

## Summary of RFI questions – Hydrology in SR-Site and the translation to the TR-10-06 radionuclide transport model

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In the presentations at the meeting by Kłos & Wörman the following questions were identified:

- \* MIKE-SHE
  - \* MIKE-SHE results with SDM-Site, pre-modelling and regional model areas – are they the same as far as the “average object” is concerned?
  - \* How were the mass balance schemes to the six lake/mire objects at 5000 CE combined to give the “average object” fluxes?
  - \* Can SSM and consultants have access to the mass balance schemes for the six objects at the three times?
    - \* *Deeper access to flow fields in SICADA?*
  - \* What is the “normalising area”?
  - \* Does the input from the bedrock change on transition from aquatic to terrestrial conditions?
- \* Translating the “average object” into the dose model
  - \* When was the structure of the hydrological fluxes in the radionuclide transport model decided?
  - \* Can a rationale for the changes in structure be presented?
  - \* Can we see a detailed, step-by-step derivation of the numerical values for the six constant hydrological parameters?
  - \* Implementation in the dose modelling
  - \* Can we see the coding of the dose model as used?
    - \* Our interest is the translation to the “average object” to situations like those in Object 121\_03
  - \* Why was the “average object” approach used rather than using the output from MIKE-SHE for each of the basins?

During the meeting the discussion addressed these issues as summarised below. Where there are outstanding issues these are indicated and these will be the subjects of formal information requests sent via SSM.

This note serves as a quick summary of the status following the meeting and a more formal meeting protocol will follow, in addition to the requests for information.

# The Questions and how they were addressed in the meeting

Key

Green – resolved no further action

Orange – Will be included in forthcoming formal requests for information

Red – Not resolved (NB, nothing was left unresolved)

## From RK's presentation

- \* MIKE-SHE
  - \* MIKE-SHE results with SDM-Site, pre-modelling and regional model areas – are they the same as far as the “average object” is concerned?
    - \* *Answer 1 - No differences – ie independent basins – issue resolved*
  - \* How were the mass balance schemes to the six lake/mire objects at 5000 CE combined to give the “average object” fluxes?
    - \* *Two options for carrying out the averaging process (as reported by Mona Sassner). Details were not given However, with the data to be requested (below) the options for combining results from the six lakes can be investigated by SSM/consultants.*
  - \* Can SSM and consultants have access to the mass balance schemes for the six objects at the three times?
    - \* *Yes see below.*
    - \* *Deeper access to flow fields in SICADA?*
      - \* *These are not available in SICADA but the details in the following request will serve present purposes.*
    - \* *Can have the values for the six lakes at 5000 CE within a few days. Details for other times will require model re-runs and so will take longer.*
    - \* *Formal request will be made for the following information*
      - \* *For each of the six lakes used to define the “average object”*
        - \* *Areas of catchment, lake, mire, lake + mire*
        - \* *Fluxes between the MIKE-SHE compartments in BOTH mm year<sup>-1</sup> and m<sup>3</sup> year<sup>-1</sup>*
      - \* *This information to be provided for 5000 CE, 3000 CE and 2000 CE.*
  - \* What is the “normalising area”?
    - \* *A<sub>obj</sub> – the total area of the contaminated object: A<sub>obj</sub> = A<sub>ter</sub> + A<sub>aqu</sub>*
  - \* Does the input from the bedrock change on transition from aquatic to terrestrial conditions?
    - \* *This is discussed in R-10-02 - SSM/consultants will have a further look at this issue.*

- \* Translating the “average object” into the dose model
  - \* *Ulrik explained the genesis and thinking for the structure of the radionuclide transport model. Developed from SR-Can.*
  - \* *When was the structure of the hydrological fluxes in the radionuclide transport model decided?*
  - \* *Can a rationale for the changes in structure be presented?*
  - \* *MS water balance for one year but need to reparameterise for evolution*
- \* Can we see a detailed, step-by-step derivation of the numerical values for the six constant hydrological parameters?
  - \* *Fluxes in and out of the object are proportional to the sub catchment area – this is a clear and sensible modelling choice.*
  - \* *Rodolfo reported that the lateral fluxes are not included as a simplifying measure. Lateral fluxes less important because the transfers from mire to lake occur as the mire grows.*
  - \* *There is a document that we can see – developer’s log*
    - \* *This document was made available but RK forgot to make a copy. This therefore still needs to be resolved.*
    - \* *Rodolfo showed how to derive these parameters and will be requested to write down the *detailed derivation* for distribution.*
    - \* *The parameters are the normalising fluxes and the flooding coefficient are to be addressed. More detail is required than is found in the document discussed by Rodolfo at the meeting.*
- \* Implementation in the dose modelling
  - \* Can we see the coding of the dose model as used?
    - \* *Our interest is the translation to the “average object” to situations like those in Object 121\_03*
  - \* *Why was the “average object” approach used rather than using the output from MIKE-SHE for each of the basins?*
  - \* *Each of these issues is resolved.*

From AW’s presentation

- Representativity of the averaging over six lakes vs. assumed leakage scenarios
 

How can this averaging be representative to a scenario where radionuclides are leaking from the repository? *See above – dealt with in the RFI to Mona.*
- Representativity of the parameterization based on AD 5000 vs. the significant change in wet area over time
 

What does the current hydrological status mean for generalization to AD 5000 and other scenarios? *See above – dealt with in the RFI to Mona.*
- The definition of top boundary condition as driver of the flow
 

How important is the selected boundary condition for parameterizing Pandora?
 
  - AW to think about it a bit more.*