Theme: **What's in the future for self-contained irradiators and their users?**
Monday, April 27, 2015

Working Group Session I
1:45 – 3:30 pm

Panelists:
Emily Craven, Nordion
Mark Desrosiers, NIST
Mark Driscoll, SUNY ESF
Lonnie Cumberland, NIST (Regrets)
Ryan Tracy, STERIS
Marsh Cleland, IBA

What's in the future for self-contained irradiators and their users? (Emily Introduction)

The purpose of this session is to bring together past and present users of small research irradiators to talk about how these irradiators have traditionally been used, what benefits and features have been important, what other alternatives are out there and how the needs of the irradiation community can be met in the future. Our panel today has representatives from Government, Academia and Industry, who each have a unique perspective on the application of these devices.

A little background on self-contained irradiators: The first Category I or Self-Contained Dry Source Storage Gamma Irradiators were made in the 1950s. Research irradiators were used to help develop the applications that would become the basis for commercial scale gamma irradiation, most notably medical device sterilization, but also including food irradiation, and materials modification. Other smaller scale operations could use self-contained irradiators exclusively such as sterile insect programs, blood irradiators, mutation breeding of agricultural products, viral inactivation and other medical or research uses.

The compact size and relative simplicity of many self-contained irradiator designs lent themselves well to being used in laboratory type settings. The predictability of the dose rate and the ability to precisely and repeatedly place samples in the radiation field meant that these irradiators became the de facto standard for calibration labs working to support the growing dose measurement requirements at industrial irradiator sites.

Today, the mandate of the self-contained irradiator has been accomplished. What started out as hundreds of small scale research irradiators around the globe has grown into hundreds of large scale production irradiators with mature applications and well understood science. As a result, many of the self-contained irradiators have become redundant and are being decommissioned. Because there are many ways that irradiations can be provided commercially, there is not a large market demand for the support or replacement of the small research irradiators left in the field.

And yet, these irradiators still perform a crucial role. They have provided an easy and affordable way for universities to work on radiation related research projects, they have become the backbone of ionizing radiation calibration services, and they permit precise and controlled dosing for experimentation that is

difficult to achieve in a larger scale setting. The continued success of modern industrial irradiation relies on the ability to continue to perform the kinds of irradiations that these systems provide.

Today's discussion is about what's next. What is the next stage in evolution of the research irradiator? Is it isotope or machine source? Is it still self-contained? Is it affordable? Is it still required?

I have invited my colleagues here to share with you their thoughts and ideas on self-contained irradiators. Before we get started, I thought we would introduce ourselves, our background with research irradiators and why we are participating in this session.

1) What are the most critical features for you in a self-contained irradiator? (for example, sample size, dose uniformity, dose rate, reproducibility, environmental control, turn-around time, cost, etc.)
2) What do you feel are the advantages and disadvantages of an isotope source vs machine source small scale irradiator?
3) How important is it to you to have the convenience of an irradiator at your site, versus offsite?
4) What has your self-contained irradiator enabled you to do that you may not otherwise have accomplished with other technologies or options?
5) If you could design a replacement irradiator, are there features that you would want that you don't have today? (e.g. larger sample size, variable dose rate, etc.)
6) What other types of irradiators would you consider as a self-contained irradiator replacement? (e.g. machine source, wet storage, small research cell, etc.)
7) What challenges do you foresee in finding a replacement device? (e.g. cost, space, etc.)
8) How are you coping now?
9) What do you think the next steps are for the industry?