

*Geological Society of America 2003 Annual Meeting, Seattle, November 2-5, 2003*

Session No. 250: Twenty Years of Exploration and Innovation in Quantitative Hydrogeology: In Honor of Ed Sudicky  
(GSA Hydrogeology Division)

## **Contributions of Edward A. Sudicky in Analytical Solutions in Fractured-Porous Media**

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### **ABSTRACT**

Edward Sudicky is justly recognized as a contemporary giant in numerical modeling in hydrogeology, not only for his own important advances in simulation techniques and their application to important and challenging problems, but also for his role in forming several key members of the next generation of numerical modelers. However, his career thus far would not be honored appropriately if attention were limited only to his work in numerical modeling. Some of Sudicky's earliest and most lasting contributions have been in the area of analytical modeling. Many of the analytical solutions he has derived and implemented have become essential tools in quantitative hydrogeology. These solutions have proven to be vital in the important task of benchmarking numerical codes. Perhaps more importantly, several of his solutions continue to be applied widely for the interpretation of field and laboratory data, and in the development of screening-level analyses. This presentation focuses on one area where Sudicky has had a particularly important impact, the development of analytical solutions for solute transport in fractured-porous media. The presentation begins by describing the key elements of Sudicky's now classic solutions for transport along fractures with matrix diffusion, with a discussion of why these solutions have enduring significance. The remainder of the presentation provides an overview of recent developments in this area. The evolution of the methods used to evaluate the analytical solutions is discussed, as well as recent extensions. The solutions are being extended both in the range of boundary and initial conditions that can be accommodated, and in the physical processes that can be represented.