Note to File Licensee: Hartford Hospital License: 06-00253-04 Docket: 030-01239 Mail Control No: 643923

Subject: AU verifications and PET shielding calculations

Authorized User Verifications:

Dr. Griffin's American Board of Radiology certification was verified on the abr.org website. The status was certified and maintained as of 01/03/2025 in the location of Chicago, IL. Because her ABR certification states her practice location as Chicago, IL, her status was also verified on the State of Connecticut elicense.ct.gov website. Her status is active with the following information listed on the site:

Physician/Surgeon 73659 02/28/2026 03/14/2023 LINDSAY GRIFFIN ACTIVE CURRENT None

Dr. Kalpana Shah State of Connecticut license was also verified on the elicense.ct.gov website.

Physician/Surgeon 76335 12/31/2025 10/27/2023 KALPANA SHAH ACTIVE CURRENT None

PET Shielding:

PET shielding calculations were performed to verify if 1/8" lead is appropriate shielding for the addition of the PET injection room for 1/8 and 1/20 occupancy factors.

Key Information:

- Radionuclide: Fluorine-18 (F-18)
- Activity: 15 mCi (millicuries)
- Exposure Time: 20 hours per week
- Shielding Material: Lead
- Shielding Thickness: 1/8 inch (lead-lined walls)
- Energy of F-18: The gamma energy of F-18 is around 511 keV (annihilation photons, produced when positrons interact with electrons).
- Half-Value Layer (HVL) for lead at 511 keV: approximately 0.25 cm (0.1 inches) for F-18 gamma radiation.

1/20 Occupancy factor with initial reading of 1.1 mR/hr (Patient waiting room)-

Attenuation Factor=2-dHVLAttenuation Factor=2-HVLd

Attenuation Factor=2-0.1250.1=2-1.25~0.396Attenuation Factor=2-0.10.125=2-1.25~0.396

1/8 lead will reduce radiation exposure by 60.4% (attenuate to 39.6% of original intensity)

Shielded exposure rate: 1.1mR/hr×0.396=0.436mR/hr

With occupancy factor 1/20: 0.436 mR/weekWeekly Exposure=0.436mR/week

Weekly exposure allowance:

500 mRem/year52 weeks/year≈9.6 mRem/week52weeks/year500mRem/year≈9.6mRem/week

.436 mR/week is far below 9.6mR/week, hence 1/8 shielding should be sufficient to protect public

For 1/8 occupancy factor with initial reading of .7 mR/hr (corridor):

Attenuation Factor=2-0.1250.1=2-1.25~0.396Attenuation Factor=2-0.10.125=2-1.25~0.396

Shielded radiation rate: 0.7mR/hr×0.396=0.2772mR/hr

Effective exposure rate with 1/8 occupancy factor: 0.2772mR/hr×1/8=0.03465mR/hr

Public limit:

1000 mrem/year365 days/year×24 hours/day≈0.114 mrem/hour365days/year×24hours/day1000 mrem/year≈0.114mrem/hour

0.3465mR/hr is well below .114mR/hr

1/7/2025

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Hiba Ahmed Senior Health Physicist Signed by: HIBA AHMED