MinE 483 - Mine Design – Mapping
HW Text

Exploration Report: Introduction/Location, Geology, and Reserves & Quality.
Students will conduct a literature search of local demographics based on the coal or mineral reserve area to complete written drafts. These papers will be due as shown in the Spring 2003 Work Plan, for instructor feedback on content, completeness and consistency. Final grading will be done on the completed report. Team members must each write part of the assignment.

1. **Introduction/Location** - Often a short statement of project purpose and general information that will orient the reader is needed to avoid confusion. This section may include some mining history of the area and the work done prior to this report. The fact that this is a student Senior Mine Design Project and the source of the data could be explained here. A description is needed of the area geography with reference to significant local features such as access highways, towns or cities, population skills, services, rivers or streams, public structures over the reserve area, pipelines, topography, land use, and transportation network. This text should refer to the “Regional Transportation” and “Mine Location” maps.

2. **Geology** - Description of the mineral deposit or coal seam and the geologic features that will have an impact on the mine plan. This section will have several maps. Geology includes the physical environment of the mine, the name, geologic position and description of related strata, mineralogy and/or petrology, known and suspected faulting or structural challenges in the deposit, water, stress conditions, ground temperature, oil and gas wells, seam gases and other nearby mine workings or experience.

3. **Reserves and Quality** - The orebody, coal seam or reserve should be analyzed in detail for quantity and quality. The report should make clear whether drilling or sample points are on a close enough spacing to properly evaluate the reserve. The USGS parameters of measured, indicated or inferred status of the quantity of reserves and resources may be used. The methods of calculation and assumptions used should be clearly stated. Reserve quality information is frequently best conveyed by mapping and a written summary. Again, the spacing of quality data points may be different than the seam thickness measurements and therefore must be re-evaluated for adequacy to predict product quality. The basis for the analysis such as "Dry, main bench only - 1.60 specific gravity float" must be given. Adverse coal or mineral ownership should be noted on the reserve maps. All maps and plans should have complete legends. Quality is generally reported as field average for the project area. More detail will be needed in the mine timing report in the mine plan section.

4. **Appendix** – An appendix or other method may be used to list the sample data, references, assumptions, etc.
Additional Comments

Introduction/Location - If the report is brief, the introduction can be eliminated but a location section is important to orient the reader to the project. The introduction should state the problem or define the project. It should describe the key elements of the project. This is a good place to discuss reserve or deposit ownership and royalties, taxes and wheelage payments if germane. If ownership issues are complex, it may be preferable to discuss these factors in the reserves and quality section(s). Surface features such as housing, railroads, streams that affect the mine plan or design should be identified.

Geology - Discuss the local and regional geologic and geographic features that will influence the mining operations. Include a discussion of the topography including natural features such as rivers and lakes. What are the physical surroundings in which the reserve is located? What are the structural features that influence the property? Briefly discuss the mineralogy and/or petrology if it is a hard rock project. If a coal project, a brief characterization is better. Leave the detailed discussion of the quality parameters for the Reserves and Quality Section. Maps with proper legends will probably convey the message better than verbal descriptions. For a coal project, the following parameters can be mapped or discussed:

a. Structure or bottom of coal contour
b. Stratigraphy or strip log
c. Typical seam cross sections
d. Roof or floor material or overburden analysis if it will affect mineability
e. Seam thickness isopach
f. Intrusions, faulting, folding, washouts and outcrop or subcrop
g. Stresses, both magnitude and direction
h. Drill hole locations and spacing. Is the spacing close enough to properly evaluate the reserve?
i. Oil and gas wells
j. Methane content
k. Other workings above, below and adjacent (this influences ground control and mine drainage calculations), previous mining experience with regard to the mining hazards and conditions encountered should be discussed.
Reserves and Quality - The orebody, coal seam or reserve should be analyzed in detail for quantity and quality. These can be in separate sections of the report. Is the drilling or are the sample points on a close enough spacing to properly evaluate the reserve? Use of the USGS parameters of measured, indicated of inferred status is a good starting point. In nearly all instances, a major project will require information gathered on sample spacing closer than measured status prior to development. Usually geostatistical methods are utilized to determine quantity and quality. A discussion of how geostatistics is applied specifically to the proposed project may be beyond the scope of an undergraduate report. Reserve quality information is frequently best conveyed by mapping. Whether by map or text, the basis for the analysis such as "main bench only - 1.60 specific gravity float, dry, diluted and adjusted" must be given. Adverse coal or mineral ownership should be noted on the reserve maps if known. All maps and plans should have complete legends. Quality is generally reported as field average and notes on large deviations in the exploration report.

This section will be expanded later in the mine design report since shipped quality is dependant on the mining horizon selected which is a function of the mining method, equipment and conditions and by time period forecast that corresponds to the mine production plan.