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Sent: Monday, November 16, 2015 5:42 PM
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Subject: FW: Attention: Docket Nos. PRM-20-28, PRM-20-29, and PRM-20-30 regarding comments from the National Tribal Air Association
Attachments: NTAA comments on NRC's Proposed Linear No-Threshold Model and Standards for Protection against Radiation.pdf

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TITLE: Linear No-Threshold Model and Standards for Protection Against Radiation
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Subject: [External_Sender] Attention: Docket Nos. PRM-20-28, PRM-20-29, and PRM-20-30 regarding comments from the National Tribal Air Association

Please find the attached comments submitted this day, November 16th, 2015 from the National Tribal Air Association regarding Docket Nos. PRM 20-28, PRM-20-29, and PRM-20-30 and NRC-2015-0057.

Thanks you,

Andy Bessler
Project Director

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November 16, 2015

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001
ATTN: Rulemakings and Adjudications Staff

Subject: Linear No-Threshold Model and Standards for Protection against Radiation
Docket ID NRC-2015-0057

Introduction

The National Tribal Air Association (NTAA) is pleased to submit these comments and recommendations to the Nuclear Regulatory Commission (NRC), regarding the proposed Linear No-Threshold Model and Standards for Protection against Radiation, 80 Fed. Reg. 50804 (August 21, 2015).

The NTAA is a member-based organization with 97 principal member Tribes. The organization's mission is to advance air quality management policies and programs, consistent with the needs, interests, and unique legal status of Indian Tribes. As such, the NTAA uses its resources to support the efforts of all federally recognized Tribes in protecting and improving the air quality within their respective jurisdictions. Although the organization always seeks to represent consensus perspectives on any given issue, it is important to note that the views expressed by the NTAA may not be agreed upon by all Tribes. Further, it is also important that the NRC understands interactions with the organization do not substitute for government-to-government consultation, which can only be achieved through direct communication between the federal government and Indian Tribes.

The NTAA understands that the NRC has received three petitions for rulemaking that request the NRC amend its "Standards for Protection Against Radiation" regulations to change the basis of these regulations from the Linear No-Threshold (LNT) model, which provides radiation is harmful to the human body at any level, to the radiation hormesis (Hormesis) model, which provides exposure of the human body to low levels of ionizing radiation is beneficial and protects the body from the harmful effects of high levels of radiation.[1] The NTAA provides its comments and recommendations regarding the Proposed Petitions, finding that the LNT model provides the best protection against radiation exposure currently, and that there is a need for additional information regarding the Hormesis model before

1-Threshold Model and Standards for Protection against Radiation," 80 Fed. Reg. 35870, 35871 (June Proposed Petitions).

the petitioners (Petitioners) and others can show the NRC why the model should replace the LNT model as the standard for protection against radiation exposure.

LNT Model Provides Best Protection against Radiation Exposure

The Proposed Petitions make their case for the Hormesis model by attacking the shortcomings of the LNT model, indicating that vast amounts of literature show there are no "protective effects at relatively low doses of radiation."[2] Ideally, the Petitioners want the NRC to eliminate from its consideration actual dosage limits or the "as low as reasonably achievable" principle (also known as the ALARA principle) regarding radiation dosage limits.[3]

The NTAA disagrees with the Petitioners' current request that the Hormesis model replace the longstanding LNT model. A number of individuals and entities authoritative on the subject of radiation exposure support continued use of the LNT model. For example, the National Research Council's Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation finds that "current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing radiation and the development of cancer in human,"[4] meaning there is no radiation dosage level safe enough to guarantee that cancer will not form in the human body. Further, the results of large-scale studies conducted as recently as 2012 and 2013, which examined medical patients' exposure to radiation through CT head scans and the existence of cancer, were generally consistent with the LNT model.[5]

Until such time that the LNT model is shown definitively to be an ineffective model, the NTAA recommends that it continue to serve as the NRC's standard for protection against radiation exposure.

Need Additional Information that Supports Hormesis Model

The NTAA understands that the LNT model may have some imperfections.[6] However, these imperfections are not enough to justify replacing the LNT model, the current NRC standard for protection against radiation exposure, with the Hormesis model for which fewer supportive studies exist than those studies supportive of the LNT model. The Proposed Petitions must do more than try to disprove the LNT model. They must show why the Hormesis model is superior to the LNT model and any other models currently available.

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[2] *Id.*
[3] *Id.*
[4] "Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII - Phase 2," Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, National Research Council (2006).
[5] De Gonzalez, Pearce et al., "Radiation exposure from CT scans in childhood and subsequent risk of leukemia and brain tumors: a retrospective cohort study." The Lancet (August 4, 2012), 380 (9840): 499–505; Darby, Matthews et al., "Cancer risk in 680,000 people exposed to computed tomography scans in childhood or adolescence: data linkage study of 11 million Australians," BMJ: British Medical Journal (May 21, 2013).
[6] Doss, Mohan, "Linear No-Threshold Model vs. Radiation Hormesis." Dose-Response: An International Journal (November 2013) 11(4): 495-512.

The NTAA finds it egregious that the Proposed Petitions are asking the NRC to accept as safe public radiation dose levels equal to dosage levels considered safe for workers, and to cease accounting for differential radiation doses for pregnant women, embryos, and fetuses, and children under 18 years of age,[7] absent a clear understanding about the health and environmental effects of each request. Further, the NTAA must ask why the Proposed Petitions fails to account for numerous scientific studies that show radiation exposure is cumulative over a person's lifetime and can have deterministic and stochastic effects on the person's body to his or her detriment.[8] Use of the Hormesis model would accelerate a person's cumulative exposure to radiation over his or her lifetime, compared to what would occur using the LNT model, and make him or her more susceptible to various cancers and other deleterious effects.

The NTAA recommends that, if the Petitioners and others truly want the NRC to replace the LNT model with the Hormesis model as the standard for protection against radiation exposure, they must provide the NRC with the requisite types and number of peer-reviewed studies that support use of the Hormesis model. At a minimum, the Petitioners and others supportive of the Hormesis model should conduct studies that assess the:

- Means by which people are exposed daily to radiation and at what levels;
- Different biological profiles of people and the susceptibility of such people to cancer after radiation exposure;
- Determination of proper radiation dosages for pregnant women, children, and the elderly;
- Varying immune systems of infants, children, elderly, and individuals with compromised immune systems.

Further, the studies must identify the shortcomings of the LNT model and how the Hormesis model will address such shortcomings; and how the Hormesis model will be more protective of public health and the environment. However, until such studies are conducted and sufficient data is collected, the NTAA recommends that reducing, and not increasing, a person's exposure to radiation should be the focus of the NRC, meaning that the NRC should continue to use the LNT model as the standard for protection against radiation exposure.

Conclusion

In summary, the NTAA is pleased to provide the aforementioned comments and recommendations concerning the Proposed Petitions.

On Behalf of the NTAA Executive Committee,

Bill Thompson, Chairman, NTAA

[7] Proposed Petitions at 35871.

[8] "Cumulative Radiation Exposure and Your Patient," Intermountain Healthcare, Cardiovascular Clinical Program and Imaging Clinical Service (January 2013).