To sample the indirect components for the blur operation, the texture coordinates for the current light buffer, in all but one texture unit, are modified using a perturbation texture. The radius of the blur circle, used to scale the perturbations, is given by a user-defined blur angle φ and the sample distance *d*:

Equation 9 Blur Radius for the Translucency Approximation

$$R = d \tan(\varphi/2)$$

In the fragment shader during step 3(b), the current light buffer is read using the modified texture coordinates. The blurred attenuation is computed as a weighted sum of the values read from the light buffer, and then blended into the next light buffer.

Figure 39-13 shows an example of translucent volume rendering using a fish CT data set. This technique is important for creating convincing images of clouds and other atmospheric phenomena (see Figures 39-1 and 39-14a). Because a separate opacity for each color component is used in step 3(b), it is possible to control the amount of light penetrating into a region by modifying the A_i values to be smaller or larger than the alpha value A used in step 3(a). When the A_i values are less than A, light penetrates deeply into the volume, even if from the eye's point of view, the material appears optically dense. Also, because an independent alpha is specified for each color channel, light changes color as it penetrates deeper into the volume. This is much like the effect of holding a flashlight under your hand: the light enters white and exits red. This effect is achieved by making the A_i value for red smaller than the A_i values for green and blue, resulting in a lower attenuation of the red component than the green and blue components.

Figure 39-13 Example of Volume Rendering with Translucent Materials