

IAEA Marine Environment Laboratory Monaco

AQCS activity in Radiometrics Laboratory

Radiometrics laboratory is within the framework of IAEA's analytical quality control services (AQCS) responsible for organisation of intercomparison exercises, proficiency tests and production of certified reference materials (CRMs) for radionuclides in the marine environment. During the year 2004 a certification of the Reference material IAEA-414 (The Irish and North Sea fish) has been completed, as well as an evaluation of the intercomparison exercise IAEA-385 (Irish Sea sediment). IAEA-418 (Mediterranean seawater) and IAEA-437 (Mediterranean mussel) have been sent to participating laboratories for analysis.

IAEA-414 - Irish and North Sea fish

The results of an intercomparison exercise on IAEA-414, designed for the determination of anthropogenic and natural radionuclides in fish sample have been published (Pham et al, 2004). The data received from 90 laboratories have been evaluated. Further to the intercomparison exercise, a certification procedure has been carried out during which new analyses were included using different analytical techniques. The certified and information values (medians) with confidence intervals for the set of radionuclides determined in the study have then been established. 4 radionuclides (^{137}Cs , ^{238}Pu , $^{239+240}\text{Pu}$, ^{241}Am) have been certified and information values have been established for another 8 radionuclides (^{40}K , ^{90}Sr , ^{210}Pb (^{210}Po), ^{226}Ra , ^{232}Th , ^{234}U , ^{235}U , ^{238}U). Radiometrics (alpha, beta and gamma spectrometry), as well as mass spectrometry techniques (ICPMS, TIMS and Accelerator Mass Spectrometry (AMS)) were used in the certification process. The CRM IAEA-414 is now available for laboratories (not for selling yet, need to write a paper on that).

IAEA-385 - Irish Sea sediment

The IAEA-385 sample was sent to 110 laboratories in 2002 as a part of regular intercomparison exercise organised in the framework of the AQCS programme for radionuclide in the marine environment. The data were received from 100 laboratories and after a preliminary evaluation the results were sent to the participants for their comments in 2003. The data were later re-evaluated including some more data sets received from 5 laboratories and a final report is under preparation. The certified values have been established for 8 radionuclides (^{40}K , ^{137}Cs , ^{226}Ra , ^{232}Th , ^{235}U , ^{238}U , ^{238}Pu , $^{239+240}\text{Pu}$). The information values have been established for 16 other radionuclides (^{90}Sr , ^{208}Tl , ^{210}Pb , ^{210}Po , ^{212}Bi , ^{212}Pb , ^{214}Bi , ^{214}Pb , ^{228}Ac , ^{228}Ra , ^{228}Th , ^{230}Th , ^{234}Th , ^{239}Pu , ^{240}Pu , ^{241}Am). Radiometrics (alpha, beta and gamma spectrometry), as well as mass spectrometry techniques (ICPMS, TIMS and AMS) were used in the certification process.

The member states requesting assistance in this exercise is around 20% of number of participants (i.e. more than 20 contacts were exchanged during that time).

IAEA-418 - Mediterranean Seawater

This intercomparison exercise is organised primarily for AMS laboratories to analyse ^{129}I in seawater samples. About 600 kg of seawater was collected at the Dyfamed station (43°25.117N; 07°50.040'E) in the Mediterranean Sea on 18th February 2001. The sample was filtered through a membrane filter with a pore size of 0.45 μm and homogenised using three-500 L containers by pumping water between the containers several times and bubbling air through the seawater for 8

hours in each container. 2 L samples were sent to 12 AMS laboratories in October 2001, the results are expected in April 2002. The extension is again accorded for 2003, but up to now we received only one result from Germany. Need to remind again participants.

IAEA-437 - Mediterranean Mussel

This intercomparison exercise is organised in the framework of the CIESM Mediterranean Mussel Watch Program. About 1080 kg of mussel were collected in Anse de Carteau, France in 2003. The shells were removed and the fresh soft parts (145kg) and internal fluids (505kg) were separated from the raw mussel. The sample was then reduced by freeze-drying to about 60 kg. After the successful homogeneity test for radionuclides, the sample was sent to the 32 participants at the end of 2004. The results are expected in June 2005.

Future exercises

IAEA-415 (North Atlantic fish), IAEA-410 (Bikini Atoll sediment), IAEA-412 (Pacific sediment), IAEA-438 (Baltic Sea fish) and IAEA-442 (North Sea fish) samples are in preparation.

References

Pham M.K., La Rosa J., Lee S.-H. and Povinec P.P. Report on the Worldwide Intercomparison Run IAEA-414. Radionuclides in Mixed Fish from Irish Sea and the North Sea, IAEA/AL/145, IAEA/MEL/73, IAEA, Monaco, 2004.