

Confused about Exempt Quantities?

Every now and again we stumble over what appears to be some confusion on what should be a straight-forward compliance matter. It always surprises us when it pops up, but lately the popping has increased. That means the issue is now worthy of a mention in the IEM e-Newsletter. Let's start at the beginning . . .

Hopefully all of our readers are aware of the fact that federal and state nuclear regulatory authorities consider certain quantities (or concentrations) of radioactive materials to be exempt from their authority. In other words, one can legally possess, use and dispose of radioactivity in amounts up to the exempt quantity without having to apply for any sort of a license.

Where to find a listing of exempt quantities? One source is promulgated by the U. S. Nuclear Regulatory Commission (USNRC) in Title 10, Code of Federal Regulations, Part 30 (10 CFR 30). Agreement States, generally speaking, have similar listings, although they may have additional use requirements or offer a slightly different interpretation of the federal rule.

A number of IEM's clients had a need for quick access to the 10 CFR 30 listing of exempt quantities. Therefore, we created a page on our web site that captured the quantities on a "per element basis". You can check it out for yourself in the "Tool Box" section of the IEM web page at <http://www.iem-inc.com/toolset.html> (click on the "Exempt Quantities" or "Exempt Concentrations" button on the left-hand side of the page).

Almost immediately after we first blasted the exempt quantity page into the world wide web, we received our first "You have the wrong value listed for isotope whatever" complaint. We like to think that we're perfect here at IEM, but we have indeed come across the occasional mistake on our web site. Therefore, when someone points one out, we immediately review the offending entry and make the necessary corrections. However, we've yet to receive an exempt quantity complaint that resulted in the need for a correction.

That had us confused for a little while, until we received a complaint that included a regulatory citation for the values that allegedly didn't match up to the ones on the IEM web page. The regulatory citation turned out to be 49 CFR 173.436, which is the U. S. Department of Transportation (USDOT) listing of "exempt consignment quantities" for radionuclides. Since then the complaints keep coming in, and we've even observed mis-use of exempt quantity provisions during visits to client sites.

Clearly there is some confusion about what the USNRC and the USDOT consider to be exempt quantities. This may be resulting in cases of licensing non-compliance, illegal shipments of radioactive materials, or both. Therefore, this seems like a good time to offer a word or two of guidance. If one wonders whether a package of radioactivity being offered for shipment needs to comply with the USDOT rules for shipping radioactivity, one should compare the amount of radioactivity in the package to the listing of exempt quantities in 49 CFR 173.436. On the other hand, if one happens to have some radioactivity sitting around and is wondering whether a license is required to possess it, one should compare that amount to the exempt quantities listed in 10 CFR 30.71, Schedule B. Don't mix 'em up or horrible things could happen!

Black Lung Disease and LNT

In the December, 2011 edition of *Chest* (Vol. 140:6, pp. 1574-1580), there was a report on increased confidence in chest computed radiography (CR) over film-screen x-rays for monitoring black lung disease and other forms of

pneumoconiosis. In that study, researchers found that CR is at least equivalent to film-screen radiography for recognizing small pulmonary opacities, and that the image quality of CR is actually better than film-screen radiography (see <http://chestjournal.chestpubs.org/content/140/6/1574.full.html> for the article).

Why do we find this interesting? The United Nation's International Labor Organization (ILO) has a classification system for black lung disease that has been relying on film-screen chest radiography for quite a number of years. That system is demonstrating an amazingly high incidence of black lung disease in miners that was borne out after autopsies of the individuals tragically killed in the West Virginia mining disaster in 2010 revealed evidence in over 70% of the victims. In light of the ILO's track record, there has been hesitancy to pursue changes to the classification system by converting to new imaging modalities. The fear appears to be that a change in diagnostics, even if it is for the better, might "inadvertently recalibrate the standardized scale for [gauging disease incidence and severity] (emphasis added)".

On what appears to be an unrelated note, let's take a look at the linear no-threshold (LNT) model for radiation risk assessment. The LNT model is widely used to establish rules and standards for radiation protection both here in the U. S. and throughout the world. It is based on the assumption that the physical energy of ionizing radiation deposited increases carcinogenic risk linearly with increasing dose and, within about a factor of two, with dose rate. However, recent developments and findings in radiation and molecular biology places the LNT concept and its scientific validity into question . . . especially at low doses and low dose rates. (For those of you that are interested, check out the proceedings of the 44th meeting of the National Council on Radiation Protection and Measurements, for some cutting edge reading on LNT thinking amongst the scientific community.)

For our more communicative readers (and you know who you are, you swell folks!), here's a question for you: Like the ILO and its reticence in converting to improved monitoring methods, could there be a world-side fear that a change in conventional scientific opinion on the relationship between radiation dose and risk might "inadvertently recalibrate the standardized scale for [regulating radiation doses]? Could there be a hesitancy to pursue the changes to the dose limitation system set for occupational workers, members of the public, decommissioning, effluents, etc. that might inevitably occur by converting to a dose/response relationship that differs from LNT? None of us here at IEM have an answer, but it sure does make for some interesting "conspiracy theory" talk during coffee breaks. Feel free to use the black lung/LNT connection as a conversation starter at your own place!

Regulatory Lightning Round

The month of January brought some discouraging enforcement action reports from our friendly regulators. After all this time, some licensees still don't get that there are rules associated with having a radioactive materials license, and that compliance isn't optional. Anyway, we thought we might share a few of January's sad stories with you in the hopes that not a one of them sound the least bit familiar:

(1) An engineering firm is facing a \$14,000 civil penalty for failing to properly transfer a fixed nuclear gauge to an authorized recipient after its license was terminated for failing to pay its annual fees. Apparently there is a stalemate in effect the firm is about to be fined \$100 a day for each day until the device is actually transferred. Lesson Learned: Pay your licensing fees when due, for starters!

(2) A company imported almost 20,000 Americium-241-bearing smoke detectors and distributed them to another company for eventual distribution to consumers before they were called to task about not having a distribution license. Lesson Learned: While it is true that certain consumer products like smoke detectors don't need a license to own, their initial distribution can only be made by a USNRC licensee, even if the products come from abroad.

(3) A radiopharmaceutical producer is facing a \$7,000 fine for failing to provide financial instruments to ensure eventual site-wide decommissioning. A decommissioning funding plan was prepared and submitted, and the company had an approved cost estimate for decommissioning, as well as the necessary provisions for periodic cost estimate adjustments. They just failed to take the last step of actually putting up the money. Lesson Learned: Put up the money!

(4) An industrial radiography firm was the subject of a transportation incident where a radiography camera was not properly secured. What happened was an individual put the camera, unsecured and unbraced, into the trunk of a personal vehicle, drove off, and then two miles later was pulled over for speeding. The driver was subsequently arrested for driving under the influence. The Radiation Safety Officer for the company noted that the camera was past-due, thus triggering regulatory intervention in what began as a simple law enforcement action. Lesson Learned: We're not even sure where to start on what appears to be a clear case of programmatic breakdown.

To Learn More . . .

We are pleased to continue distributing the IEM e-Newsletter to our subscribers in 2012, and we encourage you to send us any comments, suggestions or criticisms that you might have. We never seem to run out of interesting radiation-related news items, but we do hope the ones we select for the e-Newsletter are of interest to our readers. We also hope you will consider giving us a call at (865) 560-8850 if we can be of professional assistance to you on a radiation-related matter. We aim to serve. And don't forget to visit the IEM web page at <http://www.iem-inc.com> from time to time for the latest and greatest on our radioactive world. Best wishes!

Carol D. Berger, President



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