

## NATIONAL DOSE ASSESSMENT WORKING GROUP

### SUB-GROUP ON PROBABILISTIC MODELLING

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2<sup>nd</sup> Meeting held on 13 March 2003, Aviation House London.

#### Present

Chair	Zitouni Ould-Dada	FSA
Regulators/agencies	Cathy Griffiths	RWMAC
	Kelly Jones	NRPB
Specialists/NGOs	Kate Charles	Westlakes Scientific Consulting
	John Hunt	CEFAS
	Mike Thorne	Consultant

Apologies: John Titley (EA), Ciara Walsh (NRPB), Marcus Grzechnik (CEFAS)

#### 1. Minutes of previous meeting 26 September 2002

##### Completed actions

**Action PM\_Subgroup 1.2** Kelly to distribute the NRPB internal report which highlights the distinction between uncertainty and variability

**Action PM\_Subgroup 1.4** Ciara to provide the NDAWG Press Release for use for the actions PM\_Subgroup 1.5, 1.6

**Action PM\_Subgroup 1.8** Mike to circulate documents relevant to the topic "Application of probabilistic modelling in solid waste management".

**Action PM\_Subgroup 1.9** Kelly and Mike to draft a position paper for Topic 7 ("How probabilistic modelling can usefully inform decisions")

**Action PM\_Subgroup 1.10** Zitouni to reword Topic 7 ("How probabilistic modelling can usefully inform decisions") to take account of compliance.

##### Ongoing

**Action PM\_Subgroup 1.1** Members to send Ciara details of reports and details of committees working on issues relevant to the topic "Sources of uncertainty and variability in the dose assessment process"

**Action PM\_Subgroup 1.3** Members to comment on the NRPB internal report which highlights the distinction between uncertainty and variability and send comments to Kelly

**Action PM\_Subgroup 1.5** Mike to draft an article for the SRP website and circulate for comment. This article will detail the work of NDAWG, the work of this subgroup and the information required on uncertainty/sensitivity analysis tools.

**Action PM\_Subgroup 1.6** Kelly to submit article prepared by Mike from Action PM\_Subgroup 1.5 to the eBulletin published on the NRPB website, or to publish it directly on the website.

**Action PM\_Subgroup 1.7** Cathy to contact HSE to circulate article prepared by Mike from Action PM\_Subgroup 1.5 in their newsletter.

**Action PM\_Subgroup 1.11** Ciara to write a short letter to introduce this subgroup to other organisations, and distribute to relevant organisations and working groups.

## **2. Discussion on FSA method: Possible and probable dose (Topic 10)**

Zitouni said that at the Consultative Exercise on Dose Assessments (CEDA), October 2000 the reasoning behind the use of possible dose was presented. He said that there has been a strong recommendation from CEDA that the FSA should also present probable dose. He said that it was FSA's intention to present a range of possible doses but there was the issue of how this corresponds to the ICRP definition of critical groups. FSA felt that it was important that authorisations allowed for the existence of 'possible' habits so that they could be confident that the limit would not be exceeded. John commented that at CEDA there was much concern about the FSA's conservatism. He said that the concept of possible and probable doses were artefacts, whereas the ICRP methodology was quite clear. He said that in order to get a feel for the fluctuations around the dose a probabilistic calculation could be done to get the standard deviation around the central value and avoid the use of the terms possible and probable. Mike said that ICRP concept of critical groups was quite clear for retrospective assessments but for prospective assessments assumptions about the group had to be made.

The possibility of doing a range of scenarios was discussed. Kate said that looking at different exposure pathways was a more concrete approach than the dose distributions. Zitouni commented that the habit surveys were based on real individuals. However John Hunt made the observation that the habit surveys target individuals most likely to be exposed ie the survey is not random. Therefore it is not appropriate to present it as a statistical distribution applicable to the whole of the local population.

Cathy expressed her concerns about the conservatism of FSA's assumption for example someone drinking all their milk from a cow grazing at the point of high atmospheric deposition from the site. She said that she would prefer it if authorisations put conditions on land use ie if an area of land near a discharge point was turned to a grazing area for cows the authorisation would have to be re-examined in the light of this. Kelly said it was not clear from the paper how

the doses were calculated. Zitouni said that this could be made clear in the next version of the paper. Kelly said that she thought that the reasoning behind the calculation of doses and the presentation of doses would be unclear to members of the public. Zitouni said that the FSA had carried out a pilot study on presenting results to members of the public and that the public seemed to be happy with the use of percentiles. Mike said that for people to feel confident about the results they needed to know the assumptions, eg what were the consumption rates used.

Kelly asked what FSA intended to do with the results of the probabilistic models they were currently developing. Zitouni said this was not yet decided. The intention was to present results with the uncertainties associated with them. This will include presentation of possible values rather than just a single value of exposure. Zitouni added that if this was not helpful to the general public the format would be reconsidered. Kelly said that she found the terms probable and possible confusing. She said that she understood why FSA had taken the possible dose to be 97.5th but that it could be argued that the upper end of the distribution ie 100th percentile could also be a possible dose. She added probable dose implied that this was the most likely dose to the local population but that as John Hunt had explained earlier the individuals targeted in the habit survey were those most likely to be highly exposed. She said she thought that this was one of the points John Titley had raised in his letter to Zitouni, 12 March 2003. Zitouni clarified by saying that the dose distributions were not intended to represent the local population but that this confusion showed that there was a need for greater clarity. Zitouni said that he understood the concerns of the subgroup and would discuss the issues raised with colleagues within FSA. He would review his paper in light of the discussions and then circulate to the subgroup members.

