

The Low-level Radioactivity Ocean Sediment Standard Reference Material

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Over the past decades, on the order of 10^{15} Becquerel nuclear waste have been stored in the oceans. Potential contamination of the oceans from leaking nuclear waste has caused world wide concern. Currently, early warning of ocean contamination near the waste dumping sites rely on monitoring systems being set up by different countries and agencies. Because the determination of low-level radioactivity in ocean sediment is a difficult technical task, a basis for measurement quality assurance, methods verification, and data comparability is needed. The recently certified NIST ocean sediment Standard Reference Material (SRM-4355) is a composite of 1 percent contaminated Irish Sea sediment and 99 percent of Chesapeake Bay sediment by weight. The sediments were blended, pulverized to a median particle size of 8 μm , and re-blended to achieve acceptable sample homogeneity. A statistical assessment of the intercomparison results from 19 laboratories has shown the material to be homogeneous down to 10 grams. The certified radionuclide concentration range from 0.4 to 230 mBq/g. A variety of radiochemical procedures and detection techniques have been used in the measurements to minimize possible systematic bias. Twelve radionuclides including ^{40}K , ^{90}Sr , ^{137}Cs , ^{226}Ra , ^{232}Th , ^{230}Th , ^{232}Th , ^{234}U , ^{235}U , ^{238}U , ^{238}Pu , and $^{(239+240)}\text{Pu}$ were certified. The mean values were reported for an additional 10 uncertified radionuclides: ^{129}I , ^{155}Eu , ^{210}Po , ^{210}Pb , ^{212}Pb , ^{214}Pb , ^{214}Bi , ^{228}Ra , ^{237}Np , and ^{241}Am . The standard reference material in unit quantities of about 100 gram each will be available by the end of 1995.