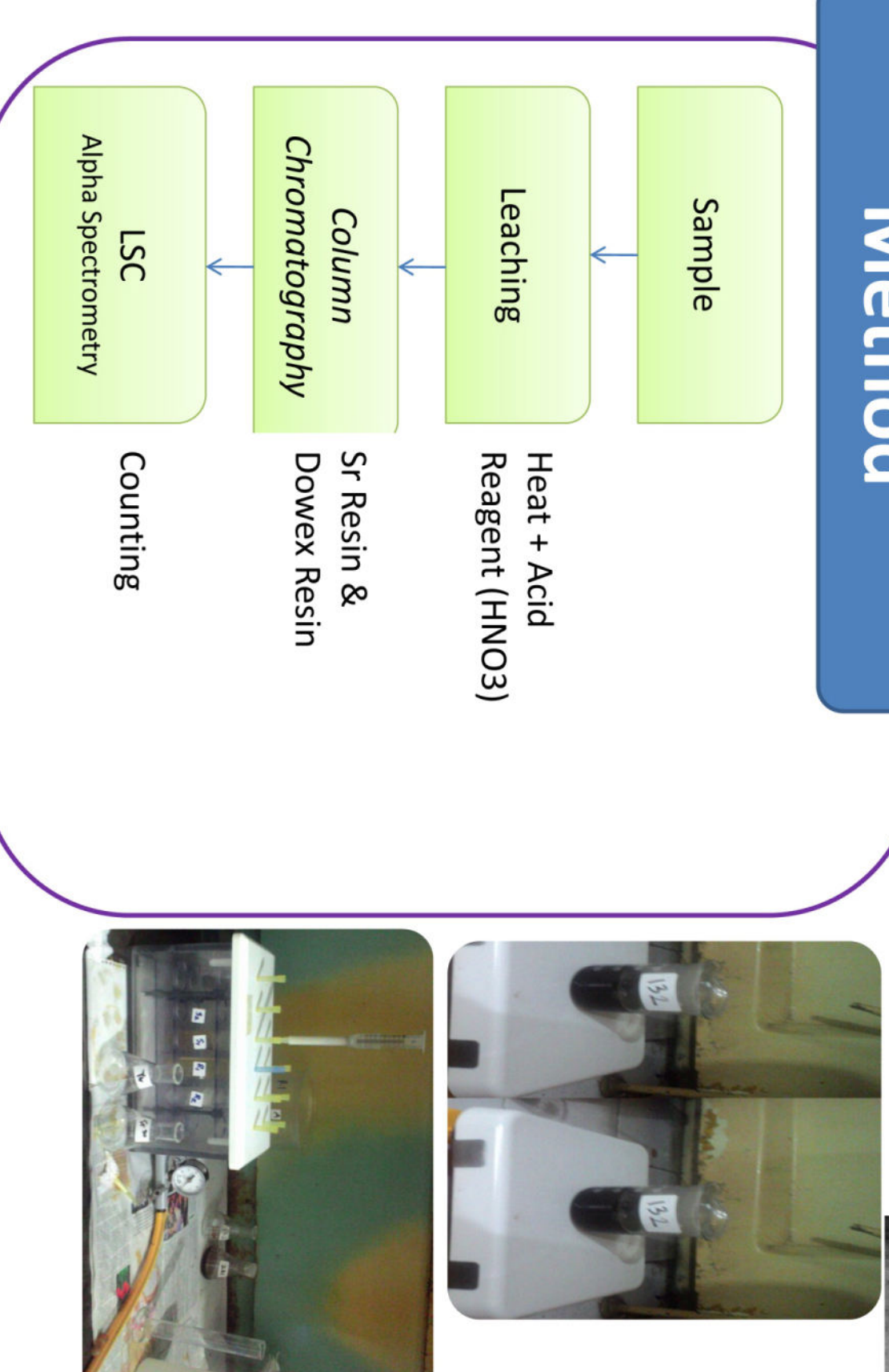
It may be easily absorbed in human body and it is highly energy released since it is chemically similar to some important biological elements such as calcium. In this study an analytical method for the determination of radionuclides in milk was performed using combination extraction chromatography method and liquid scintillation counting (LSC).

