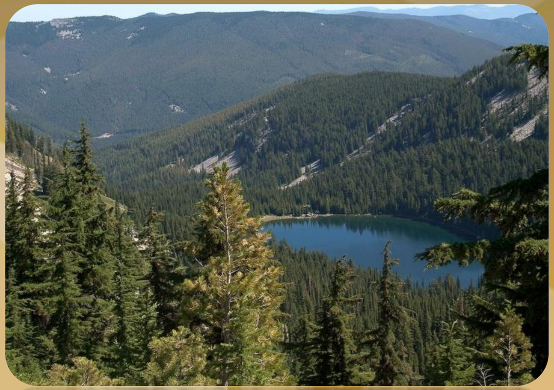



CUMO Property Feasibility Study

Boise County, Idaho

Introduction

Feasibility

- Modeling of Drill Hole Data
- Extent of Mineralization
- Calculation of Cutoff Grade
- Estimation of Mineral Reserves

Pit Design

- Local and Regional Geology
- Slope Stability Considerations
- Bench Slope Height and Angle
- Ultimate Pit Slope Height and Angle

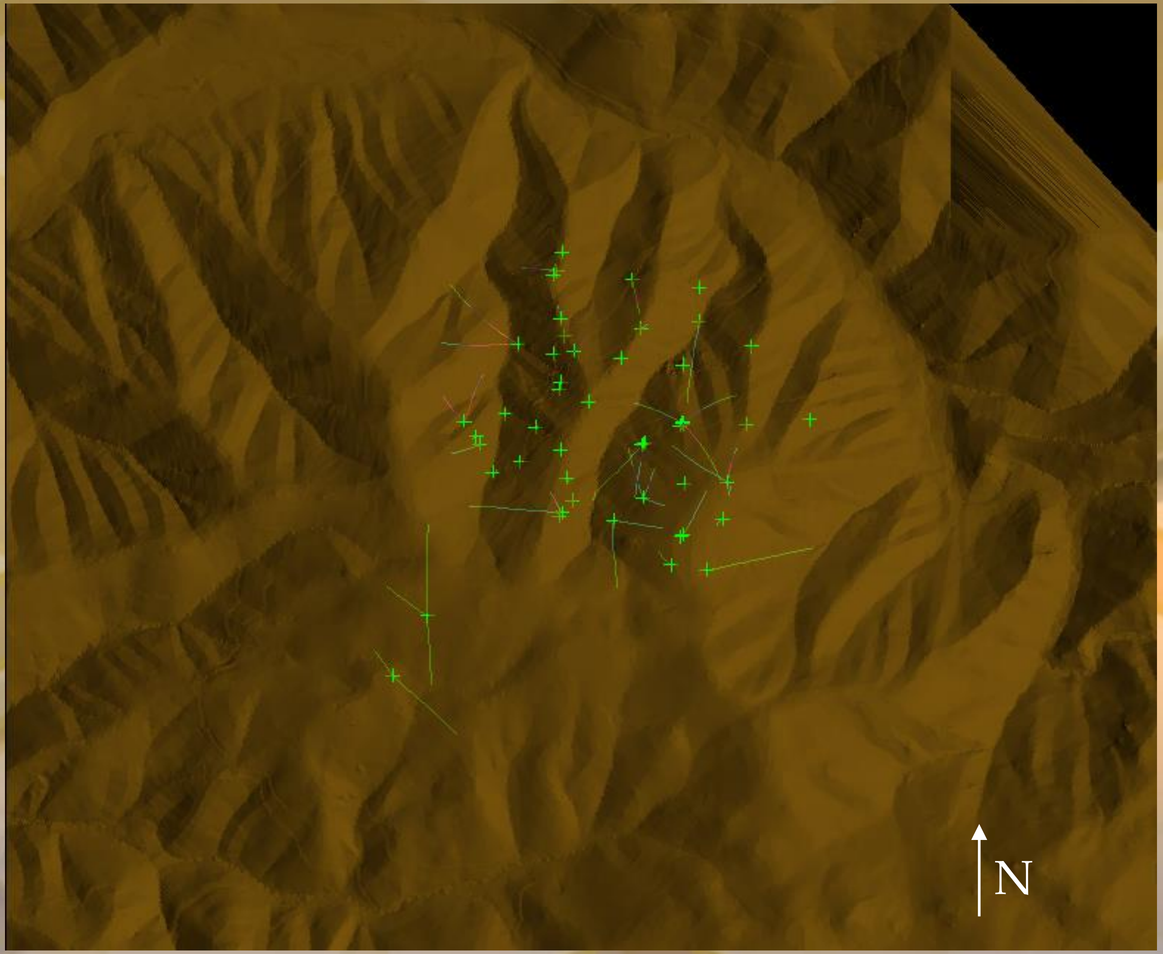
Production Schedule

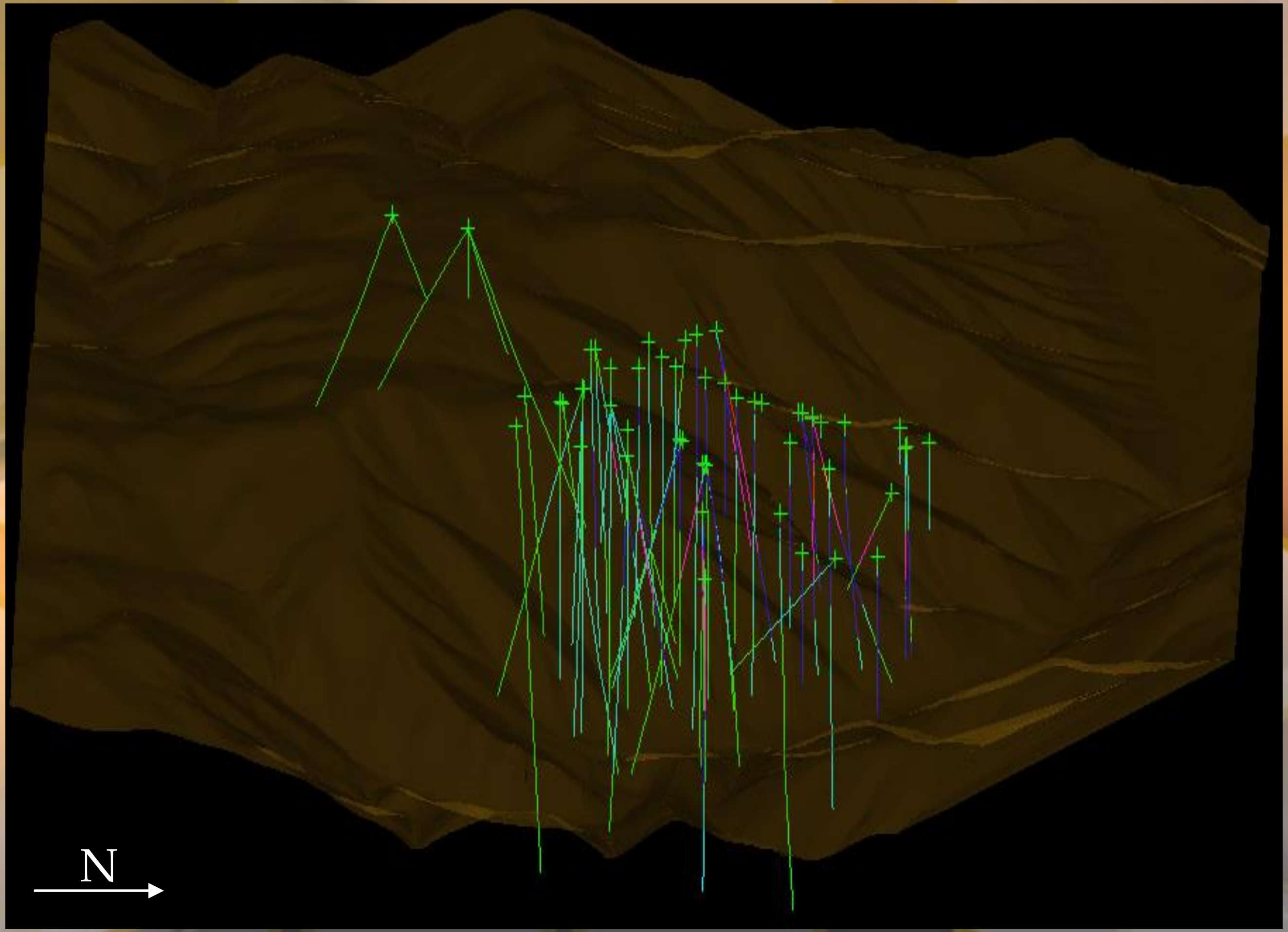
- Stripping Ratio
- Required Equipment & Planning
- Required Manpower and Scheduling
- Progression of Excavation

Economics

- Capital Costs
- Operating Costs for LOM
- NPV, ROR, IRR, ROI
- Overall Economic Evaluation

