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MS. van RONK: Thank you. It's van Ronk. It ends with a K.

MODERATOR BROWN: Okay. And following Ruth, because of a flying schedule, I'm going to ask Greg Jaczko, of Senator Reid's office, to make a brief presentation, then we'll go on to Kalynda Tilges and Leana Hildebrand. So Ruth, welcome.

MS. van RONK: I'm Ruth van Ronk, and I am a resident of Pahrump for more than 30 years. I'm here to present some excerpts of a 20-page paper presented to the Association for Women Geoscientists, Scientists for Indigenous People. And the paper's written by Albert K. Bates, University of Oregon School of Law. It's a copyrighted paper, and partially entitled "Nuclear Waste and Natural Rights." There are at least three -- three distributional injustices in the public health impacts of nuclear energy: Medical, spatial and temporal. The medical inequity relates to the varying

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abilities of different persons to withstand exposure to radiation. We can never know the specific circumstances of every human exposure, the amount and

rate of radiation, the type, gamma, beta, alpha, neutron, low LET, high LET of radiation received. The physical and biological pathways, the duration and frequencies of the exposures, age, health and sex of the individual, the influence of other environmental carcinogens and genetic predisposition and the synergistic multiple effects of other risk factors.

Because of these, and other uncertainties, we will not be able to say for certain in most individual cases whether the effects on particular persons are traceable to any discrete source or even to ionizing radiation generally. The unfair spatial distribution is related to the NIMBY reaction, something governmental regulators almost invariably encounter when trying to site a potentially polluting facility. With few exceptions, the NIMBY selection brings about a selection of sites with the lowest human population, resulting in an inequitable burden of risk that falls most heavily on those who live farthest from population centers, and have the least political visibility.

Temporal inequities are those arising from the transfer of health effects, economic costs, and

various other risks to future generations. This article is primarily concerned with the temporal qualities of radiation on human health.

Okay, then he goes into the presentation of KERMA, which is an acronym for Kinetic Energy Released in Material. Refers to a known quantum of radiation exposure based upon release rates, shielding and other factors, or more simply dose. In microphysics, in nature, energy is regularly cast off from unstable atomic structures in the form of gamma waves, free electrons or beta waves or proton-neutron pairs, alpha particles.

Wait a minute.

When these particles or energies leave their previous residences and radiate outward, they are capable of imparting an electrical charge to other matter that are encountered and so are called ionizing radiation. KERMA is therefore slightly accelerated entropy of biological systems. In the human cells, certain chemical bonds are crucial to the integrity of the genetic code, and breaking just a few of these bonds may endow the code with a permanent alteration.

When a mutated gene is responsible for regulating normal cell growth, an uncontrolled proliferation of damaged cells or cancer can develop. When mutation

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occurs in the procreative cells, or in the developing embryo, birth defects can result. When mutation occurs in the blood-forming tissue, impairment of the immune response system can result, and this can increase susceptibility to an entire spectrum of human disease.

Radiation is therefore said to be mutagenic, carcinogenic, and immunosuppressing. All of these effects which begin at a submicroscopic level remain invisible for extended periods of time until they reach observable proportions. The latent period may be decades, in the case of an incipient cancer, or it may be centuries in the case a genetic effect.

MODERATOR BROWN: You're at five minutes now.

MS. van RONK: Little bit?

MODERATOR BROWN: Okay.

MS. van RONK: Thank you. The gaps in our knowledge, some 240 radionuclides are considered to be significant byproducts of the use of uranium fuel and fission reactors. Some of these isotopes like radium

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226 and uranium 238 have been studied for almost a century. Others have been studied very little. Much of what we would like to know for reliable risk analysis is not merely unknown, but at least for the present, unknowable. If the rate of exposure is unknown, so is the full potential for impact on human

0075

health.

On the positive side, even if low-level radiation can induce cancer and genetic defects, future discoveries in prevention and cure of cancer and genetically-related diseases and genetic engineering may negate many of these effects. Although predicting the course of scientific discoveries thousands of years into the future is indeed impossible, we mere mortals may nonetheless make educated guesses based upon known physics. And then I must direct attention to pages 16 and 18 of this report, which are tables of cancer deaths per million person rem, presented by various sources over a period of time, 1972 through '86, and the range of this --

MODERATOR BROWN: Do you want to submit the entire statement?

MS. van RONK: Yeah, yeah, and the other one is the same in dollars per life.

MODERATOR BROWN: Okay.

MS. van RONK: What's your life worth?

MODERATOR BROWN: Okay.

MS. van RONK: Thank you.