



BIOMASS NEWSLETTER

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BIOMASS: THE INTERNATIONAL ATOMIC ENERGY AGENCY PROGRAMME ON BIOSPHERE MODELLING AND ASSESSMENT

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This fifth Newsletter provides a summary of the main developments and progress in the BIOMASS programme since January 1998.

It is important to notice that, according to the decision made by the BIOMASS Co-ordinating Committee a new WG on Forest modelling has been established in this year.

With regard to the October 1998 BIOMASS plenary meeting, we have introduced some

changes in its format to allow participants to spend more time in the Working Groups.

At the end of this newsletter you can find a provisional *plenary meeting Agenda* and a *meeting registration form*.

We look forward to seeing you in Vienna in October 1998.

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**Please note in your diaries: BIOMASS 1998 Plenary Meeting
will be held in the week 5-9 October, at the IAEA in Vienna.**

1.- THEME 1: RADIOACTIVE WASTE DISPOSAL (REFERENCE BIOSPHERES)

**BIOMASS THEME 1 TASK GROUP 4
Meeting. Henley on Thames, 9-13 February
1998.**



Prior to the Theme 1 Plenary meeting, a TG4 meeting had been held in the UK in February. At that meeting, participants reviewed version 2.0 of the TG4 report and applied the TG4 approach to assist in the identification and justification of biosphere systems for example assessment contexts 1A and 1B, and 2A and 2B. Following the meeting, version 3.0 of the TG4 report was produced, along with a note describing the application of the approach to example assessment contexts 1A and 1B.

**BIOMASS THEME 1 Meeting. Vienna, 4, 8
May 1998**

A most successful meeting was held at the IAEA Headquarters in Vienna attended by 31 participants. Its purpose was to progress BIOMASS Theme 1 activities. Following an initial plenary session of 1.5 hours in which the progress to date and work plans for the week were presented by each Task Group Leader, the meeting was structured so that, at any given time, two task groups were meeting in parallel sessions. A 15 minute plenary was held each morning to allow Task Group Leaders to report back on the previous day's progress and a final 90 minute plenary was held to close the meeting. This structure allowed plenty of time for technical work which ensured that good technical progress was made and each Task Group achieved their meeting goals and identified future activities, as outlined below.

General Theme 1 Developments

WD1 on the Reference Biosphere Concept is now regarded as completed. It was agreed that the current version should have minor editorial corrections made and then be distributed for wider comment, eg to NEA/PAAG, ICRP and other groups within IAEA.

Priorities for development of Example Reference Biospheres were identified, based on discussion of the alternative assessment contexts produced within TG3. The work on Examples 1A and 1B has already begun in earnest, and a working meeting is planned for this summer, with the objective of producing a document for review by Theme 1 participants in advance of the October BIOMASS Plenary meeting.

Task Group 1 (Principles for the Definition of Critical and Other Exposure Groups

The Group reviewed Version 1.1 of its Task Group report. A revised structure was developed and many technical suggestions were discussed. It was decided to revise the title of the report to 'Guidance on the Definition of Exposed Groups for Solid Radioactive Waste'. Further comments on the Version 1.1 were requested by the end of May, especially updates of the review of national guidance on critical group and related issues. Version 2.0 is planned to be produced by the end of June.

The Group also applied its own guidance to the Example 1A and 1B assessment contexts, taking account of on-going input from TG4 and TG5. This was a definite positive step in the development of the Example Reference Biospheres.

Task Group 2 (Principles for the Application of Data to Assessment Models)

The participants revised Version 2.0 of the TG report from the comments previously received and from discussion at the meeting. A procedure for the derivation of data was developed from a draft which had been provided to everyone prior to the meeting. Participants agreed on the broad classification of data into three main types, namely Prescribed Data, Well Characterised Data, and Poorly Characterised Data. Future work will be to test the procedure firstly on three illustrative

examples from these broad categories of data, and then to apply it to the Example Reference Biosphere development.

