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NEUTRON PRODUCTS inc

22301 Mt. Ephraim Road
Dickerson, Maryland 20842 USA
301-349-5001 TWX: 710-825-0542

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March 14, 1994

The Secretary
U. S. Nuclear Regulatory Commission
Washington, DC 20555

FAXED and hard copy hand carried to NRC-Rockville on March 14, 1994

Ladies and Gentlemen:

We appreciate the opportunity to comment on the NRC's proposed decommissioning criteria. These comments and recommendations are the product of:

my 43 years of active, thoughtful and responsible work directed to the production, management and constructive use of radioactive by-products;

discussions with experienced and independent thinking colleagues who have successfully devoted the bulk of their life's work to the production and use of radioactive by-products;

the extensive review and evaluation of the professional literature related to the biological effects of low level exposure to ionizing radiation;

nearly ten years of experience with the consequences of what the nuclear regulatory community perceives to be "conservative" regulation; and

participation (as an uninvited member of the public) in one of the "participatory" workshops.

Comments

1. Although NRC makes frequent reference to a "proposed rule", the package of material we received is not characteristic of a Notice of Proposed Rule-making. Rather, it constitutes a rather inconclusive discussion of diverse views and possible alternatives; so that the Commission Staff appears to be asking its respondents to propose decommissioning criteria rather than comment upon a set of Commission proposed criteria. In faithful response to that ostensible invitation, we have drafted some criteria which are respectfully presented for your serious consideration in the Section of this letter entitled "Recommendations". First, some factual background.

2. In reducing the permissible limit on public exposures to gamma radiation from 500 mRem per year to 100 mRem per year, NRC offered no solid scientific justification. Rather, the reduction was proposed (and accepted without much complaint) on the premises that:

the lower limit was considerate of those who suffer from radiation phobia, and it could be achieved in most instances without inordinate expense;

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it is well within the range of normal variations in personnel exposures from nature that have given no indication of adverse effect; and

it is much lower than the avoidable exposures to radiation (such as high altitude flying, brick fireplaces, concrete buildings, diagnostic X-Rays, the decorative use of granite, and living in Colorado) that the people of a free society can be reasonably expected to experience voluntarily.

3. Nevertheless, at least for gamma radiation, there is no scientific basis for believing that the 100 mRem per year limit now in effect is safer than the 500 mRem per year limit that had previously been the standard for forty years. Rather, numerous studies of similar populations exposed to different levels of background radiation indicate that populations exposed to higher levels of background radiation experienced increases in longevity and a lower incidence of cancer. While those studies may not be sufficiently conclusive to justify hormesis as the cardinal principle of nuclear regulation, they should serve to restrain the growing misuse of the Linear No-threshold Hypothesis in the establishment of regulatory criteria.

4. The Linear No-threshold Hypothesis is valid only to assign a number to the collection of worst case assumptions that could conceivably be applied to the possibility that ionizing radiation is harmful at low rates of exposure. Thus, the calculated "risk" of 1 cancer fatality per 10,000,000 person milliRem of radiation exposure is not a probable result, but a worst conceivable case number that ignores the following facts:

among the Hiroshima-Nagasaki survivors, there was no statistically valid correlation between radiation exposure and genetic effects; and in fact the data clearly argue that there is no adverse genetic effect for exposures of less than several hundred Rem;

a semilog plot of the Hiroshima-Nagasaki survivor data argue convincingly that the adverse effect of high-rate exposure to ionizing radiation is logarithmic above a no-effect threshold of 10 to 80 Rem, the threshold depending on the particular type of cancer at issue;

there is persuasive evidence that radiation workers, and radiologists not engaged in the careless use of radium, suffered no adverse impact from lifetime occupational exposures averaging less than 5 Rem per year of age, incurred at rates of 4 Rem per calendar quarter or less; and

there is equally persuasive evidence that persons exposed to ionizing radiation in amounts and at rates sufficient to adversely impact the immune system have experienced measurable increases in cancer incidence.

Thus, the probable increase in cancer risk arising from the annual exposure of persons to 100 (or 500) mRem of ionizing radiation is reasonably believed to be zero. Persons who are reluctant to accept that conclusion can be reasonably assured that, even if all the worst scenario concerns are given full weight, the increased risk of cancer at age 80 from a lifetime of exposure to 100 mRem

(or 500 mRem) per year is no greater than 0.08% (or 0.4%) as compared to an incidence of 22% for the average unexposed population.

5. Yet, NRC proposes to set its decommissioning criteria at 15 mRem and its goal at 3 mRem per year. Why? For the reasons set forth below, the probable costs to society far outweigh the probable benefits.

5.1 As demonstrated earlier, the probable benefit in reduced cancer incidence is zero. Moreover, even if the E-4 risk/Rem relationship were valid, the proposed reduction in permissible limit would decrease the inflated lifetime risk of cancer incidence from 22.08% to 22.002%.

5.2 Although the benefit of the proposed stringency is trivial at best, the downside risk is certain and substantial.

A misinformed public will receive another dose of misinformation in the form of a new radiation protection objective - 3 mRem per year. Why should it accept a higher level from an operating facility?

