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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

September 2, 2006

Michael T. Lesar
Chief, Rules and Directives Branch
U.S. Nuclear Regulatory Commission,
Washington, DC 20555–0001

Dear Mr. Lesar:

Subject: **Petition for Rulemaking dated May 6, 2005, filed by James Salsman Docket No. PRM–20–26**

The Wyoming Mining Association (WMA) is an industry association comprised of mining companies, suppliers, vendors, contractors, consultants and others located in Wyoming. Among the Association's mining company members are several uranium recovery licensees including an operating in-situ uranium recovery licensee, an in-situ uranium recovery licensee in the process of final restoration, the last remaining conventional uranium mill in Wyoming, and several licensees engaged in final reclamation of their sites.

The Association submitted comments dated August 22, 2005 on the original petition for rulemaking. The above referenced petition filed by James Salsman is of concern to the Association since it directly addresses the regulatory limits for uranium exposure. In his original petition Mr. Salsman states:

> *"...that the NRC revise its regulations in 10 CFR part 20 that specify limits for ingestion and inhalation occupational values, effluent concentrations, and releases to sewers, for all heavy metal radionuclides with nonradiological chemical toxicity hazards exceeding that of their radiological hazards so that those limits properly reflect the hazards associated with reproductive toxicity, danger to organs, and all other known nonradiological aspects of heavy metal toxicity".*

He then proceeds to state:

> *"the regulations were designed to address only the radiological hazard of uranium, and not the heavy metal toxicity, which is known to be about six orders of magnitude worse."*

Mr. Salsman is effectively requesting a six- (6) order of magnitude reduction in the allowable exposure limit to uranium. The Association represents uranium recovery licensees who process uranium and who require reasonable, risk based exposure limits to uranium in order to conduct their operations. A reduction in exposure limits of the magnitude requested by Mr. Salsman is neither reasonable nor justified. The Association discussed this issue in its August 22, 2005 comments.

On Sunday July 23, 2006 Mr. Salsman wrote to you via e-mail. The subject heading of his message (found at http://ruleforum.llnl.gov/cgi-bin/downloader/PRM_2026_public/1564-0015.pdf) relates to a request for a status update and a notification of change of address however, within the text of his letter, he states that he wants to significantly broaden the scope of his earlier

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proposal PRM 20-26 to include consideration of uranium neurotoxicity. In this context, he submits references to four (4) papers, and states the following:

> *I am considering submitting another petition very similar to PRM-20-26 asking that this neurotoxicity information also be used to set exposure limits.*
>
> *Instead of doing that, can the above citations be informally transmitted to the PRM-20-26 decision-makers, since the subject and necessary action are so similar? I don't want to formally amend the petition, since I know that might result in a re-opened comment period and further delays, but I am very interested in asking that the people who are already looking at previously unconsidered uranium toxicities to also consider neurotoxicity.*
>
> *Is there a way to do that informally? Can I just ask that you forward this as if it were a late public comment? If so, please do.*

Mr. Salsman's position is worrisome in that he seeks to substantially broaden the scope of the petition to include neurotoxicity while suggesting that he would like private access to the review committee with this additional information, without allowing an opportunity for public review and comment. This approach is not in the public's best interest. The comment period closed on August 29, 2005 and no additional comments should be entertained.

On August 31, 2006, Ms. Katie Sweeney Associate General Counsel of the National Mining Association (NMA) contacted you in this regard and was informed that the additional issue of neurotoxicity would be considered by the Commission without reopening the petition to public comment. The Association disagrees with this decision.

However, since James Salsman was permitted to broaden the scope of his petition for rulemaking after the public comment period expired on August 29, 2005, the Association is submitting these comments and a letter included in Appendix 1 prepared by Dr. Nancy Standler MD, Ph.D. containing a review of the literature cited by James Salsman.

Conclusions:

1. The Association disagrees with allowing the petitioner, James Salsman, to broaden the scope of his petition for rulemaking to include the neurotoxicity of uranium via an e-mail submitted after the August 29, 2005 deadline for comment has expired.
2. Since the petitioner was permitted to broaden the scope of his petition to include neurotoxicity the Association is submitting the attached comments prepared by Dr. Nancy Standler MD, Ph.D. on the papers referenced by him in his e-mail dated Sunday July 23, 2006.
3. The Association again requests that the petition be denied.

The Wyoming Mining Association (WMA) appreciates the opportunity to comment on these issues. If you have any questions please do not hesitate to contact me.

Sincerely yours,

Marion Loomis

Marion Loomis
Executive Director

Cc: Katie Sweeney – National Mining Association (NMA)

Appendix 1

September 5, 2006

Nancy Standler MD, Ph.D.
P.O. Box 2205
Cedar City Utah 84721

Michael T. Lesar
Chief, Rules and Directives Branch
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

Dear Mr. Lesar:

Subject: **Petition for Rulemaking dated May 6, 2005, filed by James Salsman Docket No. PRM–20–26**

My name is Dr. Nancy Standler MD, Ph.D. and I am a working board certified pathologist with both an MD degree from University of Pittsburgh and PHD in Biophysics and Radiation Biology from the University of Rochester. I previously submitted comments concerning Mr. Salsman's original petition for rulemaking. I have reviewed the four- (4) papers cited by Mr. Salsman in his July 23, 2006 via e-mail. The following are my conclusions:

1. Effects of short-term and long-term depleted uranium exposure on open-field behavior and brain lipid oxidation in rats Wayne Briner, Jennifer Murray

The protocol involves supplying drinking water to rats containing very large uranium doses for two weeks and six-month time periods. Equivalent human adult doses assuming 2 L of contaminated water consumption daily are 150 mg/L * 2 L/day * 14 days = 4.2 grams in two weeks and 150 mg/dL * 2 L/day * 180 days = 54 grams in 6 months. Nuclear Regulatory Commission (NRC) regulations, specifically 10 CFR Part 20.1201(e) state:

> *(e) In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (see footnote 3 of appendix B to part 20).*

There is already a 10-milligram per week soluble uranium intake limit. This equates to a 0.5 gram per year dose limit assuming that the individual is on vacation for 2 weeks each year and works 50 weeks each year. 54 grams in 6 months is over 2 orders of magnitude above the existing dose limit. Thus, the national uranium standards already cover the problem, as there is no reason to suppose that the chemical toxicity of depleted uranium acetate is anything different from the chemical toxicity of natural uranium acetate. Thus, the issue is just addressed with existing standards and there is no need to go further.