Task Group 3 (Alternative Assessment Contexts)

Following the recent distribution within BIOMASS Theme 1 of the Task Group Report (BIOMASS Theme 1, WD2), the comments received were reviewed. These were seen as useful for future developments. It was agreed that the current WD2 should have minor editorial corrections made and then be distributed for wider comment, eg to NEA/PAAG, ICRP and other groups within IAEA.

Following feedback from discussion in other Task Groups, it was decided to revise the structure and some internal details of the set of example assessment contexts. These structural changes were designed to allow greater potential for the methodology to be exploited and demonstrated.

Task Group 4 (Identification and Justification of Biosphere Systems)

The participants reviewed version 3.0 of the Task Group draft report and a note describing the identification and justification of biosphere systems for Example 1A and 1B. Improvements to the documents' contents were discussed and agreed. A schedule of activities was agreed which will result in the finalisation of the Task Group 4 report as BIOMASS Theme 1 Working Document 3 by September 1998.

Task Group 5 (Description of Biosphere Systems)

The participants enhanced and agreed a generic structure to be used in the description of biosphere systems. It was agreed that the relationships between these components could be represented using an interaction matrix and this idea was tested for Example 1A. A schedule of activities was agreed which will result in the production of a revised report documenting the approach to be used to describe biosphere systems and further development of Example 1A before the end of July 1998.

Task Group 6 (Model Development)

The key work to be done within this TG relates to development of Example Reference Biospheres. Particular Tasks include conceptual model development, mathematical model development, process representation, data selection and making calculations. All this work is to be coordinated with inputs and on-going developments in ideas from the other TGs.

Comments, questions or information on any of the above Theme 1 activities should be addressed either to the Working Group Leaders or to the Scientific Secretary:

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2.- THEME 2: ENVIRONMENTAL RELEASES

The Dose Reconstruction and Remediation Assessment Working Groups of Theme 2 met 8-12 June in Veszprém, Hungary. Béla Kanyár of the University of Veszprém graciously organized and hosted the meetings, which were held at the Regional Branch of the Hungarian Academy of Sciences in Veszprém.



Dose Reconstruction Working Group meeting

The Dose Reconstruction Working Group discussed the draft final report for the Hanford Scenario and initial modelling approaches and results for the Iput River Scenario.

The Hanford Scenario describes a short-term accidental release of ^{131}I from the Purex separation plant at Hanford, Washington, in the U.S. Six participants delivered calculations for some or all endpoints, in addition to calculations performed by the scenario author and colleagues at Hanford as part of the Hanford Environmental Dose Reconstruction Project. This scenario provided an opportunity to test models for atmospheric dispersion, as well as terrestrial food-chain transport. The draft final report contains descriptions of each participant's modelling approach, in addition to comparisons of the modelling results and (where available) environmental measurements. The Working Group plans to issue the report as an IAEA Working Document by the October 1998 Plenary Meeting; eventually it will be combined with a similar report for the Iput River Scenario for publication as an IAEA TECDOC.

The Iput River Scenario describes the contamination by Chernobyl fallout of a catchment basin in the Bryansk Region of Russia. The test exercise involves the assessment of concentrations of ^{137}Cs in various agricultural and natural food products in the rural area of the Novozybkov district, the most contaminated area of the catchment basin, as well as assessment of human whole body concentrations and average internal and external doses for residents of the district. The Iput River Scenario differs significantly from the Central Bohemia and southern Finland scenarios of the VAMP programme in that it considers the countermeasures that were implemented in the

region and also allows for assessment of river and fish contamination.

Discussion of the Iput River Scenario at the Working Group meeting centered on initial modelling approaches and results. Calculations so far have been primarily for the terrestrial food-chain pathways, without consideration yet of the implementation of countermeasures. Consequently, one topic of great discussion was how best to model the impact of implementation of the countermeasures. Additional information on watershed and river water contamination was presented at the meeting and will be distributed to participants in the working group.