The difficulty of achieving and assuring such levels with accuracy will give the financial community, already burned by RECRA, yet another reason not to finance facilities subject to such regulation.

Against a standard of 100 mRem per year of probable exposure to individuals, the prudent and proper use of ALARA, combined with the normal desires of most owners to provide margin against regulatory violations, will provide for ample protection of the public.

Yet, if history is any indicator, overly zealous regulators are likely to use the 3 mRem (or 15 mRem) per year decommissioning "goal" as a precedent for reducing the permissible site boundary exposure levels of selected operating facilities to such levels, thus subjecting responsible licensees to unwarranted citations and fines for offenses of no conceivable public health consequence.

Concluding the discussion of this point, the 100 mRem per year criterion is amply protective of public health if applied to the probable exposure of individuals; and the imposition of ALARA at \$1,000 per person-Rem of probable exposure is not likely to work a hardship on any licensee or unduly discourage the financing of worthwhile projects and facilities. An ALARA cutoff of 15 mR per year may be harmless provided the regulation is clearly worded, and is enforced in a way that prohibits the regulatory abuse of responsible licensees. For whatever it's worth, it is our view that the imposition of regulations and license conditions more stringent than required for protection of the environment, the public health and employee safety violates the stated purpose of the Atomic Energy Act to maximize the safe and commercially viable use of atomic energy through competitive free enterprise.

6. At the participatory workshop I attended I noted that the dismantling and disposal of major facilities as radioactive waste seemed unnecessarily expensive and hazardous when compared to the cost and risk of in situ

ioning. Both NRC personnel and the anti-nuclear activists who were on the panel at NRC's invitation assured me that in-situ decommissioning had been ruled out several years ago and would not be reconsidered. Yet, the package of information furnished appears to anticipate and accommodate decommissioning in situ. If that is indeed the case, the proposed regulatory criteria offer a significant improvement over past doctrine.

In our particular case, initial estimates indicate that the prospective cost of facility dismantling and disposal would likely exceed the company's net worth by a wide margin.

Under the policies described at the workshop, we were well advised to create a reserve against all earnings until we have covered the probable (and all but imponderable) cost of decommissioning; and

it was hopeless to consider the prospect of mortgage financing.

7. Given rational regulatory criteria, we are not faced with high costs of remedial action on the one portion of our plant that has been subject to contamination; and 80% of our plant already satisfies any rational standard for decommissioning. Accordingly, if in situ decommissioning is indeed to be permissible, our prospective costs of decommissioning will come well within the scope of fractional reserves against earnings; and mortgage financing becomes a reasonable prospect.

Recommendations

8. It is our opinion that the criteria set forth in this section will help provide for the safe and efficacious decommissioning of those facilities that should be decommissioned for valid cause while fostering the continued safe operation (and orderly growth) of those facilities that contribute to the public well being.

9. It is our intent that these criteria be responsive to the legitimate concerns of informed citizens while allaying (or at least not aggravating) the concerns of those who believe that there is no safe level of exposure to ionizing radiation.

10. At the option of the owner(s), and with the concurrence of the NRC, any licensed facility may be decommissioned in any of the following ways:

10.1 It may be decommissioned in situ, in accordance with duly approved plans.

10.2 It may be partially or completely dismantled, the dismantled portions to be properly packaged and shipped to one or more authorized waste disposal sites pursuant to duly approved plans.

10.3 Portions of plants that remain in situ shall be decontaminated, or subjected to contamination fixing pursuant to duly approved plans.

10.4 Recognizing that initially perceived facts and expectations may change in the course of decommissioning, duly authorized plans may be adjusted from time to time by mutual agreement of NRC and the owner.

10.5 Prior to the completion of decommissioning, all major sources of radioactivity, such as nuclear fuel, sealed sources and radioactive waste shall be shipped off site to a duly authorized recipient.

11. The decommissioning process shall be completed at such time as one or more of the following criteria are satisfied.

11.1 The site has been placed in a condition that enables it to be released for unrestricted use, said condition to be agreed upon in advance, and unlikely to result in:

the accidental uncovering of any radioactive material not naturally present on the site, and present in quantities that exceed the levels set forth in Appendix --, Column --; or

the exposure of any individual to a TEDE exceeding 100 mRem per year.

11.2 The decommissioned facility has been placed in a stable and isolated condition whereby inadvertent access is reliably denied to unauthorized parties; radioactive contamination has been either removed, reduced to a level no greater than twice natural background, or reliably fixed; the maximum radiation level at any point on the accessible boundary is no higher than 0.06 mRem per hour, and the facility is on property that is monitored and controlled by a responsible licensee.

11.3 Some other temporary or permanent disposition that is mutually agreed to by the owner and the NRC.

Those are our thoughts in response to the package of information received and the NRC's invitation to comment. We appreciate the opportunity to comment, and hope that these comments are helpful.

Very truly yours,

NEUTRON PRODUCTS, INC.

J. A. Ransohoff, President

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