

## **Simplification of the Statistical Foundations Used in the CGPC 2001 Report**

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The statistical software tools used by the Canadian Gas Potential Committee (CGPC) in their 2001 Report are Arps-Roberts and PETRIMES. These tools apparently had different statistical foundations and are used by the CGPC for different geological settings. It can be shown, however, that PETRIMES and Arps-Roberts have a common statistical foundation and that one statistical model can be used instead of two.

This paper presents a statistical model, which unifies Arps-Roberts and PETRIMES (excluding MATCH). This model is a sampling without replacement model, with a bias for finding larger pools earlier in the discovery sequence. It estimates pool size distributions and an associated exploration efficiency factor. It also overcomes two problems inherent in the use of PETRIMES, namely that the ultimate number of pools in a play assessed by PETRIMES cannot exceed 1000, and that PETRIMES cannot handle the problem of economic truncation.

This model combines work done by Gordon Kaufman, Jack Schuenemeyer, Lawrence Drew, and David Fuller, in new ways. It is a significantly more rapid than PETRIMES for computing the number of pools in a play,  $N$ , the  $\mu$  and  $\sigma$  of a play's lognormal distribution and the exploration efficiency factor,  $\beta$ . It is a model that can be easily used to develop a forecast of a play's future finding rates, and hence generate an economic analysis of future discoveries in a play.

Examples of the application of this model are provided using the play assessments from the CGPC 2001 Report. In particular, the comparison of Arps-Roberts and PETRIMES and the issue of economic truncation are re-examined.