NATIONAL DOSE ASSESSMENT WORKING GROUP

PAPER 13-07 REPORT BACK FROM SUBGROUP ON SHORT TERM RELEASES

4th meeting held on 28 February 2008, Aviation House London.

Present

Chair	Rob Allott	EA
Regulators/agencies	Ian Robertson	SEPA
	Ray Kowe	HPA
	Justin Smith	HPA
	David Webbe-Wood	FSA
Industry	Laurence Austin	British Energy
Consultants	Claire Johnson	Westlakes Scientific Consulting

1. Minutes of previous meeting 2 October 2008

Action 2.2 David Webbe-Wood to check on the value of average water consumption rate. *Completed.*

Action 2.8 Claire to find out about aerial discharge release patterns from Amersham. *Action removed as it is no longer relevant.*

Action 3.1 Rob to check if the Swindon hospital uses delay tanks for temporary storage of active liquid effluents. *Completed, Swindon does not use delay tanks.*

Action 3.2 Paul to provide a plot of typical river flow pattern in Scotland for comparison with the plot of water flow in the River Thames at Reading. *Completed, Rob has included Scottish data in the short term release to rivers paper.*

Action 3.3 Rob to check on the validity of the fish consumption rate of 20 kg y^{-1}. *Completed. This generic value will be retained for use.*

Action 3.4 David to look at the national diet and nutrition survey to see if there is seasonal data on fish consumption rates. *Complete. The available data are inconclusive.*

Action 3.5 Rob and Paul to look at EA and SEPA data on fishing club catches. *Ongoing, Paul is still making enquiries.*

Action 3.6 Rob to include habits data and assumptions in the next draft of the paper so people can comment on it. *Completed,*

Action 3.7 Rob to present summary dose results in the same layout as Justin's atmospheric case study. *Completed, Results will be left in the current format.*

Action 3.8 Rob to release the draft paper on short term release to rivers before 19th October and members to send him comments before the 5th November. *Complete.*

Action 3.9 Rob to check the value for fraction of time indoors during passage of plume for the realistic scenario. *Ongoing.*

Action 3.10 Justin to check whether the location factor for cloud gamma is 1 for annual average, 0.2 for realistic. *Completed. A value of 0.2 is valid for annual and realistic.*

Action 3.11 Justin to check on the indoor dose reduction factor for resuspension for annual average dose. *Completed. The HPA use a value of 1.*

Action 3.12 Justin to email Laurence if he requires actual short term discharge data as there are more detailed records available. *Completed.*

2. Short term releases to rivers

There are several sets of comments to address.

Comments and actions from 12th NDAWG meeting

Jane commented that the coarse fishing season for the Thames includes the winter so that to combine occupancy with low summer flow may be inappropriate. The closed season for coarse fish is 14th March – 14th June, but there is no closed season for game fish. This cannot be included explicitly in the calculations as there is limited data and it probably does not have a huge effect. It will be discussed in the paper.

John Hunt commented that Cefas may have information on seasonality in angling and suggested that the paper needs a paragraph explaining uncertainty in this type of assessment.

Action 4.1 Ray to check on John Hunt's correspondence on angling seasonality

Tim Parker commented a release of 1% seems small and asked if this figure was based on measurements: he suggested 10% may be more realistic. Rob said the bounds would be if the release is less than 1% then it would be continuous, if it is greater than 10% it is short term. David said that if the arising from operational practice is uniform and greater than 2% it is likely to be non-continuous. This figure of 2% was agreed by subgroup members as the bound for short term release. This is about once a week ie 1/52 of annual discharge released in single short term event each week.

All actions resulting from the 12th main NDAWG meeting on the subgroup have been completed.

Peer review comments

Mike Harvey

There are several comments on minor details of the reports. There are several other key points which need to be addressed:

There are large differences between nuclides due to the lack of transfer between the bed sediment and water column for the short term release model. Steve Jones has also commented on this.

The short term release model assumes the fraction in the solid phase is zero which will affect doses from ingestion of fish. Steve Jones has also commented on this.

The Kd for americium is much higher than other nuclides in the continuous release model. This needs to be reviewed.

Mike questioned the uncertainty in individual doses from the ingestion of fish in the subgroup paper and the supporting CEH document.

Action 4.2 Rob to ask Mike to clarify his query on uncertainty in of individual doses from the ingestion of fish

Mike asked if the concentration in water was for filtered or unfiltered water. Rob commented it is for filtered water.

Mike asked whether short term release factors were assumed for the ingestion of irrigated food pathway. Rob commented that there is no short term release transfer data into crops, hence data for continuous release were used.

Steve Jones

Transfer between the bed sediment and water column was ignored for the short term release model. CEH had not included this transfer as they assumed there was no time for equilibrium between the sediment and water column to be established. The high partition coefficient for americium was based on data from a lake in which there is long term association, CEH (Jim Smith) used a Kd value for short term release which is smaller. Rob commented that for the realistic assessment the americium Kd is probably too high, Jim Smith recommends a revised Kd value between 1000 and 10000.

Action 4.3 Claire to ask Steve Jones is he is aware of an appropriate value for americium Kd for short term release to rivers

Jim Smith is looking at the phosphorus concentration factor he used in calculating the integrated concentrations in fish. He is also looking at the sediment Kd values he used for the plutonium isotopes and americium.

