

## NATIONAL DOSE ASSESSMENT WORKING GROUP

### PAPER 13-08: HABITS DATA FOR PROSPECTIVE ASSESSMENTS: REPORT ON PROGRESS

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## 1. Introduction

The Habits Subgroup is now actively working on its second paper relating to prospective assessments. A revised outline of the paper was developed in October 2007 and members of the Subgroup provided substantial inputs in late January and early February 2008. The Chairman then collated these contributions and developed an incomplete draft of the second paper, which was discussed at a meeting of the Subgroup on 7 March 2008. At that meeting, suggestions were made for enhancing the content of the sections of the paper that had already been drafted, the various options for using generic and site-specific data in prospective assessments were identified, the strengths and weaknesses of these options were evaluated, and a quantitative weighting scheme was used to evaluate the preferred options.

The incomplete draft paper discussed at the 7 March 2008 meeting comprised approximately 28 pages of text. With expansion of some parts, and addition of material on options identification, evaluation and ranking, it is estimated that the final paper to be presented to the NDAWG will be approximately 40 pages. It had been intended that a complete draft of the paper should have been presented to the NDAWG at the April 2008 meeting. However, the amount of material to be included and the need to ensure that the recommendations being made are fully justified has meant that completion of the paper has been slightly delayed. Nevertheless, almost all the information needed to complete the paper is now available and there should be no problem in providing a draft final version to the NDAWG for review at its autumn 2008 meeting.

## 2 Terms of Reference of the Subgroup

The Terms of Reference of the Habits Subgroup were revised following completion of its first paper. The revised Terms of Reference reflect the change in emphasis of the work of the group, with a new focus on prospective assessments. These updated Terms of Reference state that the aim of the Subgroup is to consider the use of habits data in assessing individual doses and in defining critical groups for prospective assessments. Overall, the Terms of Reference require the Subgroup to consider and identify:

- Good practice for habits data use in prospective assessments;
- Approaches that should be used, including any core/common parts that should be adopted in all assessments;
- The need for acquisition and analysis of additional data, or the processing of data collected for other purposes.

To do this the Subgroup was required to consider:

- The contexts in which prospective assessments are undertaken;
- The current use of local, national and other habits data in such assessments;
- The types and amounts of data available;
- Locations of groups and food production;
- Approaches taken in other countries and in the context of solid waste disposal;
- The implications of the various approaches.

## 3. Structure of the Draft Paper

The structure of the draft paper considered by the Subgroup at its meeting of 7 March 2008 was as set out below.

1. Introduction
  - 1.1 Terms of Reference of the Subgroup
  - 1.2 Scope of Prospective Assessment
  - 1.3 Issues Addressed in This Report
  - 1.4 Audience of This Report
  - 1.5 Structure of the Report
2. Context
  - 2.1 International Guidance
  - 2.2 UK Legislation and Regulations
  - 2.3 Purpose of a Prospective Assessment
  - 2.4 Organisations involved in Preparing and Reviewing Prospective Assessments
  - 2.5 Reporting of Prospective Assessments and Habits Data
3. Types of Habits Data
  - 3.1 Habits Data that are Specific to a Site
  - 3.2 Habits Data that are not Specific to a Site
    - 3.2.1 Generic Food Consumption Data
    - 3.2.2 Data on Home-grown Food
    - 3.2.3 Water Consumption
    - 3.2.4 Occupancy
    - 3.2.5 Inadvertent and Deliberate Ingestion of Soil
    - 3.2.6 Inhalation Rates
4. Current Approach of UK Agencies to Dose Assessment
  - 4.1 Overall Approach
  - 4.2 Assessments for which Integrated Site Habits Data are Available

