From: "Hamrick, Barbara (DHS-RHB)" <BHamrick@dhs.ca.gov>
To: <tab2@nrc.gov>
Date: 3/12/05 2:56PM
Subject: License Terminations at sites with C-14 in soil

Terry,

As we discussed in a March 8, 2005 phone call with Nick Orlando, I am providing written confirmation of the concerns and problems relating to the site identified in U.S. Senator James M. Talent's February 9, 2005 letter to the NRC. I do not have Nick's email address, so please forward this to him for his consideration.

The California Radiologic Health Branch (RHB) has several licensees in a position similar to the licensee referenced in Senator Talent's recent letter - i.e., seeking the release, for unrestricted use, of lands previously used for pesticide or other research and involving the use of compounds labeled with carbon-14 (C-14).

As you are aware, California adopted, but had to rescind, the License Termination Rule. Nevertheless, RHB has proceeded with the release of properties for unrestricted use on a case-by-case basis. In the case of soil contaminated with C-14, the questions arising with respect to the release of these lands exist irrespective of the fact that California does not have the 25 millirem per year limit in the License Termination Rule.

On an informal basis, RHB contacted NRC staff in Region I, Region III, and Region IV to determine whether NRC had authorized the release of lands under similar conditions, and none were identified. RHB also contacted the State of Mississippi, who had received a similar request for release, but Mississippi ended up deferring the request until such time as the licensee sought license termination (i.e., the request in Mississippi was for the release of a specific property, covered by the license, but not for termination of the license, and Mississippi essentially denied the request until the licensee sought termination).

While I have not specifically reviewed the submission by the licensee identified in Senator Talent's letter, I have been extensively involved in the review of a similar submission, and the following concerns apply to all sites with residual C-14 in soil. The concerns are not laid out as specific questions to NRC, but rather as a list of the concerns and problems RHB has faced in trying to address license termination requests at the types of sites in question here. In all cases, we would like to know if and how NRC has addressed these concerns and problems in releases of any similar sites, and welcome comments on how these issues may be resolved.

1. The combustion process for analyzing C-14 in soil includes the incorporation of sugars or cellulose powder, which creates a "process background" of approximately 10 pCi/gram of C-14 in the samples, in addition to the natural background of C-14 in soil, resulting in a Minimum Detectable Concentration of about 12 - 15 pCi/gram above "total background," for a typical count time. This exceeds the "screening level" for the resident-farmer scenario of 12 pCi/gram reported in Appendix B, NUREG 1757, Volume 1, Rev. 1, implying that the licensee may need to make a demonstration that the radioactivity is indistinguishable from background, if other site-specific parameters cannot be incorporated into the modeling.

2. The model used to set the screening level noted above includes an assumption that the C-14 "moves like water" (from an email from Rachel Browder on 12/4/2004 to Linda McLean, in Region IV), and should be "gone within a few years (5 - 7 years)." It is not clear that this is the case. There is some limited data from some of our licensees indicating that the C-14 may be binding in the soil due to the compound in which it was incorporated. We have not modified the RESRAD model we use to incorporate a transfer factor other than zero, so have not yet determined how this would impact the projected dose, since we do not have any data regarding realistic transport factors for the various compounds used at these sites.

3. The MARSSIM process is generally not appropriate where soil contamination extends beyond the top 15 cm of soil. In most cases, the sites in question here do have contamination extending below 15 cm of soil. In addition, due to the low energy of the C-14 beta, scanning for "small elevated areas" is not practical. Separately, and in combination, these two limitations severely restrict one's ability to provide a statistically sound justification for demonstrating the final radiological status of a site. These problems also affect the scoping and characterization survey phases, and it has been difficult to establish whether the depth and areal extent of contamination has been adequately characterized.

4. There is a serious discrepancy between the NRC and EPA models for an agricultural site, where C-14 is the contaminant. The NRC/EPA Memorandum of Understanding (MOU) uses a consultation trigger of 46 pCi/gram and 123,000 pCi/gram for "residential" and "industrial/commercial" soil concentrations, respectively. These numbers correspond precisely to the EPA's Preliminary Remediation Goals (PRGs) at a risk level of 1E-4. The number the NRC published for screening, as noted above, for a "resident-farmer" scenario is 12 pCi/gram; however, the EPA's PRG for C-14 in an agricultural setting at a risk level of 1E-4 is 5.63E-3 pCi/gram, or over 2000 times lower than the NRC's. Given that NRC and EPA appear to have agreed to a model for the residential and industrial/commercial sites, it is unclear what the basis is for such a colossal difference in the agricultural models. In that the NRC/EPA MOU does not provide consultation triggers for agricultural scenarios, RHB would like information as to what NRC has done or intends to do with respect consulting with EPA on the release of lands for agricultural use, particularly in light of the massive difference in the models for C-14 used to project dose at agricultural sites. I.e., in a totally generic scenario, it appears the NRC screening level would correspond to a risk, as calculated by EPA, of approximately 2E-1.

5. In researching this issue, RHB identified two relatively recent authorizations by the NRC to perform research using C-14, which would result in soil contamination. One is from April 11, 2001, Federal Register pages 18817-18820, "Environmental Assessment...Dow AgroSciences LLC," and the other is from May 22, 2002, Federal Register pages 36046-36048, "E.I. Du Pont de Nemours & Co., Inc., Environmental Assessment." In both cases, in the sections involving impacts to the food chain, it indicates that all contaminated soil will be removed as radioactive waste, and in the case of E.I. Du Pont, it specifically states, "Soil will be removed...to a level where the soil radioactivity is at background." RHB would specifically like to know if this was required due to the problems and concerns noted in the preceding paragraphs, and if not, why this requirement was imposed.

If you have any questions in this regard, please contact me by return email, or at 714-270-0310.

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