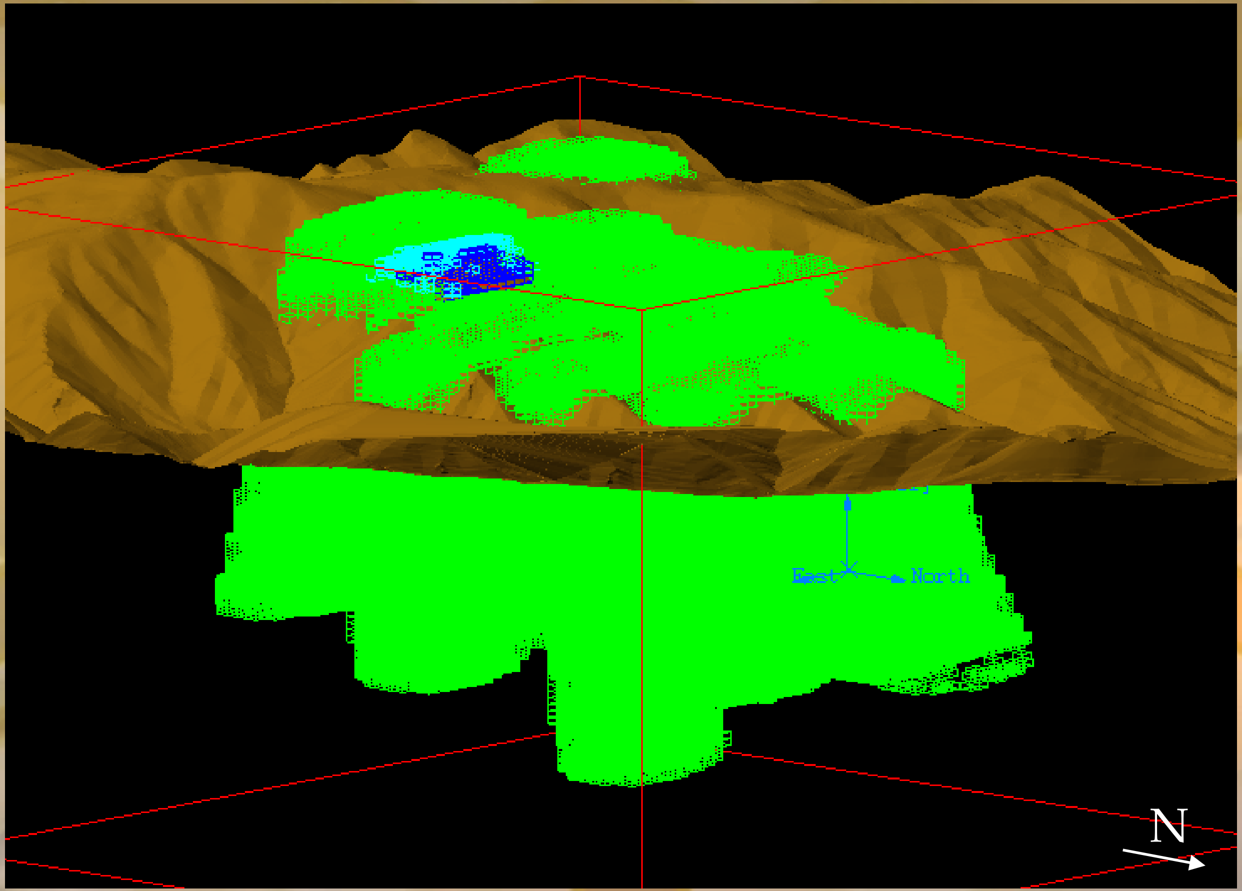
Interpretation of Drill Hole Data

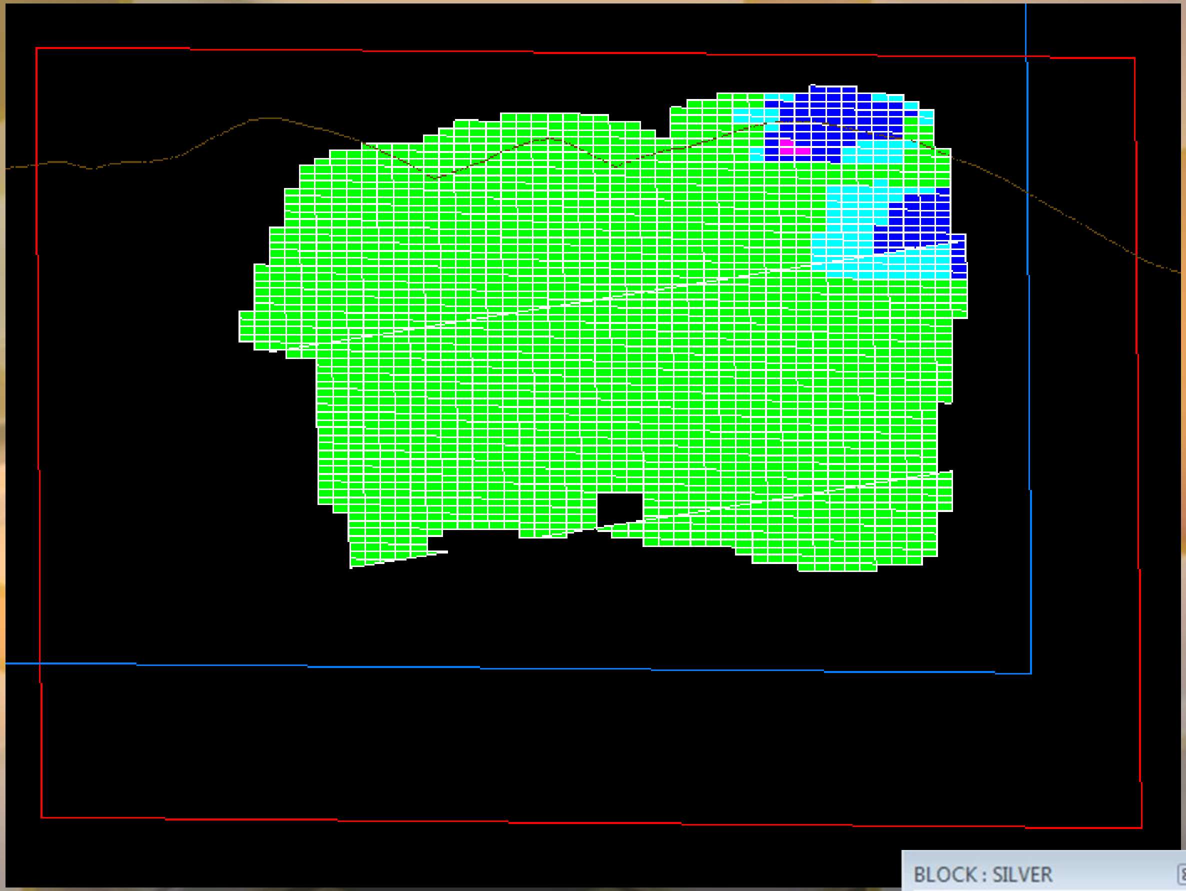


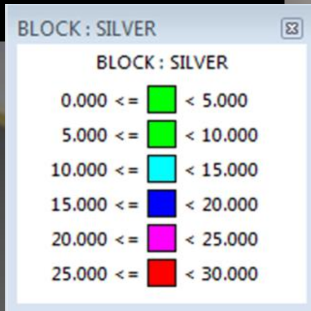


- Analyzing drill hole and assay data reveals approximate locations and depths of various minerals within the property.

Orebody Model: Silver (g/t)

