

University of Cincinnati



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United States Nuclear  
Regulatory Commission  
Region III  
801 Warrenton Road  
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January 5, 1996  
(revised)

License Number: 34-06903-05  
Re: Amendment Request

Gentleman/Madam:

The University of Cincinnati requests an amendment for broad scope license 34-06903-05 to authorize specified visitors of radiation patients, as members of the public, to receive up to 500 mrem per year.

The University of Cincinnati makes the request under 10 CFR 20.1301(2)(c), and as recommended in NCRP 91 (copy attached), to permit a small population of the general public to be infrequently exposed to an annual exposure limit of 500 mrem total effective dose equivalent.

- a) The individual to whom the 500 mrem annual limit would apply would be specified visitors of radiation therapy patients hospitalized under 10 CFR 35.75 or *specified visitors of radiation therapy patients receiving temporary brachytherapy implant under 10 CFR 35.400.*
- b) The dose limit is not requested for all visitors of all radiation therapy patients hospitalized under 10 CFR 35.75. The dose limit is requested only for specified visitors determined by the physician to be necessary for the emotional and/or physical support of the patient (e.g., parents of children, elderly patients who need support from a familiar individual, etc.).
- c) The specified visitors will be limited to adult (18 or older) non-pregnant individuals who are members of the family or are individuals with a significant personal relationship to the patient.
- d) The specified visitors will be instructed to maintain their exposure ALARA. The instruction will emphasize the basic radiation safety precautions of time, distance and shielding.

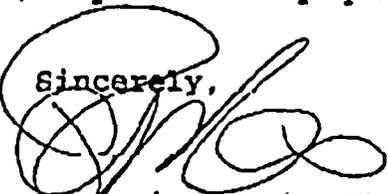
- e) To document compliance with the dose limit the specified visitors will be monitored (pocket dosimeter, film badge, TLD or electronic dosimeter) while the patient is hospitalized for the radiation therapy treatment.

*The University of Cincinnati understands that one of the main objectives of the Nuclear Regulatory Commission in granting requests under 10 CFR 20.1301(2)(c) is that the exposure limit is temporary. The University of Cincinnati feels that this request achieves this objective because persons will only be authorized to receive the exposure for a temporary period of time (i.e., during that period when they are specified visitors of patients hospitalized while receiving radiation therapy).*

This amendment covers items applicable to the human-use of radioactive materials. A check (check number 108051) for the amendment fee of \$560.00 was mailed to P.O. Box 954514, St. Louis MO 63295-4514 on December 12, 1995.

If you have any questions do not hesitate to call.

Sincerely,



Victoria Morris, M.S., CHP  
Radiation Safety Officer

- c: B. Aron, M.D.  
W. Barrett, M.D.  
C. Kupferberg  
H. Maxon, M.D.  
R. Millard, Ph.D.

## 18. Remedial Action Levels for Members of the Public

If the recommendations of the previous Section are observed, man-made radiation sources will not expose members of the public to annual effective dose equivalents greater than 1 mSv (0.1 rem) continuously, or 5 mSv (0.5 rem) infrequently. Exposures should always be less than the limits and, indeed, on the average, utilizing the principles of ALARA, they should be much less.

However, natural background is excluded from those limits and there are circumstances in which natural background itself, or more especially, natural radiation sources enhanced locally by man's operations for selected purposes, can give rise (sometimes quite inadvertently) to annual exposures above the level of 1 mSv (0.1 rem).

It then becomes necessary to consider at what exposure level remedial action, which may be possible only at substantial societal cost, should be undertaken. Remedial action levels involve a balance of risk and many other socioeconomic factors. In general, the aim of setting a remedial action level is to reduce the greatest risks from a given type of radiation source. It is clear that once a remedial action level is established for given circumstances, action is mandatory when a level above it is found. Actions to reduce exposure should not be limited by or to the remedial action level and, following the ALARA principle, levels substantially below the remedial action level may be obtainable and appropriate.

For external sources, the NCRP considers that the risks to the public from exposure to all sources except medical, should not exceed about five times the total of other risks faced by members of the public. Thus, an annual remedial action level is specified at an effective dose equivalent of 5 mSv (0.5 rem) for all external sources other than medical. External sources are specified because internal exposures from radionuclides other than radon are rarely limiting in present circumstances (NCRP, 1984a).

The recommended remedial action level, 5 mSv (0.5 rem), is 10 times greater than the average annual effective dose equivalent due to external exposure from natural background 0.5 mSv (0.05 rem). It is also comparable with the annual effective dose equivalent received by many radiation workers.

The NCRP has given special attention to the problems occasioned by exposure to indoor radon (NCRP, 1984a, 1984b) and notes that *this is potentially the most important public radiation exposure problem that currently exists*. As a result, a remedial action level of  $0.007 \text{ Jhm}^{-3} \text{ y}^{-1}$  (2 WLM  $\text{y}^{-1}$ ) was recommended in NCRP Report No. 77 (NCRP, 1984a). Elements of feasibility enter the considerations here since it is evident from NCRP Report No. 77 (NCRP, 1984a) that in a substantial number of homes the radon levels are estimated to exceed the average by amounts up to 5 or 10 times or more. It is certainly desirable that such levels be reduced and the risks associated with them decreased. A remedial action level must, therefore, be chosen for which the societal impacts are not excessive, but the greatest risks are avoided. The NCRP recognizes that an annual inhalation level for radon that corresponds to 5 mSv (0.5 rem) effective dose equivalent would be about  $0.00175 \text{ Jhm}^{-3}$  (0.5 WLM), see ICRP Publication 32 (ICRP, 1981). However, this is only two and one-half times the present estimated average annual indoor radon background exposure of  $0.0007 \text{ Jhm}^{-3}$  (0.2 WLM) and imposition of a remedial action level at this value could involve a very large number of homes. Therefore, the NCRP proposed a remedial action level which was based on excess lifetime risk being no more than 10 times the present average annual background level, or  $0.007 \text{ Jhm}^{-3} \text{ y}^{-1}$  (2 WLM  $\text{y}^{-1}$ ) (NCRP, 1984a). The annual risk of lung cancer associated with this level is  $4 \times 10^{-4}$ , and NCRP considers risks of this magnitude undesirable. However, it is anticipated that remedial actions, once taken, will, together with ALARA, establish new annual radon exposures in a given home much below  $0.007 \text{ Jhm}^{-3}$  (2 WLM).

It is also anticipated, over time, and assuming that the problem of indoor radon is addressed by taking the worst situations first, that radon levels in existing homes will be reduced. Furthermore, the Council believes that for new homes, suitable constraints should be developed so that they will have radon levels below those of many present structures.

For the present, it is recommended that remedial action be undertaken:

- (1) *When the average annual effective dose equivalent from external exposure<sup>12</sup> (excluding medical, but including naturally occurring sources) continuously exceeds 5 mSv (0.5 rem).*
- (2) *When the total exposure to radon and its decay products for an individual exceeds an annual average of  $0.007 \text{ Jhm}^{-3}$  (2 WLM).*

<sup>12</sup> In the unlikely event, that internal exposure other than radon could make a significant contribution, it should be included in the assessment of exposure.

**DISTRIBUTION:** (IMNS TAR-5241) March 19, 1996

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