MODARIA II: WORKING GROUP 6
BIOSPHERE MODELLING FOR LONG-TERM SAFETY
ASSESSMENTS OF RADIOACTIVE WASTE DISPOSAL FACILITIES

IAEA review and enhancement of Biomass methodology
IAEA Biosphere Modelling Methodological Documents


BIOMASS Methodology enhancements

Assessment Context

Biosphere system identification and justification

Biosphere system descriptions
Human actions, wildlife

Potentially exposed group definition
human/wildlife

Biosphere and supporting model definition
Conceptual model, mathematical model & data

Calculation & communication

Climate development & downscaling

Geosphere (discharge area)

Near Surface investigation methods

landscape development

Principles for critical group selection

Protection of the environment

Confidence building
**WG6 Format**

### Sub-activities
- Analogue environments
- Confidence and uncertainties
- Specific real sites as examples
- Potential Exposure Groups
- Environmental change and effects
- Climate and landscape development
- Safety assessment lessons learnt

### Meetings and field studies
- Annual meeting Vienna
- Interim meetings
- BIOPROTA meetings
- Analogue environment studies

### BIOMASS methodology outline
- Assessment context
- Biosphere system identification and justification
- Biosphere system principal components
- Biosphere system classification
- Application to specific examples
- Procedure for biosphere system description
- Critical and other exposure groups
- Application of data/addressing uncertainties
- Biosphere model development

### Report writing
- Defined writers and editors
- Input from participants
- Review of scientific findings and results
Scope of activities includes:

- Deep geological disposal
- Near surface disposal
- All types of (solid) radioactive waste
- Wide range of geographical environments
- Taking account of on-going work in the parallel BIOPROTA project on review and enhancement of the BIOMASS-6 methodology
- Greater focus on the first few thousand years
Progress to date shows us that the task is to evaluate, update, clarify and as appropriate, extend the BIOMASS-6 methodology, and deliver a report that:

- Describes the biosphere assessment strategy and how it links to the overall safety assessment so as to support transparent evaluation against protection objectives
- Builds on the biosphere concept and describes the lessons learned since 2001, including from the BIOPROTA program
- Describes supporting information/system description models needed for dose modelling
- Extends consideration to a wider range of geographical environments
- Links landscape environmental change (MODARIA I) to dose modelling
- Assesses latest science that supports all the above, and
- Describes how site understanding functions as basis for model development
Interim report drafted by members of the BIOPROTA Technical support team and printed by SKB (SKB R-18-02)

To:
- Provide a framework for further discussions
- Provoke suggestions
- Show placeholders on work to be done
- Stimulate discussions
- Provide a basis for latest work in this area
Interim meeting in Helsinki, 16 - 18 May
Key points from interim meeting

- 33 participants from 24 organisations and 9 countries
  - Operators, regulators, technical support and academic organisations
- Potential exposure group questionnaire findings
- Biota dose assessment, including spatial scales
- Updated framework for modelling long-term future climate change
  - Example use of a cold analogue
  - Climate and landscape modelling in the long and short term
- Disposal facilities in arid landscapes
- Quantifying biosphere dose object characteristics and areas of interest
- Role of FEPS, the BIOMASS FEP list and associated guidance
- Knowledge quality assessment and updating the biomass data protocol
- Site-generic estuarine, coastal and marine biosphere example
- Near-surface disposal example within an eroding coastal context
- Model application and evaluation of results and uncertainties and
- Many thanks to Posiva and especially Lauri Parviainen for very kind hosting
Two Boat Lake catchment

Field guide for a safety assessment analyst

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This week:

• Presentations on international experiences and scientific/technical developments.
• Presentations and discussions on tasks identified within the WG.
• Inputs from and integration of BIOPROTA-programme
• Update work-plan with task allocation
The biosphere, an integral part of the entire system

Join WG6!