UBC Mining Engineering
4th Year Research Trip
Poland 2006 Outline

Introduction:

In Spring 2006, the 4th year UBC mining engineering class will be conducting a research field trip to Poland, one of the most diverse and exciting mining regions in the world. The Polish mining industry offers a great variety of minerals, mining methods, and environmental and social issues that are significantly different from those in Canada. Researching such a unique mining community would offer students the opportunity to learn about the methods and technologies in use, with the objective of analyzing their applicability to the mining industry in Canada. Poland is one of the major mining regions in the world and globalization of the industry requires a better understanding of mining activities in such a key country. The extractive industries in Poland have a rich and diverse history. Students will have the opportunity to research and observe, first hand, the evolution of mining in such a unique country. Specifically, the following background topics will be investigated:

- Mining in Poland during the medieval era
- The impact of WWI and WWII on the Polish mining industry
- Re-structuring of the Polish mining industry after WWI and WWII
- Effect of state-run operations on environmental and social issues

This research trip will certainly be a major step in expanding the experience of UBC mining engineering graduates and will contribute greatly to the knowledge of those entering the mining industry.

The research project consists of the UBC 4th year mining engineering class, accompanied by Professor Dr. Marek Pawlik and PhD candidate Maria Holuszko. We will travel to Poland and visit six mines, three mineral processing plants, one chemical plant, one smelter, and The Central Mining Institute of Poland. During this time, students will also interact with fellow mining engineering students at institutions in Poland, as well as with professionals within the Polish mining community. This trip is part of a 4th year UBC mining course called MINE 493, which requires students to plan a research trip to a unique mining location as well as write an extensive report outlining the mining and processing methods used, closure plans, environmental and social issues, and any other important information related to that locale. The final report will be made available to our sponsors, to fellow students, and to faculty. In addition, the class will share their experience and knowledge gained, through presentations to the department and industry.

Research Sites:

1) **Wieliczka Salt Mine** – The historic underground Salt Mine in Wieliczka is one of the only sites in the world where mining has continued for over 650 years. Lying on nine levels, its original excavations stretch for a total of 300 kilometers, reaching a depth of 327 meters. They illustrate all stages of the development of mining technology over time.

2) **Miedziana Gora (Copper Hill) Site** – This historic underground copper mine dates back to the middle and bronze ages. Copper produced from this site was used to produce currency for the Polish mint and to build regional castles. The property was a major source of income for many of the local inhabitants. The property lies beneath an old town. Access shafts are scattered throughout the site, and are connected via underground tunnels.

3) **Rudna Mine and Mineral Processing Plant operated by KGHM Polska Miedz Ltd. –** This is a deep underground copper mine located 1,100 m below surface. The primary mining method is room and pillar with hydraulic backfilling, and the ore bodies span a total of 100 km^2. The ore seam thickness varies from 0.5m to 20m. The underground properties are accessed via 10 shafts. Ore is processed by conventional flotation methods producing a copper concentrate. Students will investigate:

    -The complex ventilation requirements of such a large deep underground mine.
    -The selectivity of the room and pillar mining method to a varying ore body seam thickness.

4) **Glogow Smelter operated by KGHM Polska Miedz Ltd**. – This smelter primarily treats copper, silver, and gold concentrates, and processes these concentrates through shaft furnaces. By-products include sulphuric acid, nickel sulphate, and platinum and palladium slimes. The smelter pursues an active environmental program which includes reducing sulphur dioxide emissions, and treating soil for reclamation. In 2004, KGHM was the 6^{th} largest refined copper producer in the world, accounting for 3.42% of global copper production. It was also the 3^{rd} largest producer of silver, accounting for 6.81% of global silver production. The amount of gold produced by this smelter satisfies the requirements of the entire Polish electronics industry. Students will investigate:

    -The technologies associated with producing multiple smelter products.
    -The technologies used to reduce sulphur emissions and reduce environmental impact.

5) **Piast / Ziemowit Coal Mine and Preparation Plant operated by Kompania Weglow S.A. –** This is the largest and deepest underground coal mine in Poland. It is located 750 m below surface, produces 5.6 million tonnes of metallurgical and thermal coal per year, and employs 7,100 people. The mine uses unique regionally developed equipment in order to economically mine this complex deposit. The preparation plant produces various products, each aimed to meet specific customer

requirements, in terms of ash content, moisture content, grain size, and calorific value. Students will investigate:

-The unique mining equipment used to exploit this deposit.
-The technical challenges associated with producing multiple products from the preparation plant.
-The complex rock mechanics issues associated with mining at such a significant depth.

6) **Grzybow / Osiek Sulphur Mine and Chemical Plant operated by Siarkopol Ltd.** - This is the only dedicated native sulphur mine in the world. The mine uses a unique solution mining method in which concentric pipes are drilled into the deposit from surface and super-heated water is pumped deep into the deposit. The water melts the sulphur and molten sulphur is pumped back to surface where it crystallizes. The crystallized sulphur is then transported to the chemical plant for processing. The chemical plant produces various sulphur based products. Students will investigate:

-The effectiveness of the solution mining method, and explore its application within the Canadian mining industry.
-The reasons for the decline in native sulphur mine production and its implication to local social issues.

7) **Olkusz Pomorzany Lead/Zinc Mine and Mineral Processing Plant operated by ZGH Boleslaw Ltd**. – The primary mining method at this underground mine is the room and pillar method, and the processing plant produces separate lead and zinc concentrates. Mining is done beneath a heavily populated area. Underground excavations are backfilled using massive quantities of sand which forces the mine to operate a parallel sand mine. The processing plant has issues with the removal of magnesium in order to produce a cleaner lead concentrate. Students will investigate:

-The technical challenges of backfilling, using such large quantities of sand.
-The difficulties of tailings disposal in a heavily populated area.
-The technical issues associated with magnesium removal to produce a cleaner lead concentrate.