Jim Smith is looking at Kd values he used for calculating the integrated concentrations in sediment, in particular for CS137, they would appear to be too high to be used in short term assessments.

Rob had incorrectly assumed a three month period for one year, he will integrate over the full year period.

Mike Thorne

Mike has made several detailed comments on the paper that Rob will address in the next draft.

Mike questioned the lack of justification for the choice of analogue radionuclides for which there is no data. Subgroup members agreed that the assessment will only include those radionuclides for which there is data,

Mike queried the robustness of the 97.5th percentile values of fish consumption rate in table 5 of the paper.

Action 4.4 David to check on the data on fish consumption rate in table 5 of the short term to releases paper

Finalising paper

Rob will address the model and parameter comments raised by Mike Harvey and Steve Jones. There are still the outstanding problems of the potential impact of seasonality of fish consumption (see Action 3.5) and river occupancy on the short term release results.

The seasonal bias in drinking water data still needs to be resolved.

Action 4.5 David to revisit any data he has on seasonality of water consumption

Action 4.6 Justin to speak to Jo Brown if there is any information available on drinking water seasonality from the removal of radionuclides from drinking water project for the Drinking Water Inspectorate

3. Short term releases to atmosphere

Justin outlined the case study for short-term release to atmosphere based on the Hinkley Point B data that Laurence had supplied him.

Laurence informed Justin that there was more detailed information on Hinkley Point B if he needed it including weather information, points of habitation and food production that may be useful.

Justin outlined the source term and modelling parameters used and the five scenarios he had considered. Claire asked why he had used PC Cream for the continuous release (scenario 3). Justin said this was for convenience, PC Cream used R91 which may be conservative, it could be done with ADMS but this requires more work.

There are potential problems using ADMS in that some required endpoints may not be available depending on the release scenarios being considered. For example percentile data are only available for air concentrations and cloud shine is not available for some averaging times

Laurence queried whether emergency assessment tools such as EPIC or COSYMA could be used which are like a short term release.

Action 4.7 David to supply Justin with integrals of activity concentrations in food following short term deposits of C-14 and S-35 to ground so he can calculate short term doses.

Rob said that for the realistic and cautious short term release doses in table A different food concentrations are needed.

Members agreed that for the source term in table A assessments of realistic, cautious and pessimistic short term doses should use quarterly notification levels with the rest of the year as a continuous release.

Justin will redo the case study for Hinkley Point B for unit release using effective release heights, population points and will include a carbon and sulphur data from SPADE model. For the continuous release scenario he will use ADMS instead of PC Cream assuming a ground level release and weather categories modified 'average' category D (for realistic case) and category F and a modified 'worst case' category D (for cautious case). No category A will be considered as is it a ground level release.

David noted that for a short term release the speciation of sulphur should not be ignored.

Action 4.8 Justin to get habitation and food production points from Laurence

Laurence commented that there may be some sensitivity naming the Hinkley Point B site explicitly, it may be worth considering using 'typical AGR site' in the short term release to atmosphere paper.

The final report for the short term release to atmosphere will be deferred till the November 2008 main NDAWG meeting.

4. Remaining work items

Discharges to Sewers

The potential pathways are from the application of sewage sludge to land, and to sewage treatment workers. Members concluded that: the sewage sludge would not be an issue for the short half life radionuclides since the sludge is often collected over a relatively long time period; the dose to workers which is predominantly external dose is not really any different from a continuous release.

Action 4.9 Rob to extend the short term release to rivers paper to say that release to sewers is not an issue

Discharges to estuary/sea

David informed the subgroup that there is an FSA report on releases to the marine environment that may be of interest. In addition CEFAS are developing a model for the FSA on accidental releases to the sea.

Members concluded that for short term releases to sea, operational procedures and extensive dispersion means there will not be a problem. For an estuarine release the only potential issue is the changing flow regime but it was thought that this would not vary significantly throughout the year to coincide with significant changes in people's habits and hence this would not be very different to doses arising from a continuous release scenario. Rob will add a discussion of the discharges to estuary/sea to the short term release to rivers paper.

Cyclotrons

Justin will carry out a second case study on cyclotrons in his short term release to atmosphere paper. The scenario will consider a ground level and effective release height as worst case scenarios.

Action 4.10 Rob to send Justin the EA report on cyclotrons

Action 4.11 Justin to ask Ciaran McDonnell if he has any useful information on cyclotron discharges.

Multiple discharges

Heysham 1 and 2 are the only operating nuclear sites that could give rise to multiple discharges, though cyclotrons may also be considered in this category.

There is a need to identify situations where there are releases in proximity and time that may lead to substantial releases and to determine how many short term releases per year may occur to gauge if there is a problem. This will be dealt with in the planned NDAWG guidance note on short term releases.

CFILS

David commented that these were more of a policy rather than a technical issue and that the FSA use them to compare against dose assessment results. David will write a section on CFILS in the guidance note.

5. NDAWG guidance note

Contents

Introduction/purpose

Scope

Principles

Releases to atmosphere

Releases to freshwater (direct)

Releases to coast/marine

Releases to sewer

Multiple releases

CFILS

Conclusions

References

Programme to produce

The draft guidance note will be ready to discuss at the autumn 2008 meeting of the subgroup

6. Date of next meeting

The next meeting of the subgroup will take place late September/early October, 2008.

7. Summary of Actions

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Ray Kowe, 3rd March 2008