



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCT 24 1986

MEMORANDUM FOR: Robert E. Alexander, Chief
Safety Research Applications Branch, DRA

FROM: Harold T. Peterson, Jr., Sr. Health Physicist
Safety Research Applications Branch, DRA

SUBJECT: IAEA ADVISORY GROUP ON PRINCIPLES FOR LIMITING RADIOACTIVE
RELEASES FROM NUCLEAR POWER PLANTS; SWEDISH NATIONAL
INSTITUTE OF RADIATION PROTECTION, STOCKHOLM, SWEDEN,
AUGUST 3-8, 1986.

IAEA Advisory Group - I attended the meeting of this group as the U.S. representative. The membership of this IAEA Advisory Group is listed in an enclosure. Professor Bo Lindell, formerly Chairman of the ICRP and formerly Director General of the Swedish Radiation Protection Institute, was the Chairman.

The purpose of the Advisory Group was to prepare a document that provides guidance on principles for limiting radioactive releases from nuclear power plants. This document is intended to provide detailed guidance to IAEA member states on implementing the principles of the 1977 recommendations of the International Commission on Radiological Protection (ICRP-26). The basic principles of implementing ICRP-26 were set out in a 1977 IAEA Report, Safety Series No. 45 (SS-45). As that document was prepared concurrently with ICRP-26, it did not totally agree with the final ICRP Publication No. 26; therefore a 1986 revision (IAEA Safety Series No. 77) was prepared to supersede IAEA SS-45.

In addition to the present advisory group on nuclear reactor effluents, there also is an IAEA advisory group on effluents from uranium mining, milling, and fuel fabrication, and an additional advisory group on reprocessing plant effluents is under consideration. This reprocessing group is somewhat ahead of the reactor group in having prepared a few drafts of their report whereas this was the initial convocation of the reactor group. Drafts of the mining and milling report have been circulated within NRC for comment by NMSS. The preparation of this series of documents was initially scoped out by an IAEA advisory group in Teheran in 1977. The delay in their implementation may have reflected post-TMI priorities within the IAEA.

The Advisory Group had the benefit of a working paper prepared by Mr. William Bush, formerly Director of the Radiation Protection Division of the Canadian Atomic Energy Control Board (AECB) and presently Scientific Secretary to the AECB Advisory Committee on Radiation Protection. Most of the paper dealt with detailed models and parameters for environmental pathway and dose assessment (similar to those in Regulatory Guide 1.109). From the content of a copy of

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this working paper that I received in advance of the meeting, I fully assumed that the emphasis would be on these models and parameters for dose assessment and brought references related to these topics. However, at the meeting, Mr. Achmed, the IAEA Scientific Officer, and Dr. Dan Beninson, Chairman of the ICRP and Director of Reactor Licensing for Argentina, noted that an IAEA Advisory Group under Dr. Beninson was in the midst of revising IAEA Report No. 57, "Generic Models and Parameters for Assessing the Environmental Transfer of Radionuclides from Routine Releases," to include models for assessing collective as well as individual doses. Consequently, a detailed treatment of the environmental dispersion, bioaccumulation, and dosimetry models would not be needed in the present report on reactors. Mention was also made of IAEA efforts to put together a compendium of age-dependent dose factors.

Without the concentration on the dose factors and environmental transport modeling, much of Bush's text was not used. It was decided that what is called for is a relatively short document paralleling the document on mining and milling effluents and bringing out guidance and examples on effluent control specific to power reactors. I chaired a writing group to produce a chapter on the reactor source term (dealing with routine releases and "typical operational occurrences" rather than major accidents). There was not sufficient time to produce a complete report, so the partial chapters and guidance were given to Mr. Bush with instructions to produce another draft report. It was indicated that a second meeting of the group might be necessary, but because of IAEA budget restrictions, it would have to be late in 1987 or in 1988. (A tentative trip has been added to the RES foreign travel forecast for this purpose.) Copies of the next draft of the report will be sent to addressees of this trip report when it is received.

Other IAEA Activities - Other on-going IAEA-sponsored efforts of interest are a report on effluent and environmental monitoring (due in 1986) and a report on the applications of radiation protection principles to potential sources. The latter effort, under Dr. Gonzales of Argentina, deals with "potential sources," i.e., probabilistic releases as from major accidents. Mr. Geoffery Webb, an Assistant Director of the U.K. National Radiological Protection Board, is a consultant to this group. A consultative document (a working paper prepared by a consultant) is expected in January 1987. This activity has importance regarding accident dose analysis (and perhaps the NRC Safety Goals) and probably should be followed closely by the NRC staff.


Chernobyl - The Chernobyl accident was a matter of great interest. I asked whether the Swedes had prepared a written report of their measurements. The following day, copies of "Chernobyl - Its Impact on Sweden" (Statens Stralskyddsinstitut rapport SS1 86-12), a summary report in English, were distributed to the conferees. One of the French delegates (Mme. Francoise Laylavois), a co-author of the French report on radiation levels from Chernobyl, had a copy of that report with her. The Swedes reproduced the French report (which was in French) and distributed it to the conferees. Both the Swedish and French reports were copied and distributed upon my return from Sweden to Frank Congel, NRR (multiple copies); R. Hauber, IP; and D. Ross, K.

