

## **Imperial Gold Mining & Production Co. Gold Exploration: Directive #1**

Imperial Gold Mining & Production has recently purchased a small mineral exploration company. Prior to its purchase, this company was searching for gold deposits in a region of South Africa. Although they had identified an area of potential geologic interest, they had not progressed very far with their geologic investigation of the region.

As the part of Imperial Gold's Exploration Division, your group has been assigned the task of completing the geologic investigation started by the exploration company. For the project, you have a topographic base map of the region and can contract with a geologic consulting firm to conduct various field investigations. To pay for the consultant's services, you have been assigned an exploration budget for project. Although the Board of Directors wants you to conduct as accurate and thorough an investigation of the area as possible, they are adamant that your project not exceed its allocated budget.

The versatile company of Myers Exploration and Brewing, LLC has been selected as the subcontractor to perform the field sampling, geochemical analyses, geologic mapping and trenching. To contract a survey or map, tell the company representative (your lab instructor(s)) the geographic area of interest and the task to be accomplished. The costs for the consultant's various services are listed on the next page. They will charge your exploration budget for the cost of the work and give you the results. (Remember the cost of your exploration program cannot exceed your budget.)

Upon completion of your investigation, you must write a geologic report for the Board of Directors (due next week). They will use this report as the basis for decisions about future exploration in the area. The Board of Directors (your lab instructor(s)) will meet next week to hear the results of your prospecting survey.

### **Geologic Report**

For your geologic report to the Board of Directors, you must:

- compile a hydrologic map of the region showing river flow direction and the areal extent of the major drainage basins (use your topographic map as the base for this map);
- construct a geologic map of the region including contacts, strikes and dips and rock units (use the blank geologic map as the base);
- prepare a prospecting map showing the locations of sampling sites and the measured gold contents at each station (you can use either the topographic or geologic map);
- indicate which units, if any, are gold-bearing and should be evaluated further.

For your oral presentation, you can use PowerPoint and the computer projector or overheads and an overhead projector. Please let us know before hand what audiovisual equipment you will need for you presentation.

Your written report should have an abstract, introduction, section on results, summary/conclusion and a list of the members of your exploration group.

### **Exploration Program**

**Budget: \$500,000**

After some discussion, the company's Exploration Division has devised a systematic prospecting program that your group should use to evaluate the economic potential of the area of interest. The steps in this program are listed below.

1. Using a single arrow, indicate the direction of flow for each stream in the map area.
  - a. Draw thick, dashed lines showing the approximate locations of the drainage divides for each major drainage basin.
  - b. Before proceeding check with your instructor to make sure your hydrologic map is correct.
2. Select 10 locations for your initial geochemical survey.
  - a. Note these locations on your topographic map.

- b. Decide what types of sampling are to be done at each location, e.g. sediment, water, soil.
  - c. Determine the element(s) you want the geochemical lab to analyze each sample for.
  - d. Take your request to the subcontractor (your lab instructor(s)). They will charge your budget for the work and give you the results.
3. Based on these results, decide if you need more sampling or want to proceed to mapping.
4. Select the sections that you want mapped geologically.
  - a. To identify the areas you want mapped, you must use the tier and range system of notation.
  - b. Remember you can go down to the level of quarter sections for mapping.
5. Tape the mapped sections on your blank geologic map in their appropriate positions.
6. Determine if you need additional information, e.g. sampling, mapping, or trenching, to understand the geology of your areas of interest.
  - a. Purchase any additional services your need from the subcontractor.
7. Use the field data to draw a reconnaissance geologic map of areas you think might contain gold deposits.
  - a. Don't forget to indicate the level of confidence you have in the contacts on your map by using the appropriate map symbols.

**Exploration Costs*****Geochemical Surveying Costs***

	<i>collection</i>	<i>analysis costs (\$/sample)</i>				
<i>type</i>	<i>(\$/sample)</i>	<i>gold (Au)</i>	<i>silver (Au)</i>	<i>platinum (Pt)</i>	<i>copper (Cu)</i>	<i>package</i>
sediment	12	50	45	60	25	135
soil	15	63	57	75	31	198
water	9	30	37	50	21	115

***Geologic Mapping Costs***

	¼ section	5 ¼ sections	10 ¼ sections	1 section	5 sections	10 sections
cost (\$)	\$125	\$600	\$1,110	\$3,000	\$14,750	\$29,500

***Trenching Costs***

	\$/foot
horizontal	750
vertical	1,000