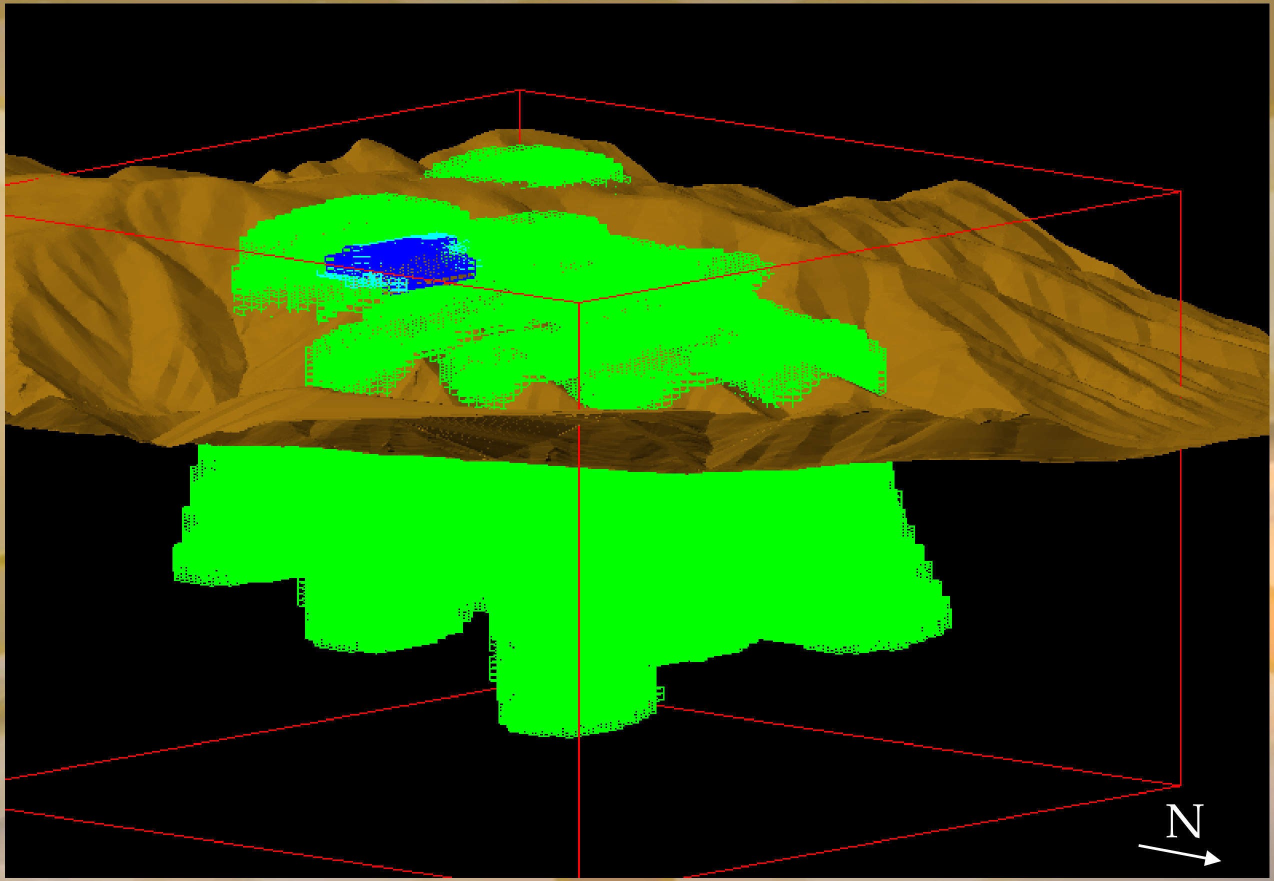


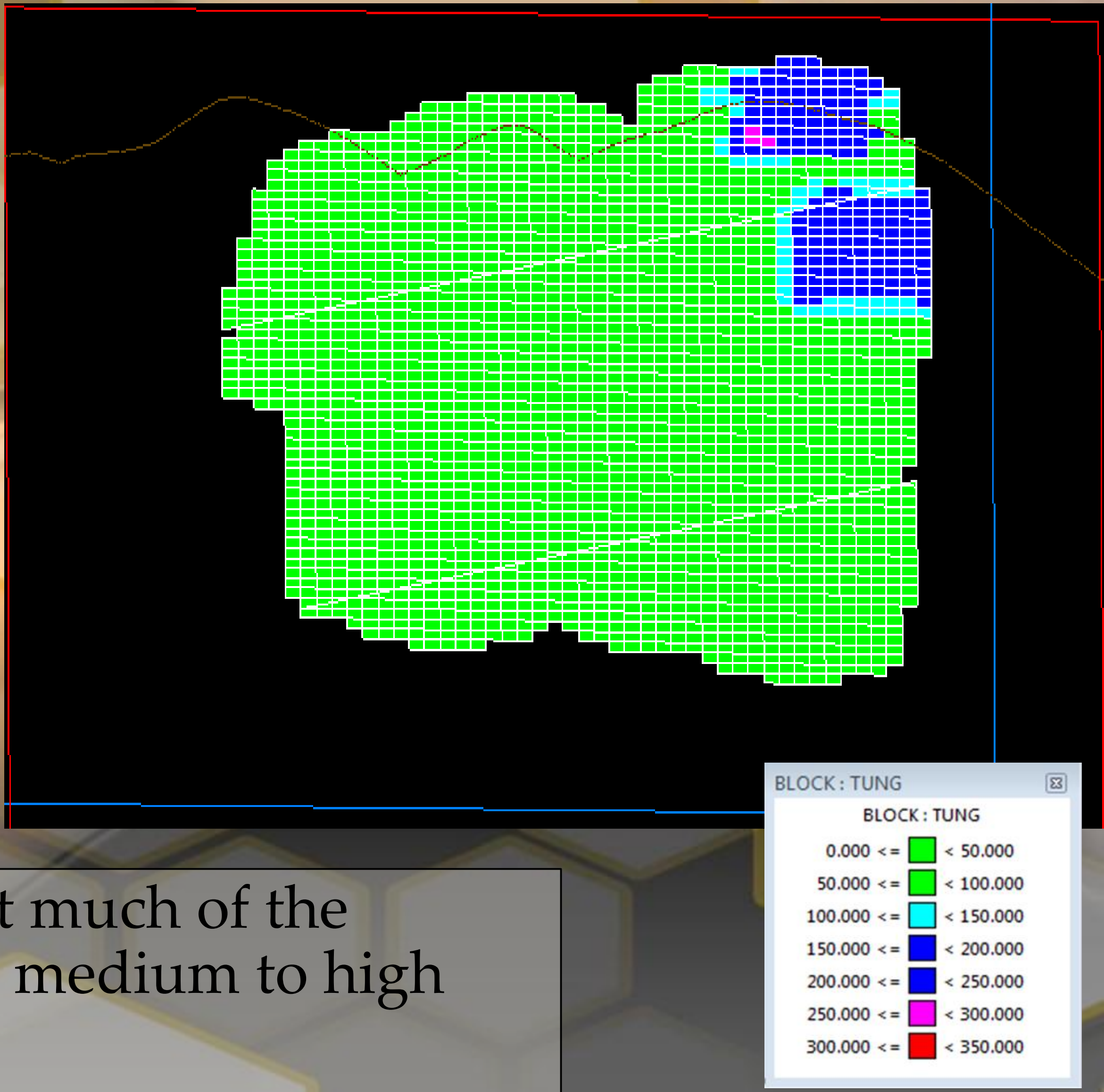




- Silver deposits in the orebody show that most of the valuable pockets lie near the surface.