2. Bioaccumulation and behavioural effects of depleted uranium in rats exposed to repeated inhalations Marjorie Monleau, Cyrill Bussy, Philippe Lestaevel, Pascale Houpert, Francois Paquet, Valerie Chazel

The experimental protocol was to force rats to inhale UO2 aerosols for 30 minutes 4 times per week for 3 weeks, to produce a total lung take of 40 micrograms per gram of lung tissue. If you assume a typical human lung weight for both lungs taken together of 600 grams, this would be a

dose of 40 micrograms UO2 per gram lung tissue * 600 grams total lung tissue in humans = 24 milligrams UO2 given over three weeks. Inhalation exposure 4 times per week for 3 weeks simulates some forms of occupational exposure. 24 milligrams given over 3 weeks approximates the 10 milligram per week dose limit for soluble uranium in 10 CFR Part 20.1201(e). This dose was able to bump the concentrations of uranium in brain tissue the day following the last exposure up to around 580 ng U/g tissue in olfactory bulb (expected to be the highest because it is in the nose), 130 to 150 ng U/g tissue in cortex and hippocampus, and 40 ng U/g tissue in cerebellum. This uranium, despite being given over a 3 week period, cleared pretty rapidly, with near 100% clearance at 3 days from the olfactory bulb; 80% clearance at 3 days and near 100% clearance at 8 days from the cortex; 50% clearance at 3 days and near 100% clearance at 8 days from the hippocampus; and 50% clearance at 3 days and 80% clearance at 8 days from the cerebellum. There is no data available past 8 days after the end of the exposure. The authors also present some behavioral data that suggests fairly mild behavioral changes including possibly mild impairment of spatial working memory at 6 days post exposure, but this data is probably not as reliable as the chemical measurements, and, for example, exhibits in figure 3 what appears to be an aberrantly high control value for 6d post-exposure rats' spatial working memory, which leads to a statistical difference with the 6d post-exposure uranium group, although the 6d post-exposure uranium group appears to be nearly identical to the 2 day post exposure control group and the 2 day post exposure uranium group for this measurement. The other behavioral parameters measured that had statistically significant results included a few values in locomotor behavior and rearing behavior, but I don't know how much weight to give these very soft behavioral differences. In summary with respect to the NRC issues, it looks like there can be rapid (but with specific site variations) rate of clearance of uranium from brain in rats, that might or might not produce some (mild) behavioral differences out to 6 days, with no behavioral data being available farther out. This information looks premature to influence public policy with respect to the issues the NRC is considering.

2. The brain is a target organ after acute exposure to depleted uranium P. Lestaevel, P. Houpert, C. Bussy, B. Dhleux, P. Gourmelon, F. Paquet.

The model in this paper is intraperitoneal injection of depleted uranyl nitrate in rats at a single dose 144 micrograms per kilogram of rat for the initial study, and a follow-up dose related study at 70 micrograms per kilogram of rat. These numbers would be equivalent in people to 10 mg per 70 kg man and 5 mg per 70 kg man. These are obviously more reasonable doses than were used in the Briner paper, and the 10 milligrams per 70 kilogram man is equivalent to the 10 milligram weekly dose limit for soluble uranium in 10 CFR Part 20.1201(e) cited above. This is probably why the dose of 144 micrograms per kilogram of rat was selected for the study. The dose limit is a weekly one and it is assumed that the ten (10) milligrams would be ingested over a weeks work (probably over five (5) days) and not in a single (essentially instantaneous) intraperitoneal injection so the results of the experiment may not duplicate actual conditions. What the authors see is altered sleeping and feeding patterns and trace uranium in the brain at 3 days (but none in the kidneys, as it has cleared by day 3) in the rats given the higher dose, but no behavioral disturbances and no trace uranium in the brain by the third day in the lower doses. The paper is well done and probably "real." My guess is that the rats felt ill and didn't eat or sleep normally, but then were better once the uranium had cleared their nervous systems (which it was obviously able to do promptly, but not quite so promptly as the kidneys can clear their uranium load). This may have implications for trying to get uranium shrapnel out of people's bodies quickly, but may not have implications for the issues that the NRC regulates.

4. Neurotoxicity of Depleted Uranium Reasons for Increased Concern George C.T. Jiang and Michael Aschner

Jiang and Aschner's paper "*Neurotoxicity of Depleted Uranium*" is a review paper and does not introduce any new data. The majority of the work they cite is in rodents. The human literature cited pertains in large part to Gulf War veterans, and there is some suggestion that there is some neurotoxicity related to embedded shrapnel exposures. This may make a case that every attempt

should be made to remove depleted uranium shrapnel from people promptly, but it is unclear that additional regulations are needed, since embedded undepleted uranium in people would also not be a good idea, and appears to be clearly covered by existing NRC regulations at the doses in question.

Thank you for your concern with the uranium issues and for reviewing this letter. If you have any questions please do not hesitate to contact me.

Sincerely yours,

Nancy Standler, MD PhD

Nancy Standler MD, Ph.D.