

**Second Set of Requests for Additional Information for the Review of the Hypothetical License Amendment Application for Treatment of Dogs with Synovetin OA™ Containing Sn-117m**

1. The technical evaluation assumes less than 1 minute a day at 6 inches beyond the scope of the instructions for all categories. If someone's typical dog-human interactions exceed this, it is possible that they will exceed the public dose limit even if they limit this interaction during the instructional period. Therefore, a different category is needed, or the procedure needs to specify that if the normal behavior of the dog leads to direct contact interactions of more than 1 minute a day, these dogs should not be treated. In addition, as there are limitations needed for direct contact well beyond the minimum duration of personalized instructions, longer instruction should be given alerting owners that direct contact interactions should not be increased to more than 1 minute a day after the rest of the instructions expire.
2. Also, confirm that the instructions will prohibit direct contact activities for the duration of time that could result in exceeding the public dose limit. Please provide an example of this instruction and the duration(s).
3. The current minimum duration of the instructions is currently not long enough for the three items below.
  - a. The current proposal sets the duration for instructions to a minimum number of weeks necessary to show that an individual will not receive 100 mrem from the release of the dog for many situations. However, the public dose limit of 100 mrem per year is a limit from all licensed operations and is not intended to be a dose limit from a single action of a licensee, such as release of an animal. In addition, 10 CFR 20.1101(b) requires a licensee "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." As calculations show, some durations could lead to doses approaching 100 mrem even if instructions are strictly adhered to. NRC does not agree that the current proposal provides adequate assurance that the 100 mrem limit will not be exceeded from all licensed operations. Adding additional time to the instruction duration (such as 2 weeks or 1 half-life) would provide additional assurance that the 100 mrem limit will not be exceeded, provide less reliance on "strict adherence" to the instructions, and meet the intent of 10 CFR 20.1101(b).
  - b. *NOTE – this item may not apply depending on the response to (a) above.*

The technical evaluation states that a child could exceed the 2 mrem in a few minutes following release of an animal with the maximum dose rate. By adjusting the results by the Sn-117m half-life, this evaluation gives the appearance that the 2 mrem limit could still be met in 4 minutes for a 1 year old after the instruction duration ends, approximately 5 minutes for a 5-year-old, and approximately 12 minutes for an adult. While staff notes that an adult is unlikely

to exceed the 2 mrem in any one hour as this evaluation appears to have significant conservatism by placing all activity into 1 joint, that the individual's abdomen is directly touching the joint, and the pre-screening questionnaire should prohibit treatment of animals who normally have direct contact, staff does not have adequate assurance that this procedure would not result in a young child exceeding the 2 mrem in any one hour after the duration of the instructions. Therefore, either add an instruction for longer duration for households with young children or provide a detailed evaluation demonstrating the conservatisms in this dose that quantitatively shows young children would be unlikely to exceed public dose limits after the minimum duration of instructions.

- c. The release instructions appear to state cremation only needs to be delayed if the animal dies during the duration of the instructions while cremation will likely need to be delayed much longer. Update the instructions to inform the owners to contact the licensee if the dog dies within a justifiable duration. Update the procedure to instruct the licensee that they may need to hold a body per decay-in-storage regulations or other acceptable disposal regulations if the dog's body needs to go back to the licensee to ensure the public dose limit is not exceeded.
- 4. The release procedure states that direct contact is when the elbow is directly in contact with an individual's torso whereas the technical evaluation calculations assumes 6 inches. When the technical basis calculation is adjusted to use the direct contact dose rate instead of dose rate at 6 inches, staff found that adults were still under 100 mrem. However, children were above 100 mrem in the Extended Duration, Close Contact and Prolonged Close and Immediate Contact (Babies/Toddlers only) categories. Either increase the duration of instruction for these categories, mark in the procedure that these categories should not be used specifically if these behaviors are present in these age groups or provide additional evaluation to reduce the conservative dose values in the close contact dose.
- 5. The response to RAI 11d and language in A3.6 of the procedure makes it appear that behavior modifications can be used to determine the category. However, the dose calculations assume the individual behavior is bounded by the category following the end of the duration of the instructions, not when the instructions are being used. Therefore, remove the language in A3.6 which states "or otherwise reduce interactions to fit into one of the categories listed below in A.3.7," as this implies the modifications can be used to fit into categories. Also, consider moving this step up to directly after A.3.4 as its current location made it appear that modifications should be used in the categorization.
- 6. In the prescreening questionnaire, the first question should have an asterisk by the "no" because if someone is unwilling to modify their interactions for the time frames indicated on the release instructions, then the dog should not be treated. This question should also have an "N/A" for cases when modifications are not necessary to ensure the instructions are followed.
- 7. On page 13 of the technical basis, there is a discussion that states dogs could be treated multiple times in a year. However, this conflicts with the procedure which prohibits this

practice. Clarify that multiple treatments on the same elbow are not being proposed and if so, delete this statement.