- Being a high value metal, helps with initial cash flows in beginning phases of mine development.

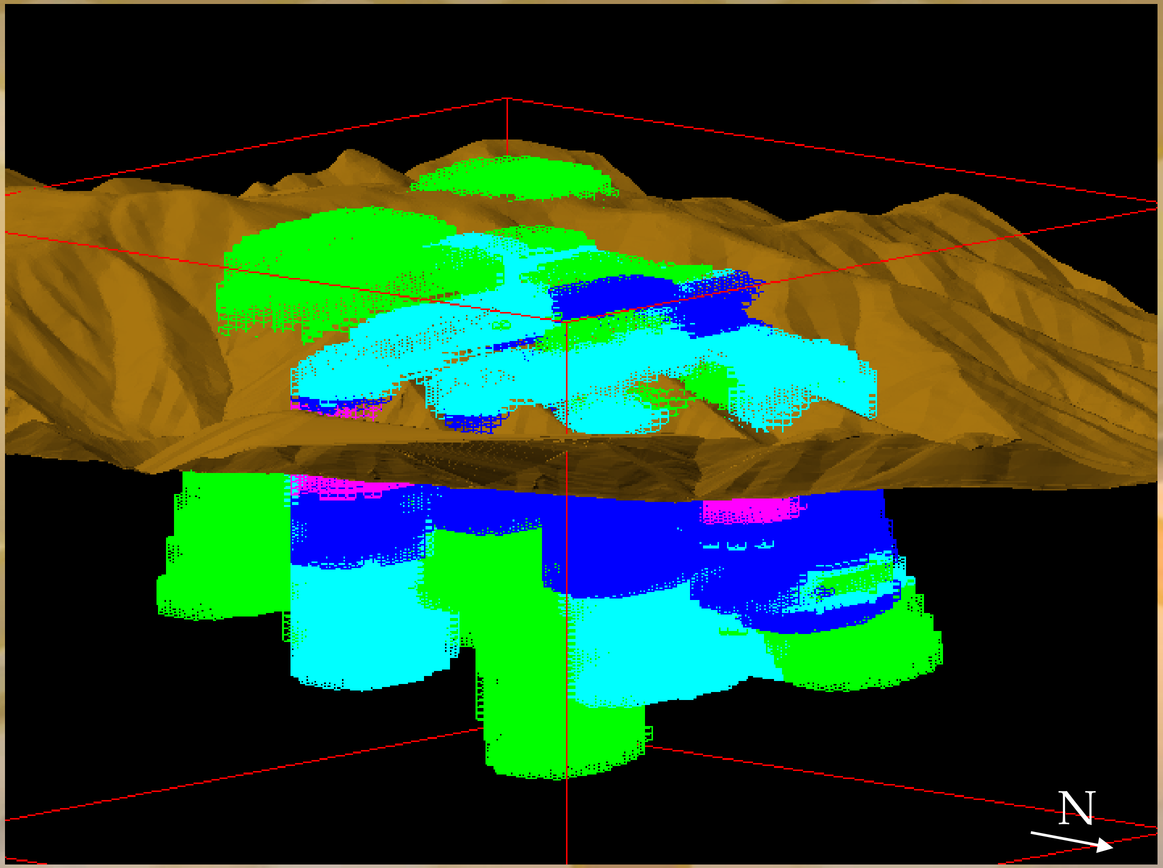
Orebody Model: Tungsten (ppm)

