



**Radiobiology Division**

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March 25, 1999

Mr. Barrett Fountos  
U.S. Department of Energy  
EH-63/270 CC  
19901 Germantown Road  
Germantown, MD 20874-1290

Dear Barry:

I indicated in my last letter that I was just finishing my part in the revision of the paper representing our old Milestone 6. This revision has now been completed and sent to *Health Physics*. I am enclosing a copy of this paper, which now has a slightly different title:

Likhtarev, I. A.; Kovgan, L. N.; Vavilov, S. E.; Perevoznikov, O. N.; Litvinets, L. N.; Anspaugh, L. R.; Jacob, P.; Pröhl, G. Internal exposure from the ingestion of foods contaminated by  $^{137}\text{Cs}$  after the Chernobyl accident. Report 2. Ingestion doses of the rural population of Ukraine up to 12 years after the accident (1986–1997).

I recently participated in a peer review of the studies of the International Consortium for Research on the Health Effects of Radiation, which has major studies ongoing in Russian, Belarus, and Ukraine. I was rather amused that they had no documentation for their dosimetry other than to mention that their Russian thyroid work was “just like” what was published by Gavrilin et al. (the paper I sent you on March 17) and to say that the dosimetry in Ukraine was similar to that of Likhtarev et al. (1996 paper in *Health Phys.*), but would be improved as in the paper just submitted and mentioned above. Thus, I think we have had a positive impact.

Sincerely yours,

Lynn R. Anspaugh, Ph.D.

Enclosure: As noted.

cc: Frank Hawkins, wo/enc.; Elizabeth White, wo/enc.; Ruth Neta, wo/enc.



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July 19, 1998

Mr. Barrett Fountos  
U.S. Department of Energy  
EH-63/270 CC  
19901 Germantown Road  
Germantown, MD 20874-1290

Dear Barry:

Enclosed is the revised manuscript, "Chernobyl accident: Reconstruction of thyroid dose for inhabitants of the Republic of Belarus," by Yuri I. Gavrilin, Valeri T. Khrouch, Sergei M. Shinkarev, Nikolai A. Krysenko, Anatoli M. Skryabin, André Bouville, and Lynn R. Anspaugh. As noted in the enclosed submittal letter, this manuscript has been resubmitted to *Health Physics*.

This marks the completion of Milestone 2 of my old Chernobyl-related project.

Sincerely yours,

Lynn R. Anspaugh, Ph.D.



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July 9, 1998

Dr. Kenneth L. Miller  
Editor, *Health Physics*  
M.S. Hershey Medical Center  
500 University Drive  
Hershey, PA 17033-0850

Dear Dr. Miller:

You will find enclosed a revised manuscript of the paper entitled "Chernobyl accident: Reconstruction of thyroid dose for inhabitants of the Republic of Belarus," by Yuri I. Gavrilin, Valeri T. Khrouch, Sergei M. Shinkarev, Nikolai A. Krysenko, Anatoli M. Skryabin, André Bouville, and Lynn R. Anspaugh. As per our understanding of your requirements, an original plus one copy of the complete paper with tables and figures is included in addition to a diskette containing the text of the paper in one file and the tables and figure legends in another file. We are also including a version of the old paper marked by Reviewer No. 1.

This paper was previously submitted quite some time ago and was numbered 0323/95. Due to many complications in dealing with our co-authors in three countries, including two from the former Soviet Union, it has been very unusually time consuming to resolve all of the issues with the paper. We have now taken all of the reviewers' comments into consideration and made changes accordingly. The outcome is a paper that essentially has been rewritten. The following are our responses to the comments of two reviewers—there were no comments from the Associate Editor.

**Reviewer 1:**

- 1) OK, no response required.
- 2) Table 7 now provides detailed information on the distribution of the thyroid doses. We propose the following key words: Chernobyl, Thyroid, Dose Assessment, <sup>131</sup>I, and Belarus.
- 3) The last paragraph of the Introduction includes now a short description of the dose-reconstruction efforts conducted in Ukraine and in Russia, with references. We did not make

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reference to the report of the International Chernobyl Project, as it gives very little information on thyroid doses in Belarus.