The Working Group recognises that the Iput River Scenario is complex and includes a large number of endpoints. Therefore, the test data (measurements) will not be disclosed until one of the 1999 meetings, to allow enough time for participants to perform and review their calculations. Modellers who have a primary interest in aquatic modelling or terrestrial food-chain modelling are encouraged to submit predictions for those endpoints of interest, without feeling obligated to do all endpoints. At the October meeting, the Working Group plans to discuss approaches and results for the aquatic modelling and the effects of countermeasures on the terrestrial endpoints, as well as continued discussion of the terrestrial pathways. Participants should submit preliminary calculations to Kirsti-Liisa Sjoebloom and Kathy Thiessen by 15 September.

For more information please contact the Working Group Leader ,

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Or the scientific secretary of Theme 2:

Remediation Assessment Working Group meeting

In the Remediation Assessment Working Group the Olen case is considered. The case deals with the remediation of an area of approximately 100 ha which has been contaminated by ^{226}Ra as a result of radium extraction activities in St. Jozef, Olen, Belgium. There are two scenarios. In the Olen scenario Type A, the influence of deep ploughing on the radium contamination of cow milk in 1971 - 1972 has been assessed. Five modellers have submitted results and an evaluation of their model predictions by comparison with measured data was made. The first draft report of the Olen scenario A was discussed at the Veszprém meeting and some changes will be made. The new draft report will be sent to the participants by 15 September for comments and will be discussed at the next Working Group meeting to be held in connection with the BIOMASS Plenary Meeting in October.

The objective of scenario Type B is to assess the effectiveness of potentially feasible remedial actions and to compare the modelling results related to these actions. Two different remedial actions have been chosen for consideration. The first option is the removal of surface soil down to 1 m in the most contaminated areas, the second one is capping the contaminated area with a layer of clean soil. At the Veszprém meeting, deficiencies in the description of the Olen scenario Type B were discussed and preliminary results of two modellers were briefly presented. The amended version of the scenario description will be sent to the participants by 15 August. The deadline for submitting preliminary results is 20 September. Results and possible questions concerning the new description will be discussed at the next Working Group meeting in Vienna.

It is still possible to join the modelling of Olen scenario Type B. If you are interested, please contact either the Scientific Secretary or Working Group Leaders.

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3.- THEME 3: BIOSPHERE PROCESSES

Tritium Working Group, WGL Yves Belot (Consultant)

The OECD International Energy Agency (IEA) "Workshop on Tritium Safety and its Environmental Effects" 11-12 May 1998 and the IAEA CRP "BIOMASS Theme 3 Tritium Working Group (TWG) Meeting," 13-15 May 1998, were held jointly in Deep River, Canada to exchange recent technical information on tritium behaviour and safety issues. The objectives of the TWG meeting were to compare model inter-comparison results based on current scenarios and to discuss the development of new scenarios based on previously collated field data. There were also discussions about what kind of experimental studies would be needed to establish some model parameter values in order to reduce the uncertainties associated with modelling tritium transport in the environment.

A total of 42 participants from 26 institutions and 10 different countries attended the joint IEA and IAEA meeting from 11-12 May. Members of both groups presented papers on new theoretical and experimental findings in tritium radioecology, radiobiology, dosimetry, and dose assessment. The priority research areas were discussed and although

agreement was not reached on the ranking of the different topics during the meeting, a previous questionnaire may be revised and distributed in order to obtain further views and information. Generally, the IEA group is more concerned with the broader area of tritium safety connected to fusion technology, whereas the IAEA TWG deals mainly with improving models of tritium transfer in the environment for dose assessment connected to nuclear fuel cycle activities. The joint meeting proved to be very useful in the exchange of information on recent studies and current issues related to tritium safety and the meeting could also result in new active participants in the IAEA TWG activities.