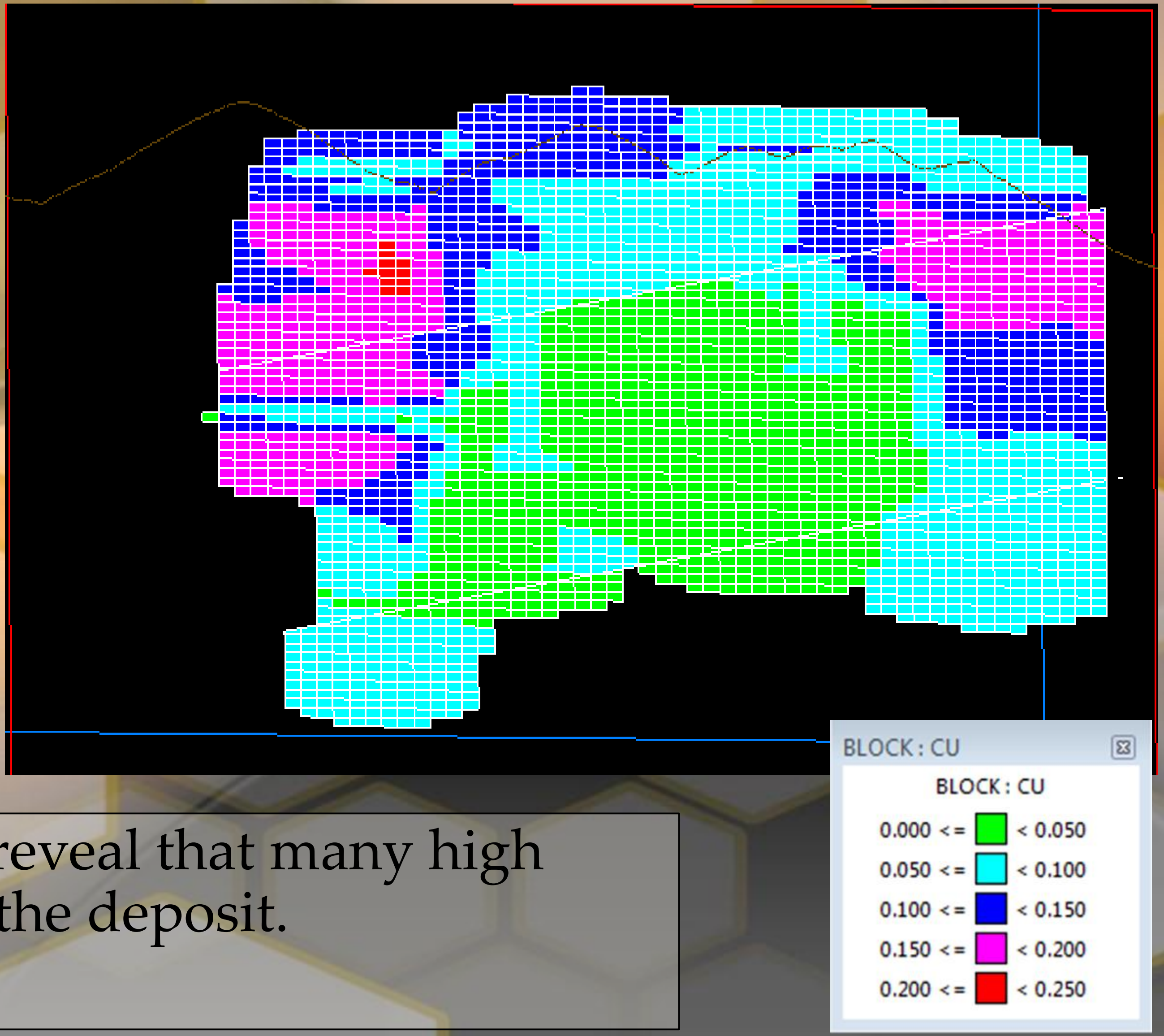




- Similar to silver, tungsten deposits show that much of the orebody is very low grade, while a pocket of medium to high grade sits near the surface.

