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William L. Higgins  
 West Virginia University Hospitals, Inc.  
 Morgantown, West Virginia

### Acceptance Testing of Gamma Cameras

**TO THE EDITOR:** The recent article by Murphy provides an excellent summary of the performance parameters that should be measured after an Anger scintillation camera is installed and the quality control procedures that should be utilized to evaluate daily performance (1). Although the set of standardized procedures provided by the National Electrical Manufacturers Association (NEMA) (2) cannot be performed in its entirety because of computer limitations in most state-of-the-art nuclear medicine systems, the major elements of camera performance can and should be tested. In the last 4 years, I have tested 30 cameras representing all major manufacturers. Only one camera met specifications and that only because it was manufactured before performance specifications were published. My experience is essentially the same as that of Finney et al. (3). While the failure of most scintillation cameras to pass acceptance tests may be partly attributed to the high degree of complexity of state-of-the-art instruments, most of the blame must be attributed to inadequate testing by the vendors at the time of installation. This statement is substantiated by the fact that all but a few of the cameras eventually met specifications and passed the acceptance tests. A satisfactory installation should mean more than the simple ability of a camera to provide an image.

Users who wish to perform acceptance tests will need some special equipment such as the NEMA resolution test pattern (1,2). In certain instruments they will also need special equipment such as field-of-view masks that are available only from the vendor. In addition, special software may be required to quantitate such parameters as uniformity, spatial resolution, multiple window spatial registration, etc. Some calculations can be performed by hand from data obtained with standard keyboard commands. For example, FWHM and FWTM values can be calculated from listings of numerical values provided by "Profile" or "Slice" commands.

Individuals performing acceptance tests need the complete assistance of the vendor's representatives. For example, in many cameras it is necessary to know the proper combination of correction circuits turned off/on for an instrument to reach the specified maximum count rate according to the NEMA specifications. Similar assistance is needed for measuring other performance parameters.

As Dr. Murphy pointed out, components not detailed in the NEMA protocols must also be tested. These include collimators, whole body scanning mechanisms, electronic formatters, magnifier/rotator circuits, etc. In my experience, vendors are usually willing to correct problems even if they are not subject to detailed specifications.

The article by Dr. Murphy comes at an appropriate time. The recent improvements in Anger camera technology will only bring added benefit to the patient when these instruments are operating to the full extent of their capability.

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L. Stephen Graham  
 Nuclear Medicine Service, V.A. Medical Center  
 Sepulveda, California  
 and  
 Biomedical Physics Division  
 UCLA School of Medicine  
 Los Angeles, California

### Early Description of "Bull's-Eye" Plot for Emission Cardiac Tomography

**TO THE EDITOR:** We are pleased to note the growing acceptance of the "bull's-eye" plot for displaying tomographic thallium-201 data, as exemplified in L. Holman's keynote address at the 1987 Annual Meeting of the Society of Nuclear Medicine. We are also pleased that Caldwell et al. at the University of Washington and Garcia et al. at Cedars-Sinai were acknowledged by Dr. Holman for their early recognition of the merits of the bull's-eye approach to data presentation (1,2). However, we feel it is important to point out that the bull's-eye method was actually developed earlier by Johnson, Kirch, Hasegawa, Sklar, Hendee and Steel at the University of Colorado and Denver Veterans Administration Hospital. This technique was described at the 1981 Western Section meeting of the Society of Nuclear Medicine, the 1981 Annual Meeting of the Society of Nuclear Medicine, and the 21st Annual Meeting of the American Association of Physicists in Medicine (3,4). A paper describing the bull's-eye method, submitted in 1981 to *The Journal of Nuclear Medicine*, was rejected for publication. We did not, unfortunately, pursue publication further, which may explain why this early presentation of the method is now obscure.

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