- 4.2.1 Identification of Receptors
- 4.3 Assessments for which Integrated Site Habits Data are not Available
  - 4.3.1 Approach if Some Site-specific Data are Available
  - 4.3.2 Approach if No Site-specific Data are Available
- 5. Other Approaches to Dose Assessment
  - 5.1 Approaches Used Overseas
  - 5.2 Approaches Used by Industry
  - 5.3 Approaches Used in Assessments of Solid Radioactive Waste Disposal
  - 5.4 Approaches Previously Used or Considered in the UK
- 6. A Critical Review of the Alternative Approaches
- 7. Recommended Approaches and Their Implementation
- 8. References

At its meeting of 7 March 2008, the Subgroup agreed the general structure of Sections 1 and 2, but considered that Section 3 should be expanded with two additional subsections. The first of these is to address the use of habits data in generic screening assessments, while the second is to provide a summary of issues. A new Section 4 was also proposed on the integration of habits data for assessment purposes. This will then be followed by a new Section 5 on Approaches to Dose Assessment. The material in the existing Sections 4 and 5 will largely be transferred either to Section 4 or to the discussion of potential alternative approaches in Section 6.

## **4. Options and Attributes**

The Subgroup has identified four broad approaches to the use of habits data in prospective assessments. These are an approach using generic data and setting consumption rates of the top two contributing foodstuffs at high percentile values; unadjusted profiling; adjusted profiling taking into account the potential for changes in occupancies or consumption rates over the assessment period; and individual-based methods using data from either a single site-specific survey or data aggregated over several such surveys. Each of these options was scored against the attributes of transparency, homogeneity of habits, realism, robustness or comprehensiveness, sustainability of habits, ease of presentation and defensibility, and degree to which the approach is future proof.

## **5. Conclusions**

The Subgroup has made very substantial progress since the last NDAWG meeting. Although the second paper from the Subgroup is not yet complete, it is likely to be a rather more substantial document than was originally envisaged. Almost all the material required for its completion is now in place and there should be no substantial difficulties in finishing the paper well before the next NDAWG meeting. Given the progress made, Dr M C Thorne volunteered to continue as Chairman of the Subgroup through to completion of this paper and its presentation to the NDAWG.

# MINUTES

NDAWG Habits Sub-Group Meeting  
Room 145 Aviation House, London  
1100hrs, 7<sup>th</sup> March 2008

Chair: Mike Thorne (MCT)  
(PK)

Minutes: Paul Kennedy

Present:

Mike Gaunt – Rolls-Royce (MG)

David Webbe-Wood – Food Standards Agency (DWW)

Rachel Smith – HPA (RS)

Fiona Clyne – CEFAS (FC)

Ian Robertson – SEPA (IR)

John Titley – EA (JGT)

## A – Introductions and Actions from Last Meeting

- **DWW to take the problem of NGO Member to the Steering Group**  
This was taken to NDAWG Steering Group by PK
- **MCT to contact Peter Roche to ask him if he would be happy to remain a member of this group, even if as corresponding member only**  
Pete Roche suggested passing paper and documents to Ian Fairlie for peer review.  
**Action 2008/01 MCT to pass on documents to Ian Fairlie for review after meeting.**  
(Note: Subsequent to the meeting Ian Fairlie agreed to review the paper.)
- **All to have drafts of their sections of the paper ready by end January/beginning February 2008.**  
All submitted their relevant sections to Chair and Secretary prior to the meeting. The only sections lacking from this draft were the critical review of processes (to be discussed at the meeting) and the recommendations (again to be discussed at the meeting).
- **JGT to liaise with SEPA with regard to relevant information about the use of Habits Data**  
This was completed through the inclusion of IR in the Habits Subgroup.
- **PK to trawl for suitable date in March 2008 for next meeting**  
Completed

## B – Progress with Habits Paper to Date and Comments on drafts of sections

All Sections were drafted in advance of the meeting and compiled with additional material by MCT. It was proposed that the index and format remain the same up until Section 4, where it was proposed that a new section be drafted on the uses of habits data. Section 4 in the original draft of the paper distributed for the meeting will become Section 5; existing Section 5 material will be distributed to new Section 5 and Section 6; Section 6 and Section 7 will not be altered in numbering.