Strontium 90



Plutonium 242

Method

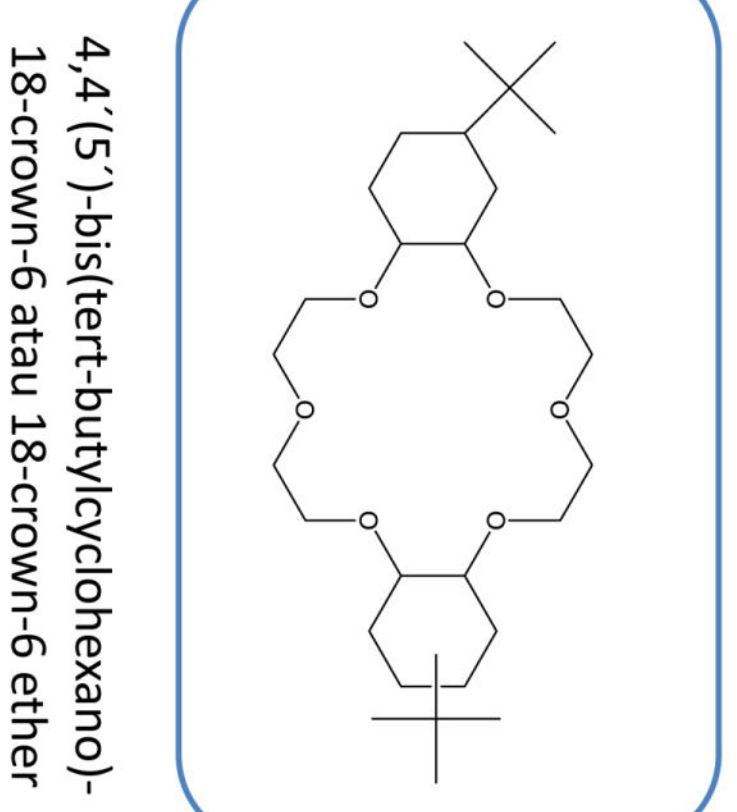
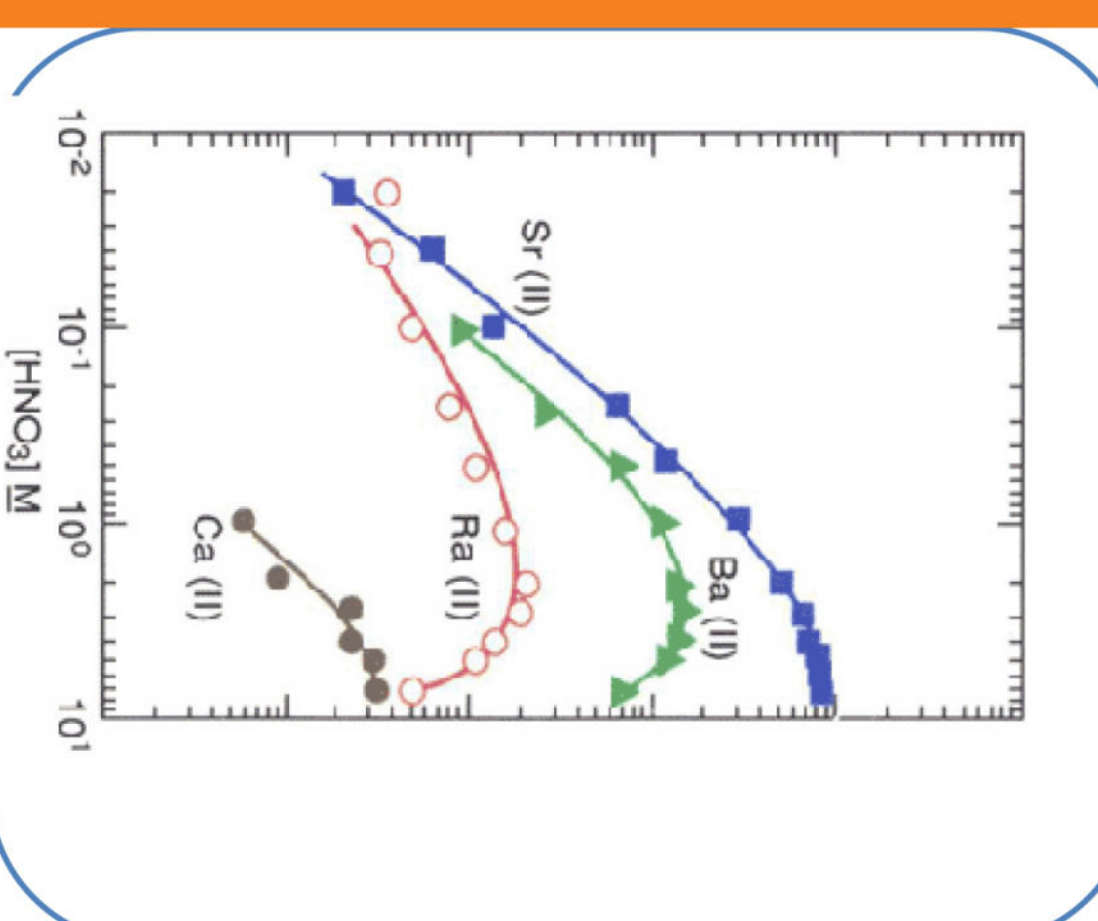


