

## **CoalVal Updated: Mine Cost Models for Surface and Underground Mining**

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CoalVal is a menu-driven Windows program that produces cost-of-mining analyses for mine-modeled coal resources. Geological modeling of the coal beds and some degree of mine planning, from basic prefeasibility to advanced, must already have been performed before this program can be used. This program developed at the U.S. Bureau of Mines, revised and published at the U.S. Geological Survey (USGS), and newly modified, will provide a mining cost accuracy reflective of the geology and mine modeling data input. The cost analysis is done by using mine cost models designed for the commonly employed, surface and underground mining methods utilized in the United States. Two Powder River surface mining models and one underground longwall mine model were used as cost examples in the USGS publication. This presentation will review the three published mine models, more than twenty revised, but unpublished mine models, and two new mine models created by the author, for coal resource evaluations using the CoalVal Program.

CoalVal requires a Microsoft Windows XP operating system and a minimum of 1 gigabyte of random access memory to perform operations. The program will summarize the evaluation of an unlimited number of coal seams, haulage zones, tax entities, or other area delineations for a given coal property, coalfield, or basin. When the reader opens the CoalVal publication from the Coal Ltd or USGS websites, options are provided to download the CoalVal publication manual and the CoalVal program.

The CoalVal report publication is divided into five specific areas relevant to the development and use of the CoalVal program:

1. Introduction to CoalVal Assumptions and Concepts.
2. Mine Model Assumption Details.
3. CoalVal Project Tutorial.
4. Program Description.
5. Mine Model and Discounted Cash Flow Formulas.

The tutorial explains how to enter coal resource and quality data by mining method; program default values for production, operating, and cost variables; and for entering one's own operating and cost variables into the program. Generated summary reports list the volume of resource in short tons available for mining, recoverable short tons by mining method, the seam or property being mined, operating cost per ton, and discounted cash flow cost per ton to mine and process the resources. Costs are calculated as loaded in a unit train, free-on-board the loadout, at a rate of return prescribed by the evaluator.

The recoverable resources (in short tons) may be grouped by incremental cost over any range chosen by the user. For example, in a Gillette, WY coalfield evaluation, the discounted cash flow mining cost (at an 8 percent rate of return) and its associated tonnages can be grouped using any dollar per ton range at any applicable increment (such as a cost range of \$5.00 to \$30.00 per ton in \$0.10 per ton increments). This grouping ability allows the user to separate the coal reserves from the non-reserve resources and to construct cost curves to determine the effects of coal market fluctuations on the availability of coal for fuel whether for the generation of electricity or for coal-to-liquids processes.