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DEVELOPMENT OF A REGENERATIVE RADON-IN-WATER RADIOACTIVITY STANDARD

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NBS HAS DEVELOPED A PROTOTYPE STANDARD THAT REGENERATES SAMPLES OF ^{222}RN GAS DISSOLVED IN DISTILLED WATER FOR QUALITY CONTROL OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S PROGRAM TO SURVEY DRINKING WATER. THE REGENERATIVE SOLUTION STANDARD, WHICH CONTAINS NO ^{226}RA, CAN BE ACCURATELY DISPENSED WITH KNOWN CONCENTRATION INTO, FOR EXAMPLE, A LIQUID SCINTILLATION COUNTING BOTTLE CONTAINING SCINTILLATION COCKTAIL. THE PROTOTYPE CONSISTS OF A SOURCE OF ^{226}RA WHICH IS DEPOSITED ON A ION EXCHANGE FILTER AND SANDWICHED BETWEEN TWO LAYERS OF THIN POLYETHYLENE TAPE AND IMMERSED IN WATER IN A SPECIALLY CONSTRUCTED ACCUMULATION CHAMBER. THE CHAMBER IS THEN FLUSHED AND ^{222}RN IS ALLOWED TO ACCUMULATE FOR A MEASURED TIME AND transferred ~~FLUSHED~~ AGAIN INTO A LARGE SYRINGE FROM WHICH THE STANDARD SOLUTION IS DISPENSED. FROM THE MEASUREMENTS MADE AT NBS OVER THE PAST TWO YEARS, THE ^{222}RN RETAINED IN THE ION EXCHANGE FILTER-POLYETHYLENE SANDWICH, AND THEREFORE THE CONCENTRATION OF RADON DISSOLVED IN THE WATER, CAN BE PREDICTED ACCURATELY. OTHER CHARACTERISTICS OF THE SYSTEM WILL BE REPORTED.

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