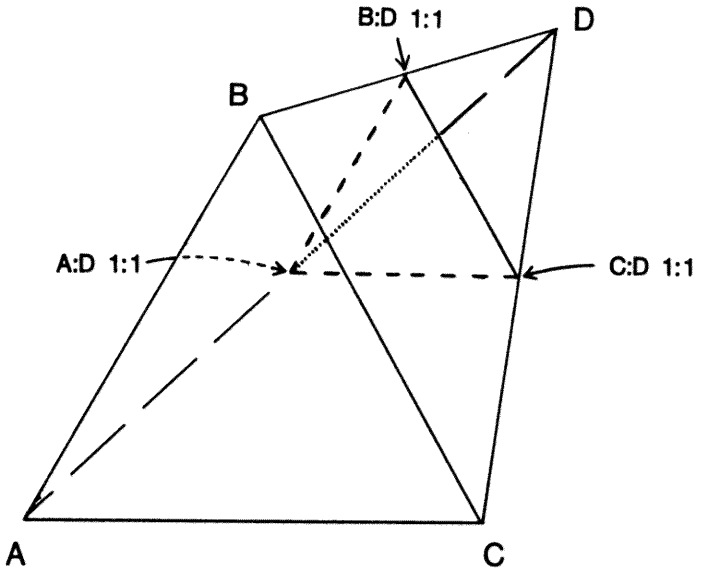

Figure 9.19 Quaternary pyramid with the 50% D plane emphasized.

To represent a system that contains more than three pure components, pseudoternary diagrams can be used, or, if only four pure components are involved, quaternary (four-component, three dimensional) pyramidal volume diagrams can be constructed or projected into two dimensions. Consider the four-component diagram of Figure 19. As with the ternary diagrams, the addition of one of the four components to any mixture of the three other components will cause the total composition to move in a straight line toward the added components corner. Also notice that any three-component mixture will fall on one of the four surface triangles that form the boundaries of the pyramid. It is immediately obvious that such a four-component system becomes very complicated, very quickly. To simplify this representation, slices through the pyramidal diagram can be taken. For instance, rather than determining the phase behavior for the system A–B–C; if A and D were mixed 1:1 by weight, B and D were mixed 1:1 by weight, and C and D were mixed 1:1 by weight, then a pseudoternary diagram for this system could be determined using the same techniques as used for a true three-component system. Determination of the mutual solubility areas would be completed exactly the same way; however, what were tie lines defined by two points for a ternary system are now tie surfaces that may be curved. Thus, an arbitrary slice through this surface will produce tie lines that are no longer necessarily linear.