8) **Central Mining Institute of Poland located in Katowice** – This is the primary national industrial research center devoted to mining development and education in Poland.

-Students will attend a seminar, and network with academics within the Polish mining community.
-Students will investigate some of the research initiatives developed within the Polish mining industry.

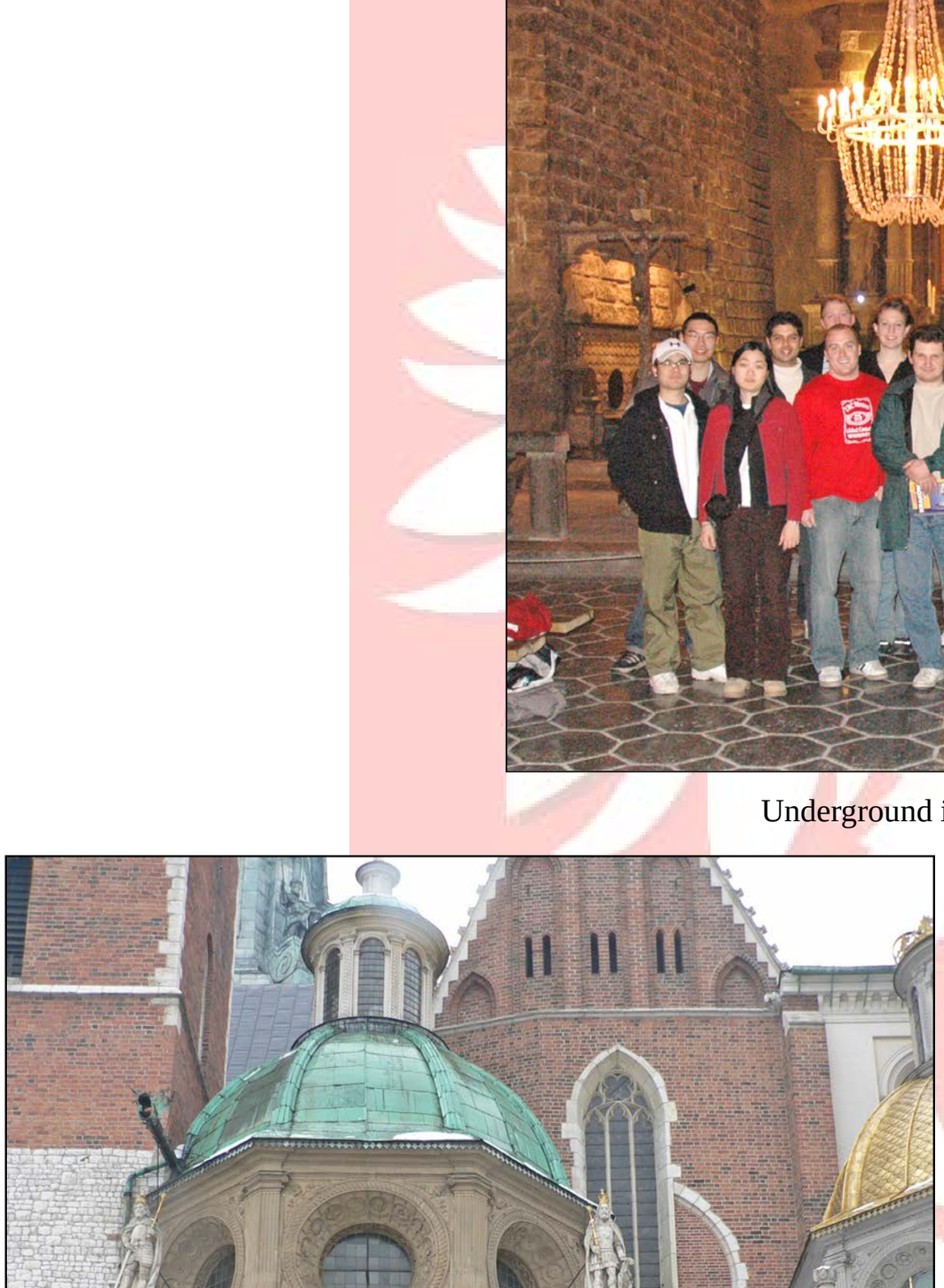
Project Itinerary:

Activity	Date
Depart Vancouver, BC	9-Feb-06
Arrive Warsaw, Poland	10-Feb-06
Travel to Warclaw vis Chartered Bus	10-Feb-06
Visit Rudna Copper Mine and Mineral Processing Plant	11-Feb-06
Visit Glogow Smelter	12-Feb-06
Travel to Krakow vis Chartered Bus	13-Feb-06
Visit Piast / Ziemowit Coal Mine and Preparation Plant	14-Feb-06
Visit Grzybow / Osiek Sulphur mine and Chemical Plant	15-Feb-06
Visit Olkusz Pomorzany Lead / Zinc Mine and Mineral Processing Plant	16-Feb-06
Visit the Central Mining Institute of Poland	17-Feb-06
Visit Wieliczka Salt Mine	18-Feb-06
Visit Miedziana Gora (Copper Hill) Site	19-Feb-06
Travel to Warsaw via Chartered Bus	20-Feb-06
Depart Warsaw, Poland	21-Feb-06
Arrive Vancouver, BC	21-Feb-06

KGHM Copper Smelter in Głogów, Poland

JSW “Krupiński” Coal Mine, Suszec, Poland

Underground in Wieliczka Salt Mine, Poland



Wawel Castle, Kraków, Poland

“Sukiennice” in the Main Square, Kraków, Poland

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