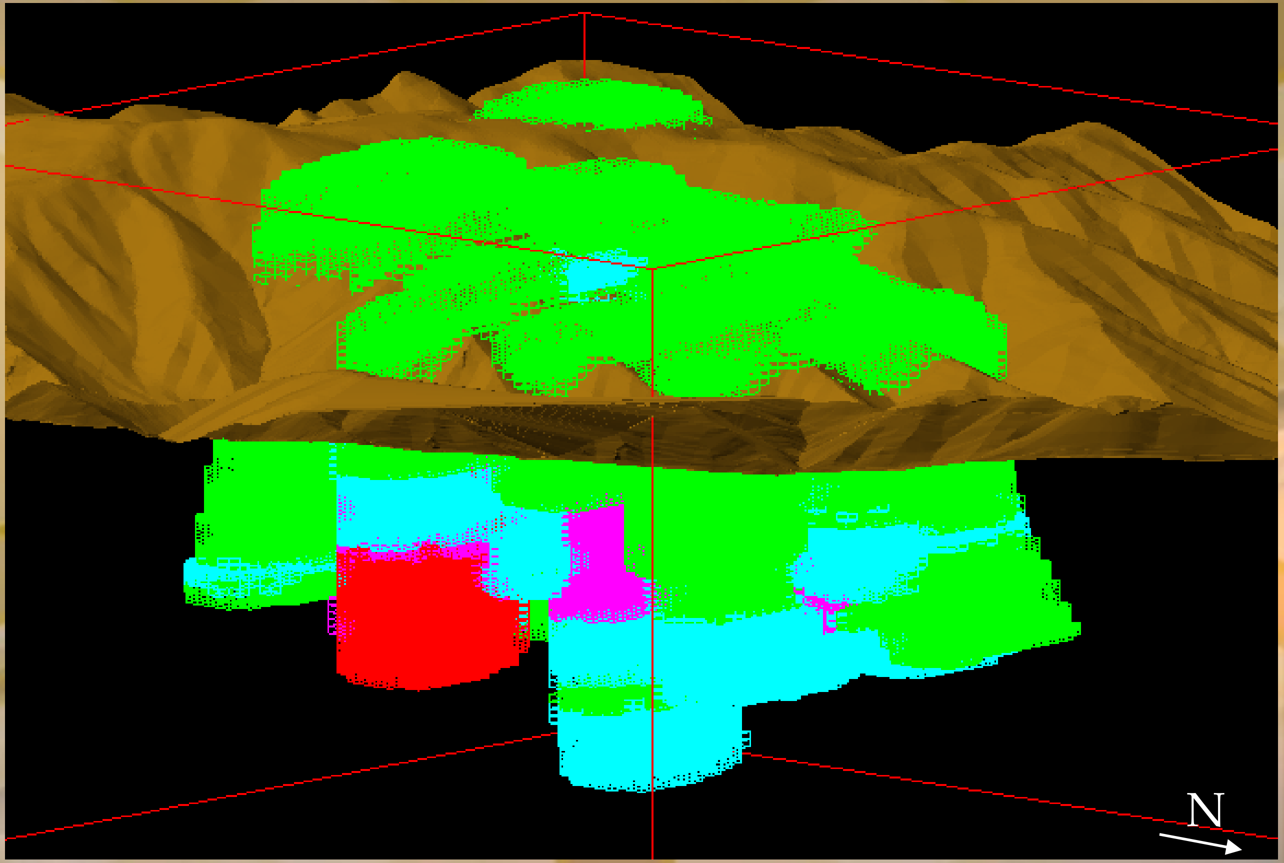
Orebody Model: Copper (%)

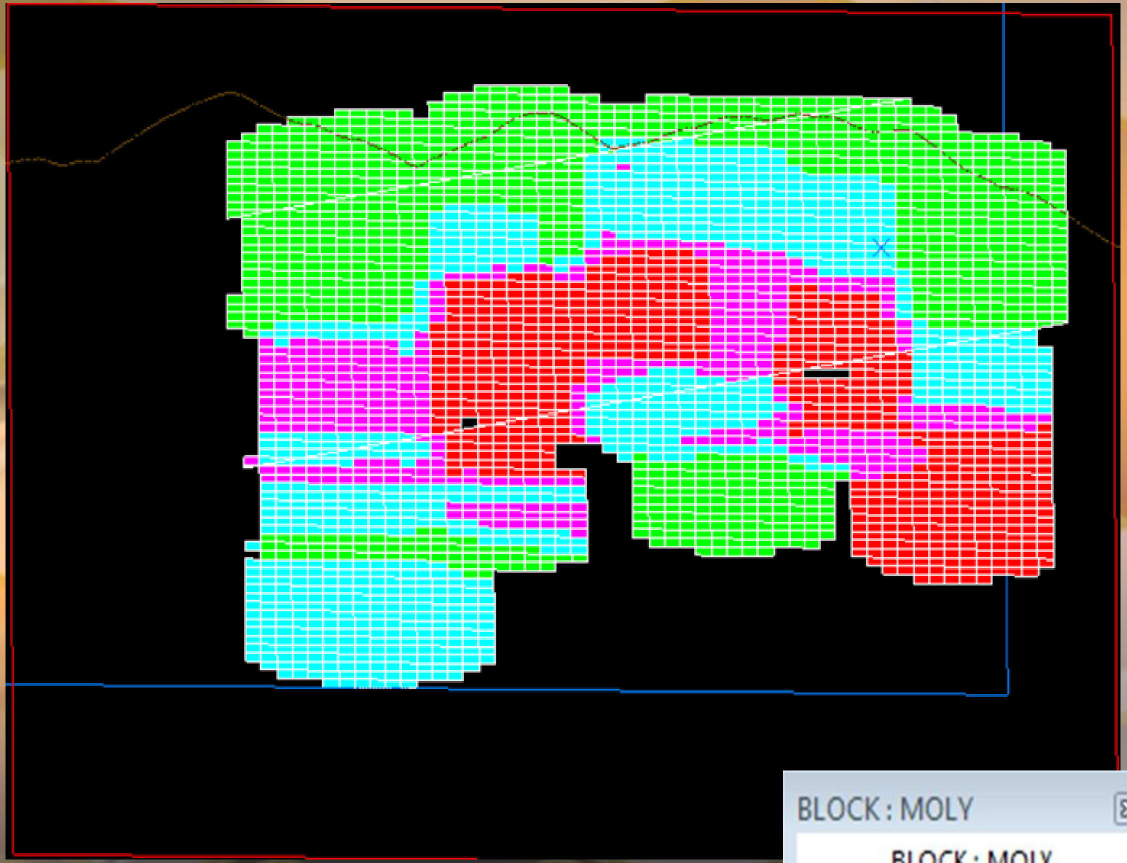


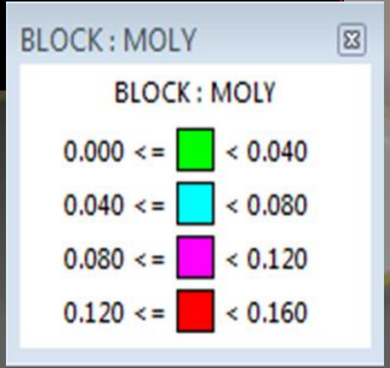


- Displaying orebody extents of copper reveal that many high grade pockets lie in the mid section of the deposit.

Orebody Model: Molybdenum (%)







- Displaying orebody extents of Molybdenum reveals that the high grade pockets lie deep within the orebody while large tonnages of medium grades exist throughout.
- This factor plays a big role in ultimate pit design.