**Action PM\_Subgroup 2.1 Zitouni** to revise his paper and circulate to members of the sub-group by the end of April

Zitouni thanked Kelly and John Titley for their preliminary comments on his paper and said that he would welcome comments from other members.

**Action PM\_Subgroup 2.2 All** to give Zitouni comments on his paper

Kate asked if FSA were thinking of extending possible and probable dose to other contaminants to which Zitouni replied to the negative. John Hunt said that there were already many cautious assumptions in the calculation of critical groups for example in the formulation of the dose coefficient many conservative assumptions were used. Zitouni summed up the discussions of the group to say that for an authorisation a reference dose should be calculated. The assumptions made in the assessment should be clearly stated. Other exposure scenarios should be considered and the realism of these scenarios discussed. It should be emphasised that the ICRP concept of a critical group is inherently cautious.

### 3. Progress with topics

#### *3.1 Sources of uncertainty and variability in the dose assessment process (Topic 1)*

Action PM\_Subgroup 1.1 was still ongoing. However a further requirement was placed on the members of the subgroup in that they should also supply some context to any reports they supply.

#### *3.2 Distinction between uncertainty and variability and their implications (Topic 2)*

Zitouni thanked Kelly for circulating the note on definitions of uncertainty and variability. He said that at a later stage he hoped to produce a report of our activities and that this would be a useful inclusion. He asked that other members make comments before the next meeting.

**Action PM\_Subgroup 2.3** All to comment on Kelly's note on uncertainty and variability

#### *3.3 Quantifying uncertainty (Topic 4), Probabilistic modelling – software and methods (Topic 5) and Correlation between parameters and its implication (Topic 8)*

Actions 1.5, 1.6 and 1.7 still ongoing

Mike said that he thought that it would be useful if a demonstration of Amber was given.

**Action PM\_Subgroup 2.4** Zitouni to look into arranging a demonstration of AMBER.

Zitouni said it might be useful at some point to have a workshop looking at the available tools. Kelly said that she thought this might be an issue to consider later in the year.

#### *3.4 How probabilistic modelling can usefully inform decisions (Topic 7)*

Zitouni thanked Kelly for her note on this topic. He said that if the dose was 10 to 20  $\mu\text{Sv}$  then a probabilistic assessment was probably not useful. Mike said that probabilistic assessments were good for identifying where more monitoring or research needs to be done.

**Action PM\_Subgroup 2.5** All to comment on Kelly's note on How probabilistic modelling can usefully inform decisions

#### *3.5 Presentation of results to the public from probabilistic modelling (Topic 9)*

Zitouni said that the FSA has asked the contractor to do a review of the best practice of presenting results and that this should be finished in the next month.

**Action PM\_Subgroup 2.6 Zitouni** to distribute paper on pilot study of presenting results to members of the public.

Zitouni said that the NRPB/Greenstreet study had encountered a few problems but that an update would be presented in June 2003 at the NDAWG main meeting

### 3. Plan for next meeting

Topics 1 and 2 are ongoing. Topic 7 has greater importance as it is linked to discussions of possible and probable doses. Zitouni commented that he thought it would likely that the main NDAWG group would refer back issues related to possible and probable doses following their meeting in June. Possible workshops will be discussed at the next meeting.

### 4. A.O.B.

#### *5.1 Terrestrial habit surveys*

Kelly asked if the FSA intended to update the Byrom et al (1995) paper which looked at food intake rates. John said that the approach was now to target individuals who are most likely to be highly exposed rather than the general population as done in the Byrom work. Kelly asked if a comparison of the recent data and data in Byrom had been done. Zitouni said that he thought not but that himself and Bryan Smith (CEFAS) were doing an equivalent paper to Byrom and that a comparison could be included.

**Action PM\_Subgroup 2.7 Zitouni** to look at possibility of doing comparison between consumption rates of terrestrial foods from targeted habits surveys and Byrom et al.

Cathy asked about the applicability of the habit data to industrial areas. Zitouni replied that the habit data were available for both coastal and inland sites and that they could be applied to an industrial area close to where the habit survey was carried out.

Cathy said it would be useful if Ciara could send a reminder of actions before the meeting

**Action PM\_Subgroup 2.8 Ciara** to send reminder of actions to subgroup one month before meeting

Zitouni mentioned that within the FSA a review of exposure assessments for all contaminants was being carried out. A part of this review is to look at uncertainty/variability. He said that when the report was complete and if it was of relevance he would distribute to the group. In addition a number of software applications are being tested for performing probabilistic calculations using dietary data and again Zitouni would circulate when complete.

**Action PM\_Subgroup 2.9 Zitouni** to circulate review of exposure assessments and models with dietary data if relevant.

**Action PM\_Subgroup 2.10 Mike** to circulate draft paper on probabilistic assessment of sewage sludge

**Action PM\_Subgroup 2.11 Kelly** to ask Ciara to circulate Rob Allott's paper on retrospective assessments.

**Action PM\_Subgroup 2.12 All** to send Zitouni postal address so he can forward copies of reports supplied by Mike.

## 5. Date of next meeting

The 18<sup>th</sup> September was suggested as next meeting date.

**Action PM\_Subgroup 2.12 All** to confirm to Zitouni that date was acceptable.

## 6. Summary of Actions

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Kelly Jones 7 April 2003