

Contract Report
NRPB-EA/5/2005

*Summary report on the independent
peer review of BNFL's Look up Tables
Tool, RADCONTAB*

Version 1.0, March 2005

SF Mobbs and WB Oatway



National Radiological Protection Board
Working in partnership with the Health Protection Agency

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ABSTRACT

NRPB were asked by BNFL to peer review a project involving the development of a calculational tool for the assessment of doses from contaminated land. This tool was originally described as a Look up Tables tool and has developed into a spreadsheet tool named RADCONTAB.

NRPB reviewed and commented on the specification of the tool, the initial draft report and early versions of the tool, and provided advice on technical issues associated with the project. NRPB then reviewed BNFL's response to comments received from the consultation exercise on the initial draft version of the report and spreadsheet tool and reviewed the then latest version of the report (draft 7) and the spreadsheet tool RADCONTAB v0.5.

NRPB considered that RADCONTAB v0.5 was fit for the purpose described in the specification document. NRPB considered that the draft 7 version of the report would benefit from some clarifications to the text. NRPB also requested caveats to be incorporated in the final version of both the report and the spreadsheet tool, referring to the fact that ICRP are expected to revise their recommended dose coefficients in the near future.

Finally, NRPB reviewed pre-release versions of the spreadsheet tool (pre-release of v1.0) and report (Draft 8; pre-release of Issue 1). These implemented the modifications listed above. NRPB considers that these versions of the report and spreadsheet tool are fit for issue and use currently recommended data and methodologies.

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This NRPB report reflects understanding and evaluation of the current scientific evidence as presented and referenced in this document.

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1 INTRODUCTION

NRPB was asked by BNFL to peer review a BNFL project involving the development of a calculational tool for the assessment of doses from contaminated land. This tool was originally described as a Look up Tables tool by BNFL and has developed into a spreadsheet tool that has been named RADCONTAB.

Throughout the development of the Look up Tables Tool RADCONTAB, BNFL has been keen to obtain feedback from a wide range of stakeholders. Therefore they posted the draft outline specification on the SAFEGROUNDS website for consultation, engaged NRPB as a peer reviewer at an early stage, and posted the initial draft product on the SAFEGROUNDS website for comment.

The peer review process had 4 stages: the specification of the tool, the development of the initial draft report and draft version of the tool, BNFL's response to comments received from the consultation exercise, and the final product.

NRPB used its experience in the development of a methodology for the calculation of doses from the use of contaminated land (Oatway and Mobbs, 2003) in carrying out this peer review.

Section 2 of this report describes the stages of the peer review. Section 3 presents the conclusions.

2 PEER REVIEW STAGES

2.1 Specification stage

NRPB were engaged as a peer reviewer at an early stage so that they could comment on the development of the specification for the calculational tool. This was welcomed as it means that the peer review process is more participatory and it inevitably results in a better product since it is better to get the specification correct than to spend time redoing things at the end. In addition, it is a natural corollary to BNFL's desire to engage in participatory consultation.

BNFL posted the outline specification for the calculational tool on the SAFEGROUNDS website in the summer of 2003. At this point a spreadsheet was not envisaged: the calculational tool was referred to as a set of 'Look up Tables'.

During this two-month consultation period, BNFL received a large number of comments from a wide range of stakeholders and compiled them in a proforma. A draft revised specification was drawn up by BNFL and the comments and draft revised specification were submitted to NRPB for review and comment. A meeting was held between BNFL and NRPB to discuss the response to the

comments and to further develop the specification. Following NRPB's input a final revised specification (Issue 2) was prepared and posted on the SAFEGROUNDS website in December 2003.

The final specification contained details of the radionuclides to be considered, exposure groups, exposure assumptions, exposure pathways and the form of the final output. The final output format envisaged in the specification was a report and a simple spreadsheet.

NRPB agreed that this specification addressed the purpose and scope of the tool defined by BNFL.

2.2 Development stage

Following agreement of the specification, NRPB gave advice on technical issues to do with the development of the spreadsheet tool, now named RADCONTAB, and its associated report. Advice was specifically given on the appropriate ICRP dose factors to use, which age groups to consider, the radionuclides and decay chains to consider, modelling dermal contact, inclusion of drinking water pathways, external dose coefficients, habit data and the verification plan. NRPB also carried out spot checks on the data used in the spreadsheet and commented on the layout and ease of use of the spreadsheet. During this period, NRPB reviewed and commented on several drafts of the report and the spreadsheet RADCONTAB. The majority of the discussions and advice was carried out by email; however a meeting was held in February 2004 to discuss comments and the way forward.

In June 2004 NRPB agreed that the data in the then current version were correct and that the tool and associated report were checked and sufficiently robust that they could be posted on the SAFEGROUNDS website for review by stakeholders. RADCONTAB Version 0.3 and the accompanying report (Draft 6) were posted on the website in August 2004 for a consultation period of about 2 months.