Cutoff Grades

Cutoff Grade		Units
Moly	0.063	%
Tungsten	1090	ppm
Silver	19.93	g/t
Copper	0.19	%

Cutoff Grade Info		Units
Operation Cost	510,000,000.00	$/year
Ore Milled	73000000	Tons/year
Operation Cost	6.99	$/ton
Copper Recovery	71.4	%
Moly Recovery	89.6	%
Tungsten Recovery	28	%
Silver Recovery	65.6	%
Price of Copper	2.57	$/lb
Price of Moly Trioxide	6.92	$/lb
Price of Tungsten	11.45	$/lb
Price of Silver	293.12	$/lb

	%Recoveries in Oxides	%Recoveries in Cu-Ag Domain	%Recoveries in Cu-Mo Domain	%Recoveries in Mo & MSI Domains
Cu	60.0	68.0	85.0	72.0
Ag	65.0	75.0	78.0	55.0
W	0.0	35.0	35.0	35.0
MoS_2	80.0	86.0	92.0	95.0

Note: The recoveries for all metals in the MSI domain were similar to the Mo Domain

Factors to use in RCV equation were as follows:

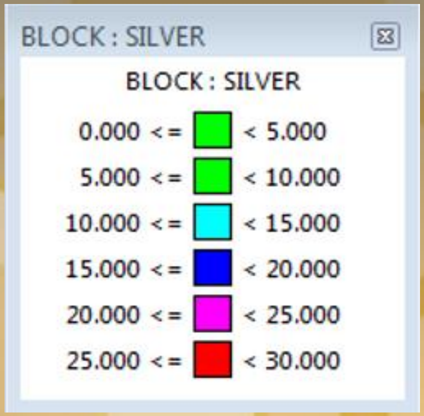
$$MoS_2 \text{ Factor (\$/ton)} = \frac{MoS_2\,\%}{100\%} * \frac{\text{Recovery }\%}{100\,\%} * \frac{2000\text{ lb}}{\text{ton}} * \frac{\text{Price for } MoO_3\ \$}{\text{lb}} * \frac{1.5}{1.6681}$$

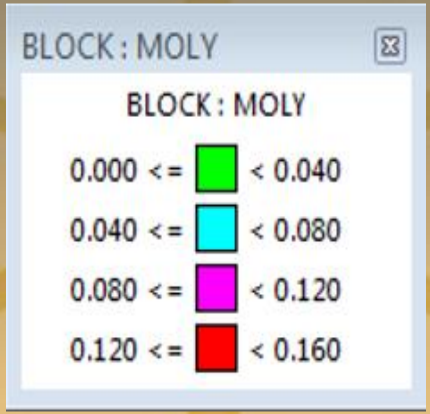
$$\text{Cu Factor (\$/ton)} = \frac{\text{Cu }\%}{100\,\%} * \frac{\text{Recovery }\%}{100\,\%} * \frac{\text{Price for Cu }\$}{\text{lb}} * \frac{2000\text{ lb}}{\text{ton}}$$

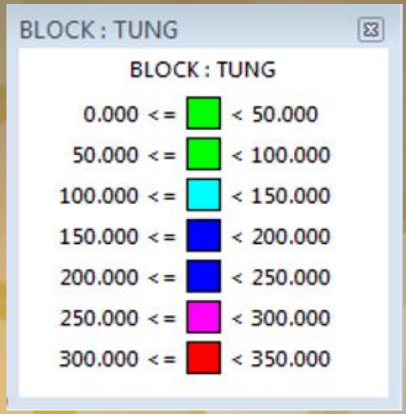
$$\text{Ag Factor (\$/ton)} = \frac{\text{Ag gms}}{\text{Tonne}} * \frac{1\text{ oz}}{31.1035\text{ gms}} * \frac{1\text{ Tonne}}{1.1023\text{ ton}} * \frac{\text{Recovery }\%}{100\%} * \frac{\text{Price for Ag }\$}{\text{oz}}$$

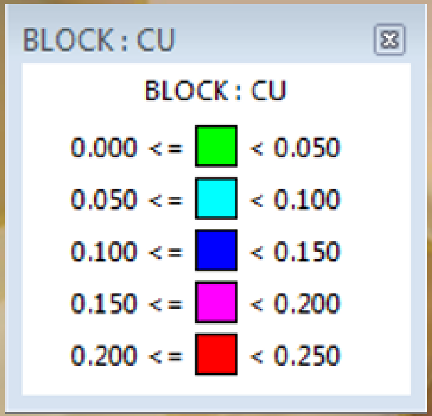
$$\text{W Factor (\$/ton)} = \frac{\text{W ppm} * 1\%}{10000\text{ ppm}} * \frac{\text{Recovery }\%}{100\,\%} * \frac{\text{Price for W }\$}{\text{lb}} * \frac{2000\text{ lb}}{\text{ton}}$$

