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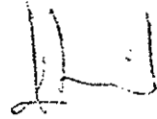
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COMMENTS ON RESERVE ESTIMATION

FOR THE HAT CREEK PROJECT

by

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1. COMMENTS ABOUT THE "COLUMN" MODEL USED BY
COMINCO MONENCO

Although the column concept is fairly standard in computerized models of coal deposits, it may not be appropriate for the Hat Creek project, due to the dip in the coal beds and size of blocks considered. It seems fairly difficult at present to exactly visualize what the model does and a set of vertical sections showing the estimated blocks, their BTU content and the digitized top and bottom of seams should be obtained from COMINCO MONENCO. As the standard procedure to manually grade blocks in such deposits is to follow the geology, the only way to decide whether the model is good or not is to check it against the known geology and see whether or not it respects it.

If it is found that the blocks usually correctly follows the geology, except in case where the beds are steeply dipping, the best way to correct the block values, may simply be to introduce manual correction in the computer model.

2. COMMENT ABOUT THE PRACTICE OF ASSIGNING TO AN
INTERSECTION THE AVERAGE GRADE OF ALL SAMPLES
IRRESPECTIVE OF ORE WASTE DISTRIBUTION

As it appears that there is a possibility for selective mining, one should decide what is technically minable and what is not. Once this definition is available, it is then possible to assign to each intersection a waste proportion and a grade for the coal portion. Then each of these values can be interpreted to define the waste content of each block and the BTU content of the minable part. Various definitions of waste can be used and the

overall effect of selective mining could be checked. This test should be done on the entire deposit rather than one hole only. For each definition of waste three maps should be produced for each subzone - one showing waste thickness, one showing coal thickness, one showing BTU content. A sensitivity analysis of recovery based on one hole only is not sufficient as selective mining may improve recovery by 15% in one hole and may be only 2% in another. The overall effect on the entire property should be seen.

3. ALTERNATIVE TO THE INVERSE SQUARE DISTANCE WEIGHTING PROCEDURE

Academically speaking this procedure can certainly be challenged from an engineering point of view however it is not obvious that another procedure would give very different results.

Kriging is an alternative procedure which could be tested fairly quickly and would at the same time produce confidence intervals. Working from the "mini data" base made up of 20 to 40 intersections for each seam or subzone, variograms could be computed and block values obtained. Twelve maps corresponding to the twelve subzones can be produced at a cost less than \$3,000.00. They would show for the 75 m blocks used in the model, which BTU content is expected.

4. ALTERNATIVE TO THE ESTIMATION OF BLOCKS 15 m HIGH

With the present procedure, when a subzone is more than 15 m thick, all the blocks sitting on top of one another within this seam are assigned the same characteristics. To be able to assign a meaningful specific grade to each requires the development of a new program. The

writer does not know of commercially available packages which would provide a quick answer. Conceptually it is possible using geostatistics to obtain the best estimation for each block. The problem lies in identifying the samples which have an influence on a given block. Recognizing visually these samples is a fairly easy task once detailed geologic sections are available. Teaching the computer to perform the same task is not a straight forward proposition.

To obtain an idea of which difference one may expect between one block 15 m high and the next above or below, one could compute an average variogram within each of the 4 zones, using the original 20' samples. The data base needed would be simply for each hole a list of "from-to" values and the associated BTU value. A leader card identifying each hole should come first for each hole. Samples could be either flagged as A, B, C, D, or 4 different data base could be submitted. A couple days should be sufficient to carry out this exercise.