A total 24 participants from 10 different countries attended in the IAEA TWG meeting from 13-15 May, where ten sets of calculation results for long-term atmospheric release scenario (Scenario 1.2), and six sets of results for long-term releases of tritium to the aquatic environment (Scenario 2.1) were presented. Discussions on Scenario 1.2 concentrated on the importance of wet versus dry deposition and consequent effects on re-emission, fluxes to the water table and the development of aquifer profiles of tritium concentration. A number of modifications of the scenario description were agreed in order to develop Scenario 1.3. Although a simple Scenario 2.1 had been described, it was not possible to fully understand the relative importance and consequences of different processes which had been included in the models. Some modifications to the scenario description were agreed upon in order to develop Scenario 2.2.

The possibility of developing new scenarios was discussed. Currently three new scenarios are in different stages of planning. All three are based on field data and hence they will be extremely useful for model testing exercises. They are based on data from field sampling at the AECL Chalk River site, Canada, which deals with long-term atmospheric releases; at the RFNC-VNIIEF, Russia, which deals with an atmospheric release; and at the Savannah River site (SRS), USA, which deals with an aquatic source term. Plans for field and laboratory experiments in France designed to obtain model validation data for Scenarios 1.3 and 2.2 were presented and discussed.

The TWG future work programme and time schedule were agreed: Scenario 1.3 description for

model inter-comparison will be distributed by 15 June 1998 and participants are requested to send their results to the Secretariat by 21 August 1998. A working document on Scenario 1 should be finalised by the end of December 1998. Scenario description 2.2 will be distributed by 15 June and participants are requested to send their results by 21 August 1998. A working document on Scenario 2 should be completed by December 1999. A scenario description based on AECL data will be sent by 15 June and participants are requested to send their results by 21 August 1998. A draft scenario description based on RFNC data will be circulated for comments by 30 September and distributed for calculations by 31 December 1998. Progresses on a scenario based on SRS data and on collating experimental data in support of Scenario 1.3 and 2.2 will be reported at the October 1998 plenary meeting.

A document on "Summary and Actions from BIOMASS Theme 3, Tritium Working Group Meeting, Deep River, Canada, 13-15 May 1998" is available from Yoshikazu Inoue (IAEA Scientific Secretary) or the Technical Secretariat (QuantiSci) upon request.

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Fruits Working Group, WGL Franca Carini
(University Cattolica del Sacro Cuore)

Introduction

The scope of the Fruits Working Group is to improve understanding of the uptake and transfer of radionuclides, both anthropogenic and natural, to fruit. The aim is to reduce the uncertainties associated with modelling the transfer of radionuclides to fruit and thereby to improve the robustness of the models that are used for radiological assessment and to increase the confidence with which they are applied.

Since the inaugural meeting of the Fruits Working Group in Vienna (October 1997), held within the framework of the IAEA BIOMASS annual plenary meeting, the following progress was made:

- a review on the transfer of radionuclides to fruit has been drafted;
- the questionnaire prepared during the meeting was circulated among people who declared their interest in the activities of the group; and
- responses to the questionnaire were forwarded to people responsible for review subjects, to allow them to extract relevant information for the review.

The second meeting of the Fruits Working Group was held at the Management School of Imperial College in London, 15-18 April 1998. The meeting was sponsored by the Ministry of Agriculture, Fisheries and Food (MAFF) and the Environment Agency of England and Wales. The following progress was made at the meeting:

Experimental results. New experimental results were presented by V. Skarlou on soil to plant transfer factors in Mediterranean crops.

The questionnaire. An analysis of the responses to the questionnaire was presented by N. Mitchell. It was decided that additional information should be collected by sending a list of targeted questions to those people who answered the first questionnaire.

The review. The different topics of the review as listed below were presented. Needs and priorities for additional experimental work were discussed.

