IMR Professional Development Short Course

Mine Engineering Inputs to Integrated Planning

Friday April 13 – Saturday April 14, 2018

University of Arizona Student Union, Catalina Room. 1303 University Boulevard, Tucson Az 85719
Note: Easiest parking is in the Park Ave. garage at the NE corner of Speedway and Park

Program Outline:

Day 1.

Introduction, Fundamentals of mining engineering

- Introduction to this course and to the series
- Introduction to what the field of mining engineering covers

Module 1, Inputs required to assess the mining of a resource

- Geologic model with metal grade, rock, ore and mineral types
- Recovery for all payable products by process and/or ore type
- Costs: operating, downstream, G&A, discount rate, sustaining capital requirements
- Metal prices, credits

Break for lunch, 12:00 to 1:00

- Equipment type(s) and productivities, discounting, sinking rate
- Boundaries, property, infrastructure, physical
- Valuation of the economic planning model
- Slope parameters
- Lerchs-Grossman (LG) optimization

Module 2, Geomechanics and mine design

- Goal to Safely execute the optimal extraction plan
- Determine the rock mass and hydrogeologic characteristics at the future wall location
- Slope design
- Excavation process
- Slope management process

Activity 1 *Economic Pit Limit exercise*

Day 2.

Module 3, Pit and phase design

- Use ultimate pit shell results to guide the mine design process
- Select design parameters such as: mineable width, ramp width and grade, bench and slope geometries
- Select working phase design parameters such as, ore and waste production rate, min/max phase width, slope angles, D&B design and OC, etc.
- Develop incremental phase designs using incremental techniques
- Reconcile final phase designs to original assumptions

Module 4, Scheduling a plan

- Constraints: plant and equipment production capacities, tailings, leach pad or stockpile rate and total capacities, metal targets, sinking rate limit, permit requirements
- Internal, break-even, and operational cutoff grade analyses
- Prepare waste rock and stockpile designs and haul road network
- Calculate equipment requirements
- Prepare production schedule
- **Long, medium and short-range planning needs:**
  - Plan for Safety
  - Appropriate period selection to align with schedule use
  - Use long term, current or case specific cost assumptions
  - May incorporate blast hole assay data
  - Identify maintenance cycle(s)

Break for lunch, 12:00 to 1:00

Module 5, Reporting Resources and Reserves

- Reporting Guidelines
- Resource & Reserve Class Estimation Methods
- Life of Mine Forecast Models
- Cost Assumptions
- Commodity Price Assumptions
- Other considerations

Activity 2 *Project evaluation and selection by various KPIs*

Module 6, Options and Alternatives to a Mining Project

- Underground
- Alternative processes
- Reconciliations
- Project expansion, debottleneck, etc.

Conclusion and exit survey