Equation

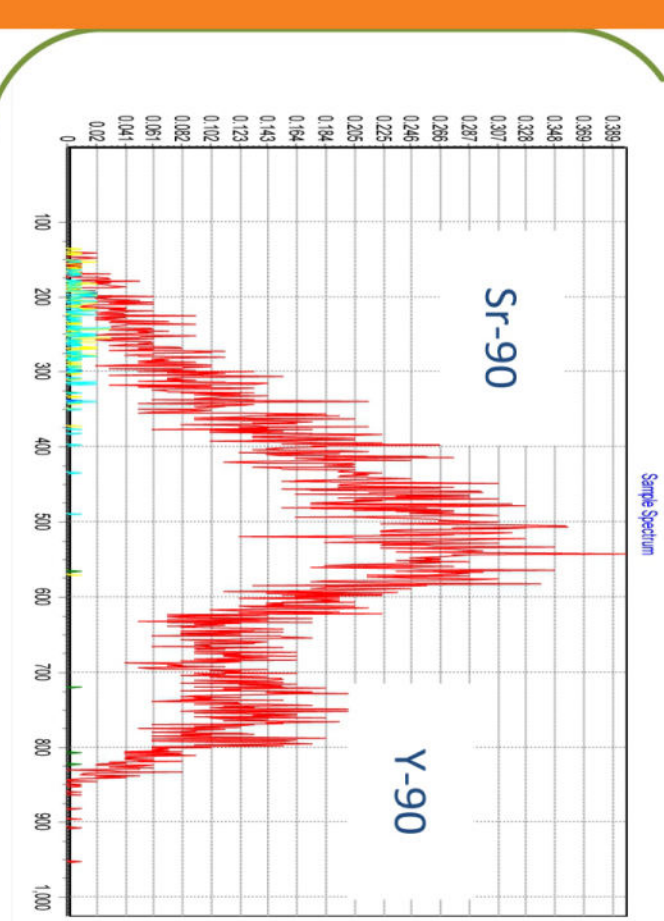
$$A_t = A_0 \cdot e^{-\frac{0.693}{T} \cdot t} \dots \dots \dots \text{Activity (1)}$$

$$MDC = \frac{4.66 \sqrt{\frac{A_0}{T \cdot D}}}{E \cdot x \cdot V} \dots \dots \dots \text{Minimum Detectable Concentration (2)}$$

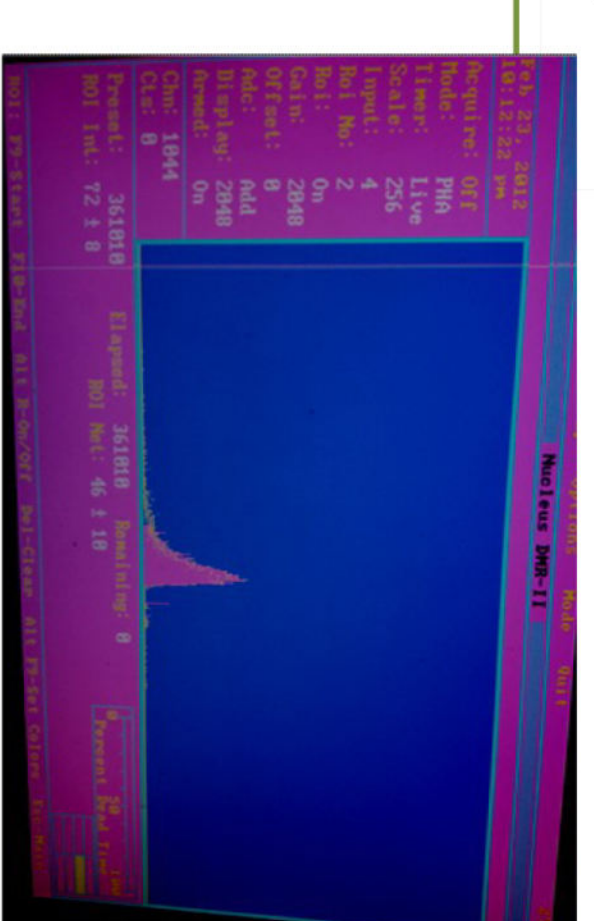
Resin Capabilities



Spectrum of Sr-90



Spectrum of Pu-242



SR-90 RESULT

Sample	Activity (Bq/Kg)	MDC (Bq/Kg)	chemical Rec (%)	MethodRe c (%)	efisiensi (%)	Limit max (Bq/L)	Limit max (Bq/Kg)
132	16,3951	47,11	17,49	82,96	58,08	75-125	96,15-
254	12,9708	0,0476	32,43	82,96	58,08	75-125	160,26
331/1	14,2150	0,0476	39,40	82,96	58,08	75-125	160,26
667/1	16,2899	0,0476	39,40	82,96	58,08	75-125	160,26
804	13,1390	0,0476	49,50	82,96	58,08	75-125	160,26

Pu-242 RESULT

Sample	Activity (Bq/Kg)	MDC (Bq/Kg)	chemical Rec (%)
1	0,042	19,28	41,51
2	0,001	2,36 x 10 ⁻⁸	21,31
3	0,005	35,63	33,55
4	0,003	33,55	33,55
5	0,002	33,55	33,55

CONCLUSION

Based on the above experiments it can be concluded that the determination of strontium - 90 and plutonium-242 can be done by using chemical methods and the results obtained from these measurements obtained results that are still below the allowable threshold.