2.3 Response to consultation stage

During the consultation period, BNFL received comments from 8 individuals, representing 7 organisations. These comments, together with the proposed BNFL response were compiled into a pro-forma by BNFL and sent to NRPB for review. The majority of the comments referred to clarifications of the text in the report to define the exact purpose and scope of the tool and to assist the user in the choice of suitable parameter values. Other comments referred to suggested improvements to the presentation of the spreadsheet. BNFL proposed to address the majority of these comments. NRPB agreed that this approach was acceptable as the outstanding comments which BNFL did not propose to address generally referred to issues outside the stated purpose and scope of the tool.

2.4 Production of final version

In December 2004, BNFL sent the revised version of the report (draft 7) and the revised version of the spreadsheet tool (RADCONTAB version 0.5) to NRPB for review. This review was completed in February 2005. The output of this stage of the review was a draft of this NRPB summary review report and a set of editorial comments on draft 7 of the RADCONTAB report, which were sent to BNFL. These editorial comments mainly referred to minor changes to clarify the text. Examples were in the section on guidance on the choice of parameter values relating to inadvertent ingestion of contaminated soil, the description of the geometries (contamination profiles) considered for external dose calculations, and the description of the scenario relating to dermal contact with contaminated soil. It was also suggested that BNFL adopt the correct symbol for litres in both the report and spreadsheet, ie, 'l' instead of 'L'. Overall NRPB considered that the spreadsheet and report were of good quality and represent a robust assessment methodology.

Two additional paragraphs were suggested to provide assistance to the user and to flag up potential changes that may be relevant.

The first suggested additional paragraph was to record that ICRP are currently in the process of preparing revised recommendations and therefore their recommended inhalation and ingestion dose coefficients are expected to change, though the timescale for publication of these revised recommendations is not clear at present. This statement has been incorporated in the final versions of both the spreadsheet tool and the report.

The second suggested additional paragraph was to refer the user to additional references for assistance in the definition of critical groups and their habits. The critical group concept and its application are discussed in detail in ICRP Publications 42 and 43 (ICRP 1985a and ICRP 1985b). They are also developed in ICRP publication 81 (ICRP 2000). In addition, interim guidance is given in the EA, SEPA, DOE Northern Ireland, NRPB and FSA Principles for Assessment document published in 2002. This comment applied to the report only (not the spreadsheet tool).

NRPB considered that, with the addition of these two paragraphs and the editorial comments referred to above, the report and spreadsheet tool RADCONTAB would be suitable for issue.

NRPB requested BNFL to send them the final spreadsheet tool (to be designated RADCONTAB v1.0) and final report for review before publication so that NRPB could fully endorse them. This was done in March 2005, when BNFL sent NRPB a pre-release version of the spreadsheet tool RADCONTAB v1.0 and a pre-release version of Issue 1 of the report (designated Draft 8).

NRPB reviewed these pre-release versions of the spreadsheet tool and report, and concluded that all these issues, except the use of 'l' for litres had been addressed. However, NRPB considers that this omission is not sufficient to

compromise the suitability of the spreadsheet tool and its report for the intended use. Therefore NRPB considers that the final spreadsheet tool (to be designated RADCONTAB v1.0) and final report (draft 8, to be designated issue 1.0) are suitable for issue.

3 SUMMARY AND CONCLUSIONS

This report has described a peer review of the BNFL project to produce a calculational tool for the assessment of doses from contaminated land, RADCONTAB. NRPB welcomed the opportunity to undertake the peer review and were impressed with the degree of consultation that BNFL engaged in. NRPB particularly welcomed early involvement, at the project specification stage, as this enabled a better product to be developed and a more participatory peer review process.

The spreadsheet tool RADCONTAB v1.0, and associated report, will allow the calculation of doses arising from contaminated land. The tool is intended for use on Nuclear Licensed sites to give an assessment of doses from existing contamination. It does not consider long term implications or potential migration of contamination in groundwater and therefore it is not suitable for use for assessments associated with delicensing the site or for use for assessments under the future Part IIa regime for contaminated land. This is clearly spelt out in the accompanying report.

NRPB considered that the version of the spreadsheet tool reviewed in February 2005, RADCONTAB v0.5, was fit for the purpose described in the final (Issue 2) BNFL specification document.

NRPB recommended that the final version of the report would benefit from some clarifications to the text and a paragraph referring the user to an EA, SEPA, DOE Northern Ireland, NRPB and FSA report that gives interim guidance on the choice of critical groups.

NRPB also recommended that caveats should be incorporated in the final version of both the report and the spreadsheet, referring to the fact that ICRP are expected to revise their recommended dose coefficients in the near future.

The modifications listed above have been implemented by BNFL in pre-release versions seen by NRPB. NRPB considers that the report and spreadsheet tool are fit for issue and use currently recommended data and methodologies.

4 REFERENCES

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