The new section 4 will deal with how the data is used by the various parties, including the "top two" method, where it is assumed that the two most radiologically significant pathways are assumed to apply at high consumption rates, whereas all others considered are taken to apply at median rates.

**Action 2008/02 – MCT to Draft New Section 4 on Uses of the Habits Data and restructure the overall report.**

**Action 2008/03 – All Section Authors are responsible for further drafting of their sections of the paper by Easter Weekend 2008.**

MCT announced that the project which would mean his standing down chair of the Subgroup, has been delayed. This should mean that he can continue with this task until the final paper is completed. MCT's feelings about the completion is that the work ought to be finished by the Autumn NDAWG Meeting.

**Action 2008/04 – MCT to produce written report back to NDAWG meeting of 02/04/2008**

One thing to note is that there were gaps in many of the sections with regard to the use of the data in Scotland.

**Action 2008/05 – IR to provide information in practice in Scotland where gaps still exist.**

- [1] Introduction (MCT)  
This was agreed by all with minor formatting changes and a more positive statement of scope suggested for Section 1.3.
- [2.1] International Guidance (RS)  
It was felt that there might be reference to IAEA Document in the section. It was suggested that High Level Principles be included in this section and to note that the time span for review of Habits Data is not tied to five years, as the Sellafield reviews are undertaken annually for inter-tidal occupancy and seafood consumption pathways and this rule evokes the time when EA reviewed site permits every five years – this is not the case today.
- [2.2 – 2.5] UK Legislation and Regulations, Purpose of Prospective Assessment, Organisations Involved in Preparing and Reviewing Prospective Assessments, Reporting of Prospective Assessments and Habits Data (JGT)  
2.4 paragraph 1 – As well as NRPB Report W-63, there is also "Initial Assessment Methodology" developed by Thorne et al. This is a very conservative method. Although not officially sanctioned by EA as yet, the group is aware of Non-Licensed operators and SEPA using this method.

2.4 2<sup>nd</sup> paragraph in the section: the reference to the way in which FSA uses the data will require editing.

**Action 2008/06 – DWW to edit this paragraph.**

- [3] Types of Habits Data (DWW/RS)  
3.2.4 With regard to Occupancy at sewage treatment works. For the Nuclear Licensed Sector, there is data for Harwell, Cardiff and Amersham, which are the main sites that discharge liquid waste via a sewage works. This paragraph was not completed.

**Action 2008/07 – JGT to complete section on Sewers.**

3.2.5 This is the first report, which recognises "exploratory mounding" of soil for consideration in its conclusions.

- [4.1-4.2] Current UK Agencies' Approach to Dose Assessment: Overall Approach and Assessments Where Integrated Site Habits Data are Available (JGT)

- [4.3] Current UK Agencies' Approach to Dose Assessment (DWW/RS)  
It was felt that there were gaps in information on habits relating to direct radiation or shine. MG commented that although it is HSE who will commission work in this area, it is usually up to the operator to submit the assessment to HSE on this area.

**Action 2008/08 - on MG and Patrick Stephen to draft a few sentences on data relating to this pathway.**

- [5] Other Approaches (MCT/DWW/All)  
It was noted that the assessment for Article 37 (of Euratom) ought to be applicable Europe-wide. JGT noted that the National Guidance for this in Germany, according to his recollection, differs quite significantly from that used in UK. MCT noted that in many parts of the world, such as USA, the statute usually defines what is required and this can be prescriptive. There were questions raised as to the added value of this part. MCT and DWW suggested that there may be other approaches used outside UK, from which best practice could be learned.

**Action 2008/09 – MCT, FC, JGT to obtain information on other countries' methods; FC to approach John Hunt, formerly of CEFAS to obtain clarification, based upon his experience.**

With regard to approaches used by industry, JGT is aware of Dose per Unit Release Factors used in generic assessments.