- The role of fruit in the diet (M. Fulker)
- Changes in the phenological development of shoots and roots of fruit bearing species as determinants of the potential for the uptake of

- radioactive contaminants (C. Atkinson)
- Significant nuclides and speciation (I. Fairlie)
- Contamination of fruit crops via the aerial pathway (R. Kinnersley)
- Transfer of deposited radionuclides from the above-ground plant parts to fruits (F. Carini)
- Transfer of radioactivity from soil to fruits (F. Carini)
- Storage and processing (N. Green)
- Models and data requirements (N. Mitchell)

The review chapters listed above will be collated and edited into one document. The draft review will be completed in September for the final discussion during the next meeting (October 1998).

Model intercomparisons. A scenario for the model intercomparison study was discussed and established. The scenario is based on the following:

Radionuclides:	^{137}Cs and ^{90}Sr (both as sub-micron diameter particulates)
	^{129}I as methyl iodide (vapour)
	^{35}S as COS
Source term:	Continuous atmospheric release
Fruit:	Strawberries, blackcurrant and apples
Soil type:	Temperate loam

Persons interested in participating in the model intercomparison study can request a detailed scenario description.

Model validation. Datasets for model validation were discussed and a form for collecting data was proposed. The form will be circulated to people who offered datasets through the questionnaire. Collected information will be useful to propose scenarios for model validation at the October 1998 meeting.

UIR database. The structure of the UIR Radflux database was presented. Data on fruits are requested. People that want to contribute to the fruit database can request the proforma and associated helpfile for submitting data to the dedicated database address: radflux@mouchel.com or directly to the Radflux Database chairman N. Mitchell.

Fruits group conceptual model. A proposal was made to develop a general conceptual model for fruits. Background information will be circulated to the active group members to draft a proposal to be discussed during the October 1998 meeting.

Next meeting

Next meeting will be held 5-9 October 1998 at the IAEA, Vienna, within the framework of the BIOMASS annual plenary meeting. The purpose of the meeting will be to:

- discuss the final draft of the review;
- present and discuss the results of the model intercomparison study;
- discuss new ongoing or starting experimental activities for collection of data useful for validation;
- discuss the datasets for model validation;
- formalise scenario and work programme for validation;
- discuss the fruits group conceptual model.

Enquiries about the BIOMASS Theme 3 Fruits Working Group can be addressed to either the Scientific Secretariat (IAEA) or the Technical Secretariat (QuantiSci) at the following addresses:

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Forest Working Group, WGL George Shaw (Imperial College, Ascot)

A planning meeting for this new WG within the BIOMASS programme was held in Vienna on 26-27 March 1998.

The participants agreed about potential interest in the Forest Working Group (Forest WG) and supported the nomination of George Shaw as Group Leader. To avoid duplication with other programmes also addressing the behaviour of radionuclides in forest ecosystems, and because of the relatively short time available, it was proposed that the Forest WG should focus on model testing against data sets, and not on radioecology. It is therefore important that participants from other forest programmes such as SEMINAT and LANDSCAPE also participate in the BIOMASS Forest WG.

There was some agreement regarding the lack of good data sets, including multi-compartment time series data for dynamic model testing. Some of these time series are extended experimentally in the LANDSCAPE Programme. The SEMINAT Programme has embarked on a 3 to 4 year field measurement programme, though results are still being obtained and will not be available before the Summer of 1999.

The participants agreed that there was a need to keep the models simple, but at the same time the forest should be approached as a multi-compartment system with the compartments represented at different levels of complexity, depending on the relevance of the compartment to radiological protection issues.

Objectives of the Forest Working Group

Preamble

The approach of the Working Group is to test our understanding of models, where possible using existing data, and not to generate more data.

The source terms of interest are:

- Atmospheric, both acute (e.g. accidents) and chronic (e.g. reprocessing plant operation).
- Surface and subsurface (e.g. contaminated land and waste disposal).

Although acute source terms are of interest, it is the longer term effects of those source terms which are of interest to the Forest WG.

Specific issues to be addressed will be determined on the basis of assessment needs.

From a radiological protection perspective, ¹³⁷Cs is currently the most important radionuclide for which data are available; other radionuclides, such

as ^{14}C , ^{36}Cl , ^{99}Tc , ^{90}Sr , ^{129}I and plutonium isotopes are also of potential interest, depending on the source term.

