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Experiences in Source Strength Verification for HDR, LDR AND Intravascular Brachytherapy Sources

An effective brachytherapy quality assurance program has been set up in our clinic with the use of a single commercially available well chamber. Manufacturer source strengths are conveniently and accurately verified using the Standard Imaging 1000 Plus well chamber for high dose-rate iridium-192 sources, low dose-rate iodine-125 and palladium-103 seeds, and intravascular iridium-192 ribbons. We use a variety of source holders and jigs with the well chamber for source strength verification with secondary traceability, as per AAPM Task Group No. 56. There are three different source holders, all commercially available. The source holder for the intravascular ribbon is used in conjunction with a jig, made in-house, which ensures the repeatability of the source ribbon position within the source holder.

A chamber measurement of our high dose-rate iridium-192 source is conducted on the day of every source change. Our measured results over the past 31 calibrations have a mean of 0.1% deviation from the manufacturer's assay. For low dose-rate iodine-125 and palladium-103 seeds in cartridge, we verify the source strength of a representative sample, by calibrating four fully loaded cartridges from every batch of seeds received. Our measured results over 88 calibrations show an average deviation of 0.4% from the manufacturer's assay. Prior to use in the Cardiac Catheterization Laboratory, we calibrate every ribbon of iridium-192. Our measured results over 16 calibrations show an average deviation of 1.4%.