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ROCKY MOUNTAIN ENERGY COMPANY

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ENVIRONMENTAL SERVICES
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Docketing and Service Branch

Dear Sirs:

This letter contains comments in response to "Standards for Protection against Radiation; Advance Notice of Proposed Rulemaking".

Sincerely,

Dr. Lyda Hersloff

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Environmental Specialist

LWH/kc

cc: C.M. Bolser
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I. Essential Elements of the Radiation Protection Standards

a) Radiological Protection Principles

Statement: "Identification of basic assumptions used for radiation protection purposes such as: (1) there is within the range of exposure conditions usually encountered in radiation work, a linear relationship without threshold between dose and probability of stochastic effect;"

Comment: The above statement, although often assumed by regulatory agencies to be the best approach, has not been substantiated for low doses up to and including the present standard of 5 rem per annum for radiation workers. In addition, a dissenting report of the Committee on the Biological Effects of Ionizing Radiations, BEIR, 1979 states "In contrast the dose-effect relation for low LET radiation is very unlikely to be linear in this dose range" (a few to about 100 rad). "We conclude furthermore that risk estimates for whole body irradiation that are based on individual organ risk extination in BEIR III are overestimates of incidence at low doses. We do not believe that there is adequate information to determine accurately the magnitude of the error. It seems likely however that it is as much as an order of magnitude and possibly more". Finally, what does appear to be linear is the effect of radiation dose with dose rate. For example, there is a strong linear correlation for a total dose between the dose rate and the $LD_{50(30)}$.

Statement: (2) "The severity of each type of stochastic effect is independent of dose".

Comment: The response of biological systems to irradiation has in fact been shown to be independent of total dose when considering fractionated doses, type of radiation as well as the dose rate. The ultimate effect of the radiation scheme depends to a large extent upon the processes of repair, redistribution and reoxygenation. It is apparent that total dose is not a good predicter of effect and risk and therefore should not be used exclusively in establishing radiation protection standards.

Statement: "Identifications of the basic radiation protection principles which are derived from the assumptions, such as: (1) No practice or operation involving exposures to radiation should be adopted unless its introduction produces a positive net benefit".

Comment: The site of Uranium mining and milling, or a nuclear reactor may not benefit the population in the immediate vicinity. It is important to consider the good of the whole, in this case the whole population of the United States of America. In the same vein, it is unfair to burden the Nuclear Industry with excessively restrictive standards to the "regional population" when the benefit to the whole appears to outweigh the small risks of present radiological standards.

I. b) Standards for Individual Occupational Exposures

Statement: "(2) Consideration of special provisions for limiting exposures of susceptible groups (eg. embryo/fetus, women in general, fertile women and minors), applicable laws being taken into account".

Comment: Often times in our society's attempts to protect women and children, we overlook the part males play in the reproductive process. Many of the cells of the spermatogenic series undergo necrotic changes, chromosome abnormalities, and inhibition of division following small to moderate radiation exposures. Genetic changes in these cells also occur with very small radiation doses. Even though mature sperm are radio-resistent, the spermatogenic series, especially stem cells undergo mitosis and therefore are quite radiosensitive. As with the male, irradiation of follicles containing ova may cause genetic changes as well as temporary sterility. It is therefore not reasonable, on the basis of gender alone, to limit the amount of radiation exposure of women. Further, to do so would potentially eliminate 20 million jobs from the job market for women. Finally as per the Federal Register, Vol. 45 No. 23/February 1, 1980, the Equal Employment Opportunity Commission and Department of Labor issued the following guidelines:

> If the hazard is known to affect the fetus through either parent, an exclusionary policy

directed only at women would be unlawful under Title VII and E.O. 11246, if the hazard is shown by reputable scientific evidence to affect the fetus through women only, the class excluded must be limited to pregnant women and not all women of childbearing capacity. Whether expressed in policy or not the employer/ contractor's conduct will be examined by the enforcement agencies to determine whether the conduct is non-discriminatory or justified.

Based on the above it is recommended that the above referenced statement read: "Consideration of special provisions for limiting exposures of susceptible groups (eg. embryo/fetus, all people of reproductive age, pregnant women, and minors) applicable laws being taken into account".

c) Standards for Exposures of the General Public

Statement. (2) "Effluent release limits including ALARA (as low as reasonably achievable) numerical guides and consideration of special populations".

Comment: The nature of radiation exposures in the environment is such that only distribution statistics can adequately describe any exposure condition. To be practical, limits set on effluent releases to limit exposures should include confidence limits for measurements, acceptable and realistic probabilities of exceeding specified limits or other statistical specifications.

The principle of ALARA, as first introduced by the ICRP and NCRP as ALAP (as low as practicable), was not intended to be quantitfies. The AEC, however, in 1971 interpreted ALARA to mean exposures which correspond to those achievable with existing technology. A quantitative definition of ALARA should therefore, of necessity, be based on an in-depth review of the technological cost versus the social benefit in terms of real radiation effects averted as well as distribution statistics.

II. Areas in Part 20 that Need Improvement

b) Standards for Individual Occupational Exposure

Statement: (1) "Consideration should be given to adopting the ICRP recommendations on the use of "effective dose equivalents" and dose

limitations for combined internal and external exposures. Present Part 20 does not preclude radiation exposure as high as a total of 17 rem of combined internal and external dose to the whole body in a single year . . ."

Comment: In the recent ICRP 30 for workers, there is no mention of an "effective dose equivalent". This term needs clarification.

Comment: The radiation protection guides, as cited in 10 CFR 20.101, were developed for normal operational with every effort being made to maintain radiation doses as far below these guides as practicable. It is also emphasized that these are operational guides which should be modified to meet special situations. Perhaps, instead of combining internal and external doses it should be stipulated in 10 CFR 20.101(b)(1) that the limit of 3 rem in any one calendar be applied only after a real determination of its necessity. Further, it may be reasonable to put a restriction on the length of time the special situation dose is applicable for any employee. For example, the wording of 10 CFR 20.101(b)(1) may be changed to read:

(1) During any calendar quarter, not to exceed two consecutive calendar quarters in any one calendar year, the dose to the whole body from radioactive material and other sources of radiation in the licensee's possession shall not exceed 3 rems;

The above would then limit the total possible dose per year for any radiation worker to 8.5 rem while maintaining flexibility for nuclear enterprises to cope with special situations without additional personnel.