Two-part Quality System

For Irradiation System Confidence

ASHLAND®

With good chemistry great things happen.™

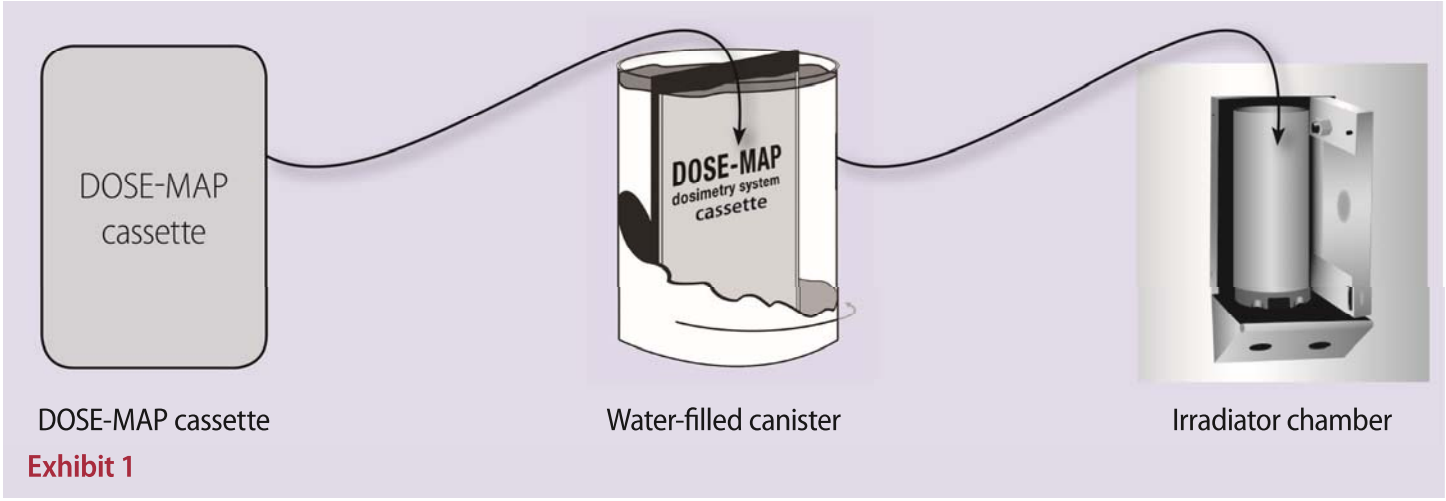
DOSE-MAP™ dosimetry system

Accurate, quantitative 3-D dosimetry for blood irradiators

The DOSE-MAP dosimetry system for blood irradiators is based on an instant-imaging film medium that darkens in response to ionizing radiation. The film has been extensively characterized and calibrated every 12 months with exposures provided by the University of Wisconsin Radiation Calibration Laboratory. The system is capable of measuring the absorbed dose in a blood irradiator canister with an estimated accuracy of ±5%.

DOSE-MAP dosimetry system is designed to measure most commercial blood irradiators that contain a cylindrical canister and use either cesium-137 or cobalt-60 as the gamma ray source.

The DOSE-MAP dosimetry system cassette is placed into the irradiation canister and the canister is filled with water. The cassette/water "phantom" is then exposed using the same irradiation cycle that would be used for blood products (See Exhibit 1).



DOSE-MAP cassette | Water-filled canister | Irradiator chamber

Exhibit 1

Upon return to Ashland, the cassette is disassembled and the entire film (See Exhibit 2) is analyzed using a flatbed scanner and software designed specifically for film dose analysis. All measurements are indexed to alanine, an internationally recognized dosimetry transfer standard, which is incorporated into each cassette. The measurement of the alanine pellet is performed by NIST.

The final report (see Exhibits 3 and 4) issued to the customer consists of:

- A dose distribution chart showing the centerline, left edge and right edge of the canister.
- A color-coded dose contour plot showing the distribution of absorbed dose in the canister.
  - Minimum and maximum axial dose
  - Minimum and maximum dose

Exhibit 2

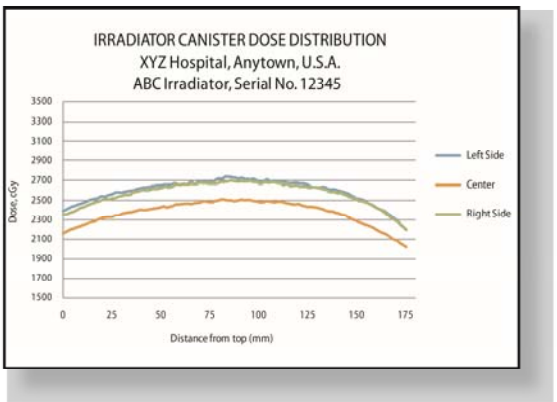


Exhibit 3

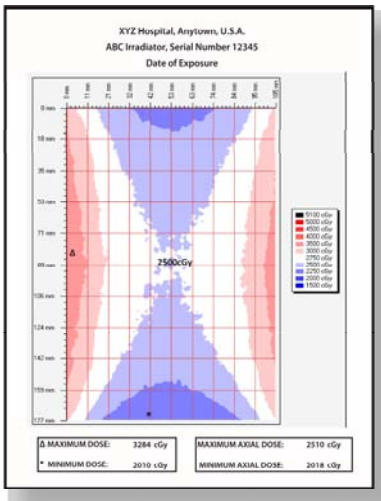


Exhibit 4