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General Comment

Please see the attached comments.
Thank you for you consideration,

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Attachments

NRC Public Comment Final

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June 22, 2015

Subject: Comments Regarding Advance Notice of Proposed Rulemaking for Potential Changes to 10 CFR Part 20, Standards for Protection Against Radiation

As board certified physicists and members of the radiation safety committee at a large multicenter community hospital, we appreciate the opportunity to submit comments regarding the proposed rule changes in No. NRC-2009-0279. Specifically, are currently analyzing radiation badge data from 2008-2014 to determine the impact of Issue 3: Dose Limit for the Embryo/Fetus of a Declared Pregnant Occupational Worker on workers and workflow. Further we have analyzed radiation badge data from 2013 to determine the impact of Issue 2: Occupational Dose Limit for the Lens of the Eye and Issue 4: Individual Protection ALARA Planning for workers. We present our preliminary results below.

Issue 2: Occupational Dose Limit for the Lens of the Eye and Issue 4: Individual Protection ALARA Planning

We analyzed 2013 radiation badge data from 1,234 workers. Median lens dose was 0.04mSv [10th/90th percentiles: 0.0mSv/2.45mSv]. No worker exceeded the original Dose Limit for the Lens of the Eye, or Lens Dose Equivalent (LDE), limit of 150mSv. If the LDE Annual limit were reduced to 50mSv, then a single worker (0.081%) would exceed this limit. This worker was a neuro-interventional radiologist. If the LDE Annual limit were further reduced to 20mSv, then 9 workers (0.73%) would have exceeded the limit. These workers were all physicians working in pain medicine, radiologists working in interventional labs, or cardiologists working in cardiac catheter labs.

We do not believe there would be a significant burden added to the Diagnostic Medical Physics/Radiation Safety Office if the limit was reduced to either 50mSv or 20mSv annually.

We believe there would be a substantial burden on pain medicine physicians, interventional radiologists, and cardiologists working in cardiac catheter labs if the thresholds were to be reduced. In the event that the Annual LDE limits were reduced, we would strongly recommend that a shielding factor be considered to account for the use of leaded glasses. This would allow for a more accurate LDE to be calculated.

Issue 3: Dose Limit for the Embryo/Fetus of a Declared Pregnant Occupational Worker

We analyzed radiation badge data from all declared pregnancies of occupational workers between 2008 and 2014. This review included 181 pregnancies for 129 women. Median fetal dose was 0.009mSv [10th/90th percentiles: 0.005mSv/0.31mSv]. After correcting for missing badge data and for declaration and end dates, no workers exceeded the current 5mSv threshold. Two nuclear medicine technologists (1.10%) would have exceeded the proposed threshold of 1mSv.

We do not believe there would be a significant burden added to the Diagnostic Medical Physics/Radiation Safety Office if the limit was reduced from 5mSv to 1mSv.

Our data implies that this reduction would most likely impact nuclear medicine technologists, as pregnant workers in other job duties did not appear to exceed the proposed 1mSv threshold. We do not believe that this decreased limit would be a burden to workers. However, it may give pregnant workers leverage to reduce/modify work duties during pregnancy to ensure they are meeting As Low As Reasonably Achievable and regulatory standards.

Issue 4: Individual Protection ALARA Planning

We analyzed 2013 radiation badge data from 1,234 workers. If no shielding modifiers (e.g. EDE2 weighting factor) are applied to the readings, the median Deep Dose Equivalent (DDE) was 0.04mSv [10th/90th percentiles: 0.0mSv/2.42mSv]. Further, cumulative doses for those workers (up to 2013) were: median DDE 1.74mSv [10th/90th percentiles: 0.01mSv/31.12mSv]. Several possible criteria are suggested in the text of issue 4; however, the age of each worker was not readily available so those criteria that include the workers age were not analyzed. No worker exceeded 0.75Sv of cumulative dose. One worker (0.035%) exceeded 0.5Sv cumulative dose. If the typical shielding modifier (EDE2 weighting factor: 0.3*single over the collar lead apron badge reading) is applied then no worker exceeded 0.5Sv cumulative dose. Eight workers (0.65%) exceeded 20mSv in 2013. These were physicians from pain medicine, interventional radiology, and cardiology working in cardiac catheter labs. No worker exceeded 20mSv if the shielding modifier is included. Sixteen workers (1.3%) exceeded 10mSv in 2013. This included those who exceeded 20mSv as well as some nuclear medicine technologists. Three workers (0.24%) exceeded 10mSv in 2013 even with a shielding modifier. One-hundred thirty workers (10.53%) exceeded 30mSv cumulative dose. Again these were mainly in pain medicine, interventional radiology, cardiac catheter labs, and nuclear medicine. Adding the criteria of also having greater than 20mSv in 2013 resulted in 8 workers (0.65%) exceed both limits. Twenty-eight workers (2.27%) still exceeded 30mSv cumulative dose when a shielding modifier was implemented. No worker exceeded both 30mSv cumulative dose and 20mSv in 2013 when shielding modifiers were implemented.

It is currently difficult or impossible to confidently track worker dose across different facilities and throughout a worker's lifetime in the United States because there is no national database. Some dosimetry services offer tying cumulative dose to a worker's personal identifier (e.g. social security numbers); however, these services are optional. While we acknowledge the potential benefit of tracking cumulative dose, we believe that requiring employers to accurately track cumulative dose for each worker is a substantial burden. We feel that it is incumbent upon the employer to provide dose history information while the individual is employed; however, it should be the individual worker's responsibility to gather and track their cumulative dose across their employers and lifetime. Further, most current commercial systems do not factor worker age into their databases and it would take time to populate databases with birth dates to facilitate the application of age-based criteria.

An absolute threshold on lifetime worker dose should never be implemented because it acts as a defacto limit to the number of years a person may work in their field of specialty and the number of cases a worker may be involved in during that time. The combination of a cumulative dose threshold and a yearly threshold for monitoring purposes is less onerous; however, the combination criteria of 30mSv cumulative and 20mSv yearly as a threshold still would have resulted in up to eight workers needing to alter their workload as a result of these new criteria (assuming shielding modifiers were not applied). This may represent a substantial burden to those workers. This also has the unfortunate side effect of penalizing the most seasoned workers - forcing them to undergo increased scrutiny and possibly reducing their workload. Given the variation in the number of workers impacted by each of the different criteria we hope that, should this issue be implemented, the NRC will choose to use broad language that includes a range of possible criteria to implement as opposed to prescribing a single set of specific criteria.

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