4a) We feel that Table 1 (now Table 4) should be kept in the paper, as it summarizes information that is scattered throughout ten pages of text.

4b) The characteristics of the thyroid-activity-measurement equipment are now more fully described on page 6. Contrary to the reviewer's opinion, no measurements included in the database were done by means of hospital radiodiagnostic equipment.

4c) Arefieva et al. 1987 is quoted. The reference "Ilyin (Ed.) 1988" is in fact "Arefieva et al. 1988" and we have verified that this is the proper reference.

4d) The data of Vakulovskii et al. have now been published by Makhonko et al. (1996). We eliminated the reference to Vakulovskii et al. and replaced it with Makhonko et al. (1996). We do not see the reason why these scientists should be co-authors of the paper.

5a) The new Table recommended by the reviewer has been prepared. It is Table 7.

5b) The section "Collection and verification of environmental  $^{131}\text{I}$ -contamination data" has been removed.

5c) The section on "second-iteration data" has also been removed.

6) To the best of our knowledge, the references were prepared in accordance with *Health Physics* policy.

## Reviewer 2

General: A serious effort has been made to revise the paper in order to make it more clear and understandable to the reader. The paper has been reorganized and streamlined; it is now consistent with the traditional style of papers published in *Health Physics*.

1) OK, no response needed.

2) OK, no response needed.

3a) Information on the equipment and how measurements were conducted is now given on pages 7 and 8.

3b) As indicated on page 10, available information on the date when individuals started taking KI pills was not used in the initial assessment, either because the date given was too late to have a significant effect on the thyroid-dose estimates or because the answers were thought not to be reliable. What is not stated in the paper is that there is to this time no clear information on how,

when, where, and to whom KI pills were distributed. We believe that the distribution of KI pills was late and inefficient, but we have no proof. It is our intention to investigate this issue in depth in the months to come. Regarding the date when individuals stopped drinking fresh milk, we make it clear on page 10 that this information was used.

3c) We have attempted to clarify, on pages 10–13, how the “measured” doses are derived from the direct thyroid measurements. In order to do so: (1) We used a simpler formulation, (2) we make it clear that  $D_{131}$  is not directly proportional to  $D_0$ , and (3) we list the main assumptions that were used in the calculations and indicate the parameter values that were used.

4) The paper was rewritten in such a way that the description of the methods is now clearly separated from the results and discussion.

5) There is now a section called “Results and discussion”, in which an attempt to discuss the results has been made.

6) References to thyroid-dose reconstruction in Ukraine and in Russia are now provided in the paper. The methods that were used in Ukraine and in Russia present similarities with those used in Belarus, but there are also substantial differences. The purpose of this paper is to provide information on what was done in Belarus. We believe that this has been done in more detail and more clearly than in any other paper that has been published so far on the subject. A comparison with the results obtained in Ukraine and in Russia could be made, but it would not be straightforward and would require pages of presentation and discussion that would detract from the main purpose of this paper. As stated on page 6, “there is, to this date, no comprehensive review of the thyroid-dose-reconstruction efforts that have been undertaken in the three countries.”

7) We have rewritten the paper and tried to make it as clear as possible.

8) OK, no response needed.

9) OK, no response needed.

10) OK, no response needed.

11) We have attempted to clarify the Tables and the Figures. The numbers in old Table 8 (now Table 9) have been confirmed: The cities of Gomel and Mogilev (where radioactive contamination was relatively low) had proportionately fewer children with measured doses, as most of the measurements were made in more heavily contaminated areas.

12) OK, no response needed.

13) OK, no response needed.

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Other comments: These were taken into account in the rewrite of the paper.

We hope that you can accept this substantially revised paper for publication in *Health Physics*. Please do not hesitate to contact me if you need further information.

Sincerely yours,

A handwritten signature in black ink, reading "Lynn R. Anspaugh". The signature is written in a cursive style with a large, stylized initial "L".

Lynn R. Anspaugh, Ph.D.