

## AbstractID: 7250 Title: Monitoring Hospital Entrances to Prevent Radioactive Contamination: Disaster Planning

**Purpose:** To determine the optimal configuration of radiation detectors for monitoring a hospital entrance to prevent contamination by patients seeking treatment in the event of a disaster.

**Method and Materials:** A digital area monitor (LUDLUM, model #375-30) with two NaI-scintillation detectors (LUDLUM, model #44-99) was purchased for each entrance to the hospital. The counts of the detectors are summed and two radiation levels were set to trigger an audible and visual alarm. The sensitivity of the two-detector combination was measured with a 10  $\mu\text{Ci}$  Cesium-137 source as a function of detector configuration and source position. The configurations evaluated included placing the two detectors 1) with the end of the crystals facing each other horizontally and 2) over the entrance aiming downward. The detectors were then tested with the source moving at different speeds to determine system temporal response and the extent of traffic flow control needed.

**Results:** Curves of iso-sensitivity were measured that were bulbous in shape diverging from the face of the crystal. The sensitivity was sufficient to initiate the low alarm for the Cs-137 source at a distance of about 175 cm in the collimated direction for a single detector. It was determined that for an opposed configuration separated by 10 feet or directly under an overhead mounted detector, an individual walking into the entrance at under 6.5 mph triggered the alarm if contaminated with 10  $\mu\text{Ci}$  of Cs-137.

**Conclusions:** Utilizing these results and the dimensions of a hospital entrance it was possible to determine an optimized configuration of radiation detectors. For the main hospital entrance, which consisted of two double-door entryways having a combined width of 129in., the orientation of choice was when both detectors faced one another horizontally. This orientation allowed the detectors to monitor the entire entrance reducing the possibility of radioactive contamination.