**Action 2008/10 – Action JCT to obtain further information on industry uses of habits data.**

MCT Proposed that the new section for this will probably comprise two very short paragraphs 6.1 and 6.2.

- [6] Critical Review of Approaches (MCT)  
The Approaches were split into five types: Screening + Generic; Screening + Profile; Screening + Adjusted Profile; Individual; Individual +.

Theses were scored against the following criteria – Transparency; Homogeneity (as it applies in ICRP recommendations); Realism; Robustness; Sustainability; Presentation and Defensibility; Future proofing.

This was rated 1-5, where 5= best and 1=worst. The categories were ranked according to perceived priorities and the ratings were repeated with weightings against each of the criteria. Please see Table 1 Below.

**Table 1: Scores Obtained Based Upon Options and Criteria**

	Generic top2	Profile	Adjusted Profile	Individual	Individual Plus	Weighting	original
Transparency	5	5	3	1.5	1	0.1	0.1
Homogeneity	1	5	5	2	2	0.05	0.05
Realism	1.5	4	3	5	3	0.2	0.25
Robustness	3	5	5	5	4	0.1	0.1
Sustainability	5	3	3	3	4	0.1	0.1
Defensibility	3	4	3	5	3	0.15	0.15
Future	5	2	4	2	4	0.3	0.25
Transparency	0.5	0.5	0.3	0.15	0.1		
Homogeneity	0.05	0.25	0.25	0.1	0.1		
Realism	0.3	0.8	0.6	1	0.6		
Robustness	0.3	0.5	0.5	0.5	0.4		
Sustainability	0.5	0.3	0.3	0.3	0.4		
Defensibility	0.45	0.6	0.45	0.75	0.45		
Future	1.5	0.6	1.2	0.6	1.2		
	3.6	3.55	3.6	3.4	3.25		

When the weighted scores were added up, it was agreed that for optimisation purposes, Screening + Profile was the preferred option, but in terms of future proofing, it maybe more useful to adjust the straight profile to take into account pathways, which may not be captured by the profile method, with particular emphasis on pathways which may not be immediately relevant, but could become important in the future.

It was suggested by RS and JGT that guidelines are drawn up in the paper for when and how adjustments can be made.

**Action 2008/11 – All to produce guidance on adjustments to the profile method.**

- [7] Recommended Approaches and Implementation (MCT)  
The highest scores in the evaluation were for the “screening + profile”. It was recommended that as part of the report, guidance be produced on adjustments to the profile method.

**C – Summary of Actions Arising from this Meeting**

**Action 2008/01 MCT to pass on documents to Ian Fairlie for review after meeting. Completed after the meeting**

**Action 2008/02 – MCT to Draft New Section 4 on Uses of the Habits Data.**

**Action 2008/03 – All Section Authors are responsible for further drafting of their sections of the paper by Easter 2008.**

**Action 2008/04 – MCT to produce written report back to NDAWG meeting of 02/04/2008**

**Action 2008/05 – IR to provide information in practice in Scotland where gaps still exist.**

**Action 2008/06 – DWW to edit 2<sup>nd</sup> paragraph Section 4.2.**

**Action 2008/07 – JGT to complete section on Sewers.**

**Action 2008/08 – MG and Patrick Stephen to draft a few sentences on data relating to this pathway.**

**Action 2008/09 – MCT, FC, JGT to obtain information on other countries' methods; FC to approach John Hunt, formerly of CEFAS to obtain information, based upon his experience.**

**Action 2008/10 – JCT to obtain further information on industry uses of habits data.**

**Action 2008/11 – All to produce guidance on adjustments to the profile method.**

#### D – AoB & Date and Time of Next Meeting

There was no AoB raised at the meeting.

The next meeting will be planned between NDAWG 13 in April 2008 and NDAWG 14 in November 2008.