AbstractID: 4962 Title: Post-Processing Dead Pixel Evaluation for Digital Detectors

Purpose: To investigate and determine a viable method for determining the absolute number of dead pixels from a diagnostic x-ray digital acquisition output.

Method and Materials: In a digital receptor, dead pixels are averaged over surrounding pixels to present an image without artifacts. The absolute number of dead pixels is in general not provided by the manufacturer, but a relative number of pixels from the last check may be reported. Due to the relative difficulty of gaining access to the raw image values, we focus on the least processed images obtainable from a given unit and employ post-processing techniques to evaluate the pixel information. We use statistical and autocorrelation algorithms to evaluate the likelihood that a given pixel point or line of pixels is aberrant from the expected random noise resulting from several uniform exposures from a digital acquisition detector.

Results: We are able to determine that both algorithms provide indications for the line and individual (or grouped) point pixel modifications which are not consistent with random noise. The statistical method (employing both a local and global statistical analysis of noise variations) shows both geometries (point and line defects) but requires statistical averaging over several images to provide relevant point geometry data (we use a minimum of three images to average). The autocorrelation method provides results without the need for averaging. However, by employing the criteria that each of the three images must meet the same correlation requirements, we increase the confidence of the final evaluation results through redundancy.

Conclusion: We have developed two independent methods for determining the overall dead pixel information from a digital acquisition detector given three uniform exposures. Both methods provide data for point and line geometries and can be used to provide initial and time logged progression of absolute pixel drop out with time.