The focus will be on modelling behaviour of radionuclides in forests so as to improve confidence in prediction of concentrations in media relevant to important radiological exposure pathways.

Dose calculations will not be addressed, as methods for calculating doses from concentrations already exist.

Countermeasures will not be addressed as the options are not so well evaluated or obvious.

Objective

The general objective of the BIOMASS Forest WG is to improve the capability to assess the radiological impact of forest radioactive contamination. The specific objective is to enhance our ability to model the migration and accumulation of radionuclides in forest ecosystems, thereby supporting appropriate long term management strategies to be developed for contaminated forests, whatever the mechanism by which the contamination arises. This will be achieved by providing a forum for international model testing using:

1. model-model inter-comparisons;
2. model-data inter-comparisons.

Tasks

1. Model inter-comparison studies based on theoretical scenarios. The descriptions of the forests will be based on real forest systems; the source terms and quantitative assessment endpoints will be chosen to take account of assessments needs. The comparison exercises will allow participants to identify what processes different modelling groups regard as important in particular circumstances.
2. Test models against reliable data sets for source terms and subsequent concentrations in relevant forest media to improve confidence that the models adequately represent processes in forest ecosystems.
3. The exercises in 1 and 2 will necessarily be focused on specific issues. However, the results should have wider implications for forest modelling, e.g. for other forest systems, other radionuclides, and other source terms. A third

task is therefore anticipated, to make recommendations on modelling of radionuclide behaviour in forests in terms of important radionuclide specific pathways and processes. This should allow development of a list of Features, Events and Processes (FEPs) for forests.

Scenarios for Model Testing

The final report of the Forest WG will be due in October 2000, when the IAEA BIOMASS Programme finishes. The schedule of tasks therefore has to be limited to a little over 2 years. It has to include:

- scenario development;
- time for performing the calculations;
- review of results; and
- documentation.

A scenario has been developed and is being used in the LANDSCAPE Project; it was decided that the Forest WG should develop different scenarios. In setting a scenario, decisions must be made regarding the forest ecosystem (coniferous, deciduous, etc.), the source of contamination (acute, chronic, atmosphere, groundwater), the radionuclides and the time scales of interest.

Forest system

Although most work has been carried out on boreal/coniferous forests, there are still many unresolved issues. It was decided that the Forest WG would again concentrate on coniferous forests, although there is an awareness that deciduous and tropical forests are also potentially important.

Source(s) of contamination

There is an interest in the long term effects of forest contamination resulting from fall out. For example, decisions have to be made on use of forest products after accidental releases to the atmosphere. There is also an interest in releases from underground sources. For instance, many waste repositories in the USA are situated in forests, or have had tree cover established over them following repository closure. Planting of fast growing trees such as willows is also being considered as a remedial measure to remove radionuclides and metallic contaminants from contaminated soil. The Forest WG can therefore apply itself to testing models of how radionuclides

migrate and accumulate within forest systems with results also being relevant to BIOMASS Theme 1 and Theme 2.

Forest fires and contaminated groundwater source terms were excluded at this stage.

Radionuclides of interest

Availability of data will affect the radionuclides that can be modelled. Some data sources were identified by participants. A suggestion that existing data sets be examined and missing data be identified, i.e. a review of data sets was considered and rejected since the group felt that there is not sufficient time to do that. The Forest WG should concentrate on model testing and not on data evaluation/data base development.

The BIOMASS Programme addresses radiological issues associated with accidental and routine releases of radionuclides to the environment, and solid waste management. In terms of accidental releases, ^{137}Cs would be of radiological interest, and therefore there is sufficient justification for the Forest WG to focus on ^{137}Cs . However, in terms of routine releases and solid waste management, other isotopes such as ^{90}Sr and ^{129}I are also of interest.