Goller, and R. Alexander, RES. Additional copies of both reports were also provided to Tim Margulies (RES, RDB) and S. Yaniv (RES, SRAB).

On Wednesday, August 6th, the IAEA and our Swedish hosts held a dinner. The dinner was held in an auxiliary building of the Swedish Institute for Radiation Protection. This building is a former courthouse and houses their work related to nuclear facilities (Professor Bo Lindell, the former Director of the institute, also has his office in this building.) In addition, the courtroom itself serves as their Emergency Response Center. We were permitted to tour this facility, which still had maps of the Chernobyl fallout prominently displayed. The maps made it quite evident that the Swedes were somewhat fortunate in that the two bands of highest contamination went north and south of the heavily populated area around Stockholm. The Swedes indicated that one of their main problems from the Chernobyl fallout will be the cesium-137 in reindeer meat. This is a particular problem for the following reasons:

- (1) cesium-137 has a 30-year half-life;
- (2) cesium is highly concentrated by lichen which have a long retention half-time and serve as a major food source for reindeer;
- (3) cesium is further concentrated by the grazing of the reindeer over wide areas, and;
- (4) reindeer meat provides the major source of protein for the Laplanders in the northern part of Sweden (as well as in Norway and Finland).

The maximum cesium-137 content in reindeer meat was 10 kBq/kg (about 0.27 uCi/kg) which, if consumed at the level of U.S. meat and poultry consumption (110 kg/yr for the maximum adult), would result in a projected annual cesium-137 intake of close to 30 uCi the first year and a committed dose equivalent of $(0.27 \text{ uCi/kg})(110 \text{ kg/yr})(7.14 \times 10^{-5} \text{ mrem/pCi})(10^6 \text{ pCi/uCi}) =$ about 2 rem. Long-term levels were estimated to be reduced to no lower than 0.3 kBq/kg (8.1 nCi/kg) which would give committed dose equivalents in excess of 0.5 rem per year (0.58 rem/yr). As the ICRP-recommended limit for exposure of the general public to all sources of radiation is 0.5 rem per year, the contribution from the Chernobyl fallout is of understandable concern to the Swedes, particularly as there are no readily available substitutes for reindeer meat in the diet of the Lapps.



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Enclosure:
Advisory Group Membership

- cc: E. Beckjord, RES
- D. Ross, RES
- F. Congel, NRR
- J. Buchanan, IE
- R. Cunningham, NMSS
- R. Alexander, RES
- D. Morris, RES
- G. Arlotto, RES
- R. Hauber, IP
- Division of Security
- V. Stello, EDO

Department of Nuclear Energy and Safety
Division of Nuclear Safety

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NOTIFICATION OF AN AGENCY-SPONSORED MEETING

Title of meeting: Advisory Group Meeting on the Application of the Principles for Limiting Radioactive Releases in the Case of Nuclear Power Plants (611-J1-AG-548)

Dates of meeting: 4-8 August 1986

Opening: 9:30 a.m.

Place of meeting: The National Institute of Radiation Protection, Fack, S-104 01 Stockholm.

Scientific Secretary: Mr. J U. Ahmed, Room A2725, ext. 2719

| <u>PARTICIPANTS</u> | <u>ADDRESS ABROAD</u> | <u>ADDRESS IN STOCKHOLM</u> | <u>P E R I O D</u> |
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| <u>CANADA</u> | | | |
| Mr. W. Bush | Atomic Energy Control Board P.O. Box 1046 Ottawa | " | 4-8 August 1986 |
| <u>CZECHOSLOVAKIA</u> | | | |
| Mr. Jan Salava | Ministry of Health of CSSR Prague | " | 4-8 August 1986 |

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| Mrs. Helga Zindler | Staatliches Amt für Atomsicherheit und Strahlenschutz Waldowallee 117 1157 Berlin | " | 4-8 August 1986 |
| <u>FINLAND</u> | | | |
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| Mr. Daniel Manesse | Departement d'Analyse de Surete BP No. 6 Centre de Fontenay aux Roses | " | 4-8 August 1986 |
| M. Françoise Laylavoi | CEA BP 6 Fontenay-aux-Roses | " | 4-8 August 1986 |

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| Mr. I.S. Bhat | Scientific Officer(SF) Environmental Survey Laboratory TAPS Colony , TAPP Post Thane District, PIN Code: 401 504 Maharashtra | " | 4-8 August 1986 |
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| Prof. B. Lindell | National Institute of Radiation Protection Box 60204 S-104 01 Stockholm | " | 4-8 August 1986 |
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| Mr. N.T. Mitchell | MAFF Fisheries Laboratory LOWESTOFT Suffolk NR33 0HT England | " | 4-8 August 1986 |

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