Document title	Information by Sweden about the Tvären project
Code	3-10
Category	INF
Agenda Item	3 – Scientific reports by the Contracting Parties and IAEA
Submission date	15.05.2019
Submitted by	Sweden
Reference	

Action

The Meeting is invited to take note of the attached information.

Sediment studies in Tvären

Mats Eriksson, Swedish Radiation Safety Authority

Introduction:

SSM has been studying discharges of radionuclides from the Studsvik facility into the marine environment, Projects name "Utsläppsstudier i Tvären och omkring liggande marina miljö". This paper gives a short summary of the progressing of the project. The project is linked to the SSMs surveillance since the inventory of several radionuclides are being investigated in Tvären and also the distribution patterns in and around Tvären. Detailed analysis of the sediment chronology also helps in verifying the discharges made over the time of operation.

Background:

The project has some more participants apart from SSM, e.g. it acts as part of an IAEA CRP-project (Study of Temporal Trends of Pollution in Selected Coastal Areas by the Application of Isotopic and Nuclear Tools).

Short description of the main parts of the project

i. The monthly discharge reports from the Studsvik facility from 1959-2016 has been revised.
ii. An analysis of the distribution of radionuclides has been made to gain an understanding of the discharge pattern in the early years
iii. An analysis of the inventory of gammaradiating radionuclides in Tvären has been made
iv. Radiometric dating of sediments to reconstruct the discharge history

Metoder:

i) γ-spectrometric analyses has been carried out in collaboration with Med Radiofysik, LiU. Another collaboration was initiated with DTU Nutech, Risø in order to speed up the time consuming analyses of γ. DTU Nutech, Risø has analysed two sediment cores.
ii) Four sampling campaigns has been made, one in 2018. 23 sediment cores has so far been collected. 11 sediment cores are fully analysed.
iv) Radiometric dating of the sediment was made by using $^{210}Pb/^{210}Po$ and has so far been conducted on two sediment cores. The sediment of Tvären is unique as the chronological history is well preserved, i.e. the sediments are not mixed and this results in a high level of time resolution in the dating of the sediments.

One part of the project has focused on development of methods for radiochemical separation for actinides $^{238,239,240}Pu$, ^{241}Am, $^{234,235,236,238}U$, ^{237}Np and $^{243,244}Cm$. In total, 70 sediment samples has been separated and are waiting to be analysed. More sediment cores has been selected and are being treated with radiochemical separation, this work will continue for approx. another 1,5 years.