Radiography Concepts Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Score:

**LAB #2: Grid Cut-off**

Materials needed: Two “wafer” or “tape-on” grids with different ratios, preferably a very low ratio and a very high ratio. (A parallel grid of equal ratio to one of the others may be added.) Lead markers.

NOTE that with digital processing, grid cut-off will not be as obvious as with a film/screen system. It will generally appear as a lighter area with increased mottle. Use magnification of the image to better see mottle. Extreme changes, such as placing a focused grid upside down, should still yield dramatic results.

**Procedure**

Without any phantom, make exposures as listed below on each grid attached to the front of a CR cassette or a DR detector (with any internal grid removed), and placed on the tabletop with the grid lines lengthwise to the table. Use 60 kVp on all exposures. List the grid ratios below:

Grid A ratio: \_\_\_\_\_\_\_\_\_

Grid B ratio: \_\_\_\_\_\_\_\_\_

(Optional: Add a *parallel* grid for Exposures #2 and #4.)

Also, for each exposure, log below the exposure indicator read-out.

Make each of the following exposures *using the high-ratio grid,* unless otherwise directed.

Exposure #1: For comparison, make an exposure with the normal tabletop-to-tube distance of 40 inches (100 cm) with the x-ray beam perpendicular (vertical) and properly centered to the grid. Use about 12 mAs.

**EI = \_\_\_\_\_\_\_\_\_**

Exposure #2: Reduce the tabletop-to-tube distance to 35 inches (89 cm) to maintain a true

SID of 40 inches (100 cm). Angle the x-ray beam 25 degrees parallel to

(along) the grid strips and center. Use the same mAs as *Exposure #1*.

**EI = \_\_\_\_\_\_\_\_\_**

Exposure #3: Reduce the tabletop-to-tube distance to 35 inches (89 cm) to maintain a true

SID of 40 inches (100 cm). Angle the beam 25 degrees *crosswise* to the grid strips and center. Use the same mAs as *Exposure #1*. *Repeat with the*

*lower-ratio grid if one is available.*

**EI = \_\_\_\_\_\_\_\_\_**

Exposure #4: Maintain the tabletop-to-tube distance at 40 inches (100 cm). Off-center a

perpendicular (vertical) beam across (crosswise to) the grid strips by 6

inches (15 cm). Use the same mAs as *Exposure #1*.

**EI = \_\_\_\_\_\_\_\_\_**

Exposure #5: Keep the x-ray beam perpendicular (vertical) and centered, but reduce the

SID to 20 inches (50 cm). Reduce the mAs to about 4 mAs. *Repeat with the lower-ratio grid if one is available.*

**EI = \_\_\_\_\_\_\_\_\_**

Exposure #6: Turn the grid over, upside down. Use a perpendicular, centered beam at the

normal 40 inches (100 cm) tabletop-to-tube distance). Use the same mAs as *Exposure #1*.

**EI = \_\_\_\_\_\_\_\_\_**

**Analysis**

NOTE: Be sure to examine each image toward the outer edges where grid cut-off will show best.

1. List which situations above resulted in grid cut-off only toward one side of the image:

2. If the grid were *tilted* within a vertical x-ray beam, the results would be identical to which of

the above scenarios?

3. List which situations above resulted in grid cut-off symmetrically toward both sides of the

image:

4. Examine Exposure #1: Does angling the x-ray beam parallel to the grid strips cause grid cut-

off?

5. Can you *off-center* to a grid in a direction parallel to the strips?

6. Side-by-side, compare the high-ratio and low-ratio grid images for Exposure # 2; What is the

relationship between grid ratio and the degree of cut-off produced by an angled the x-ray

beam?

7. Side-by-side, compare the high-ratio and low-ratio grid images for Exposure # 4; What is the

relationship between grid ratio and the degree of cut-off produced by a reduced SID

outside the grid radius?

(7b. If a parallel grid was also used for Exposures #2 and #4, was the degree of cut-off

worse for the parallel grid or for a focused grid of equal ratio?)

8. For each exposure #2 through #6, compare the exposure indicator read-out to the read-out for

*Exposure #1* taken with proper distance and alignment; Note below in which cases the EI

**dropped** by more than 5%.

#2:\_\_\_\_\_

#3:\_\_\_\_\_

#4:\_\_\_\_\_

#5:\_\_\_\_\_

#6:\_\_\_\_\_

9. Explain *why* any of these EI read-outs dropped beyond normal statistical variations (5%):

10. Also, were there any that were *expected* to drop substantially and did not? If so, can you

explain why this might have happened? (Remember that some manufacturers use only the   
central 1/3 or 1/4 of the detector plate area to derive their exposure indicators.)