Model-model intercomparison scenario

This is the initial activity in the programme of the Forest WG. The Forest WG secretariat, with the assistance of various Forest WG participants, has developed a hypothetical scenario for model-model testing from various real forest data sets. The scenario is based on a spike release of ^{137}Cs to a coniferous forest.

Results should be reported for

- bole wood,
- total wood (i.e. trunk plus branches),
- needles (correlation, time dependence),
- other parts of tree, especially bark,
- soil profile, including litter,
- animals (moose),
- vegetation (mushrooms, and berries).

Each of these could be considered:

- as a function of time,
- with uncertainty estimates.

The preliminary results of the exercise were discussed at the meeting of the Forest WG that was

held in co-operation with the NATO Forest Workshop in Kiev (June 24-28). The scenario will be modified on the basis of the comments received at the meeting. The second round of results has to be submitted by 15 September 1998, therefore it is still possible to join the study. A copy of the scenario can be obtained from the Scientific Secretariat (Ferruccio Gera, IAEA), or from the Technical Secretariat (A Venter, QuantiSci).

Meeting in Kiev

The organisers of the NATO Forest Workshop that was held in Kiev (24-28 June) kindly allocated a session to the BIOMASS Forest WG for discussion of the preliminary model-model intercomparison results. There was a further opportunity to inform participants about the BIOMASS Forest WG during the session on *International Initiatives in Forest Radioecology*. In the absence of the Working Group Leader, George Shaw, the Technical Secretary, A Venter (QuantiSci) gave a short presentation and distributed the document on the Scope, Objectives and Work Programme of the BIOMASS Forest WG. Several persons expressed interest in BIOMASS in general, and in the Forest WG in particular. Four groups offered their data sets for the model-data intercomparison study. Enquiries about the BIOMASS Forest Programme should be directed to the Technical Secretariat at the following address:

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4. OTHER INFORMATION

BIOMASS 1998 Plenary Meeting Agenda.

Vienna, 5 - 9 October 1998

Monday: **Opening Session (1/2h)**
 Theme 1 (TG specific, 2 rooms)
 Theme 2, Remediation Assessment WG
 Theme 3 Fruits WG

Tuesday: Theme 1 (TG specific, 2 rooms)
 Theme 2 Remediation Assessment WG
 Theme3 Fruits WG

Wednesday am: Theme 1 (plenary, 1 large room)
 Theme 2 Dose Reconstruction
 Theme 3 Fruits WG and Tritium WG

Wednesday pm: **Plenary presentations of Theme activities** followed by
 Wine and Cheese Party

Thursday: Theme 1 (plenary, 1 large room),
 Theme 2 Dose Reconstruction WG,
 Theme 3 Forest WG and Tritium WG
Coordinating Committee Meeting

Friday: Theme 1 (plenary, 1 large room),
 Theme 2 , Dose Reconstruction WG
 Theme 3 Forest WG and Tritium WG

REGISTRATION FORM FOR THE THIRD BIOMASS PLENARY MEETING
IAEA HEADQUARTERS, VIENNA, 5-9 OCTOBER, 1998
IAEA CO-ORDINATED RESEARCH PROGRAMME ON BIOSPHERE MODELLING
AND ASSESSMENT METHODS (**BIOMASS**)

Please fill in this form and send it to the IAEA Secretariat (details given below) as soon as possible (please no later than 15 September, 1998):

YES, I will attend the meeting.....	<input type="checkbox"/>
I intend to participate in:	
THEME 1	<input type="checkbox"/>
THEME 2	
Dose Reconstruction WG	<input type="checkbox"/>
Remediation WG	<input type="checkbox"/>
THEME 3	
Tritium Modelling WG	<input type="checkbox"/>
Fruit Modelling WG	<input type="checkbox"/>
Forest Modelling WG	<input type="checkbox"/>

My personal data and address are:

Name:
Organisation:
Address:
Telephone:
Fax:
E-mail:

Ms. Claire Halsall
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International Atomic Energy Agency
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