EMRAS II
Working Group 1

Canada

Selection of a Critical Group

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CSA N288.1

- Canadian Standards Association (CSA) document N288.1: Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operations of nuclear facilities (2008)

- Uses the concept of a "representative person"

Representative Person

- An individual with characteristics that reflect those of the group that receives the highest doses from a particular source is known as the representative person for the radionuclide in question

- Derived release limits (DRL's) should be developed by considering a representative person with average rather than extreme characteristics within this most exposed group

- Based on the definition in ICRP 101

Identifying the Representative Person

- The representative person should be identified by performing DRL calculations for all potential persons. The representative person might not be the same for all radionuclides. It should be assumed that the representative person could be of any age. Separate DRL calculations should be performed for each age class and the smallest value should be taken as the DRL for that site and radionuclide

Bruce Power Station

- Marine power station in Canada

- Similar to Sizewell scenario

- Contacted to find out their method for selecting a critical group – should be applicable to our scenario

Old Method

- Used a simple, conservative method

- Chose a group with extreme habits – if they were protected, everyone should be protected

- Used 2 groups:
  - A nursing infant who drank milk from a cow located at the boundary fence
  - An adult who was a clam catcher, eats a lot of seafood and does all his work at the fence boundary

- Limited surveying required

New Method

- Based on the new version of N288.1, more realistic
  - Ex. Cow will be moved from 1.5km away to 45 km away – its actual distance

- Looking a several subgroups, based on real people, surveys

- These people will be divided into "groups", each group will be subject to a pathway analysis

- The group which receives the highest dose will be considered the "critical group"

Darlington New Build

- Additional reactors to be added to the Darlington power station in Ontario, Canada
  - Currently in the licensing phase, have completed an environmental assessment

- Considers 12 different human receptors located around the perimeter of the power station

- Each person is assumed to be exposed for 75 years to the maximum concentration possible while outdoors, 24 hours each day of the year

EMRAS II WG1, Scenario B

- Need to choose our own critical group

- In order to follow Canadian standards, we will need to model ~ 6 different persons living around the power station
  - Use different age groups
  - Use different dietary intakes
  - Use different exposure frequencies

- Person receiving the highest dose will become the critical group, or representative person