Problems with Cutoff

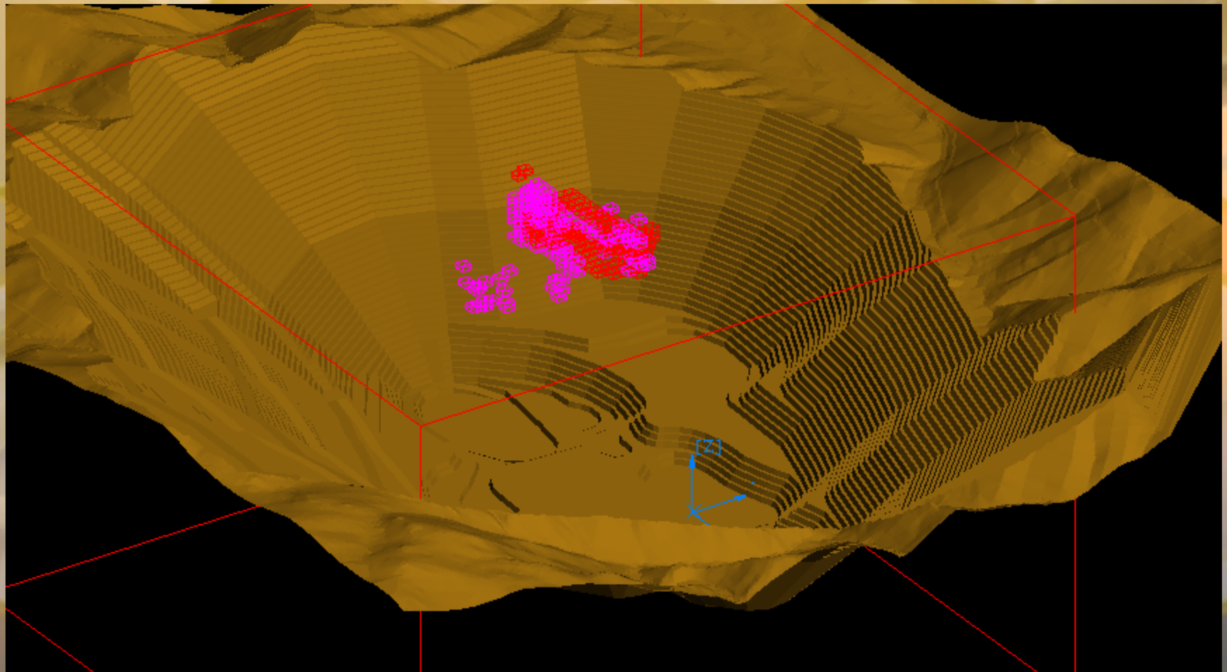




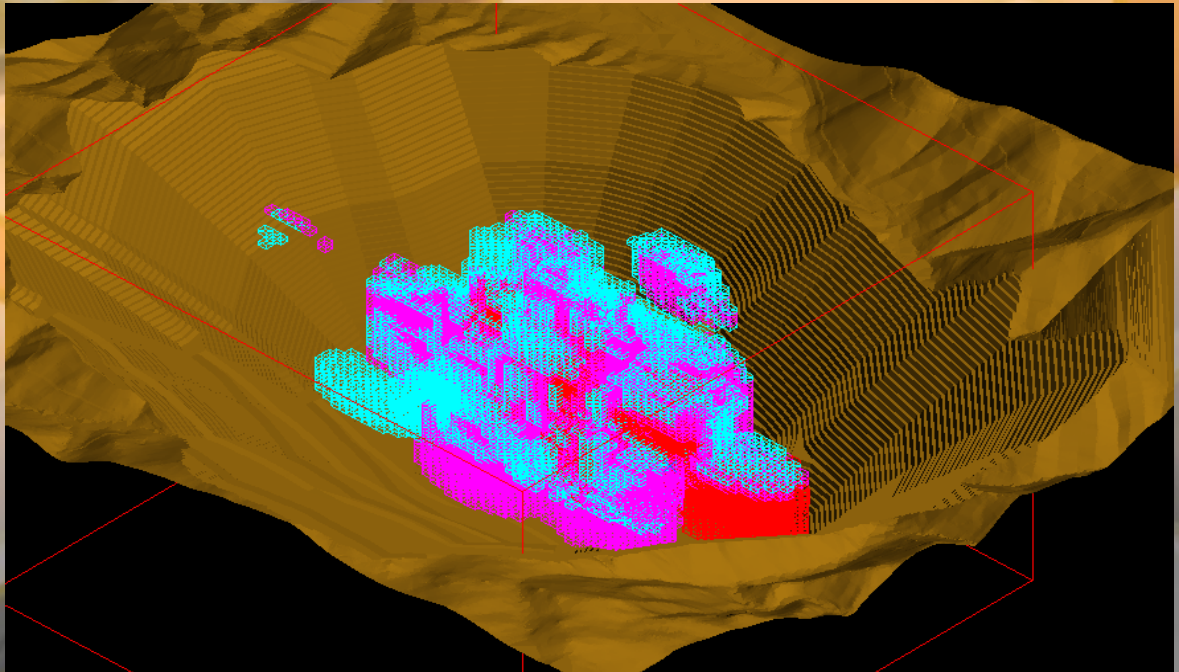




Cutoff Grade		Units
Moly	0.063	%
Tungsten	1090	ppm
Silver	19.93	g/t
Copper	0.19	%



Copper



Molybdenum

Reserve Calculation: Ore and Stripping

Cutoff Grade	
Cu	0.03%
Mo	0.025%
Ag	0.00024%
W	0.0038%

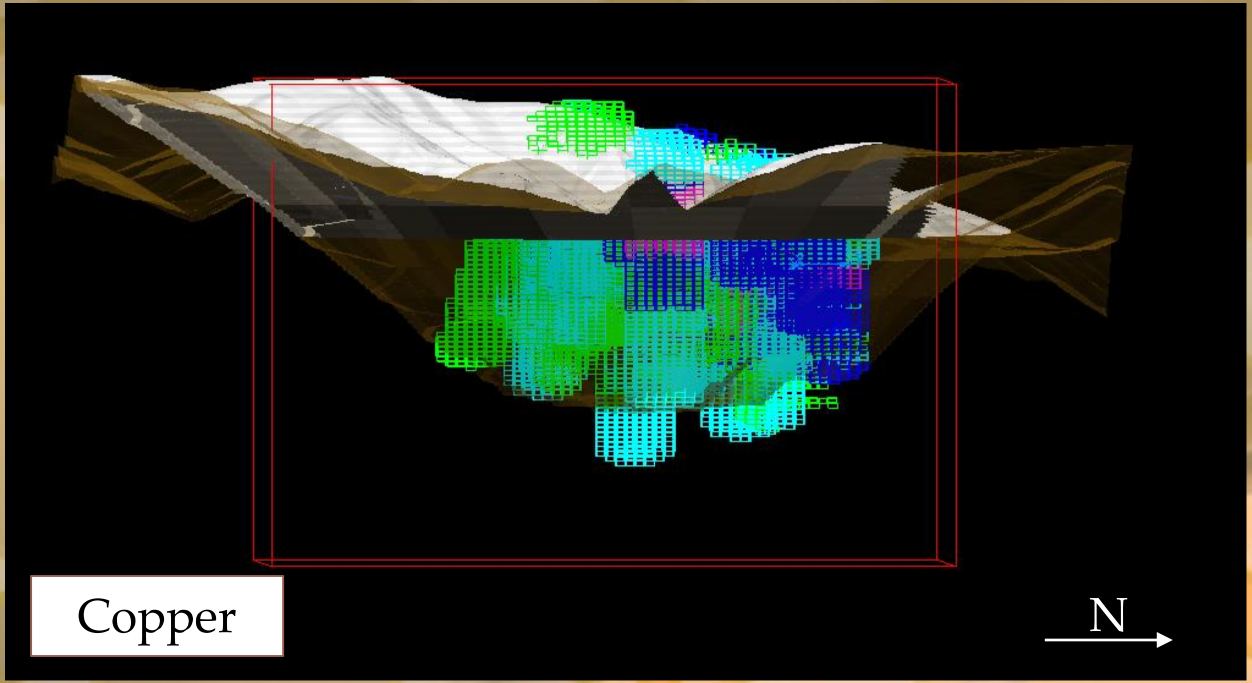
Total Tons	
ORE TONS	2,815,124,963
WASTE TONS	3,545,300,413
TOTAL - STRIPPING	6,360,425,376
STRIPPING RATIO	0.68
TONNAGE RATIO	1.26

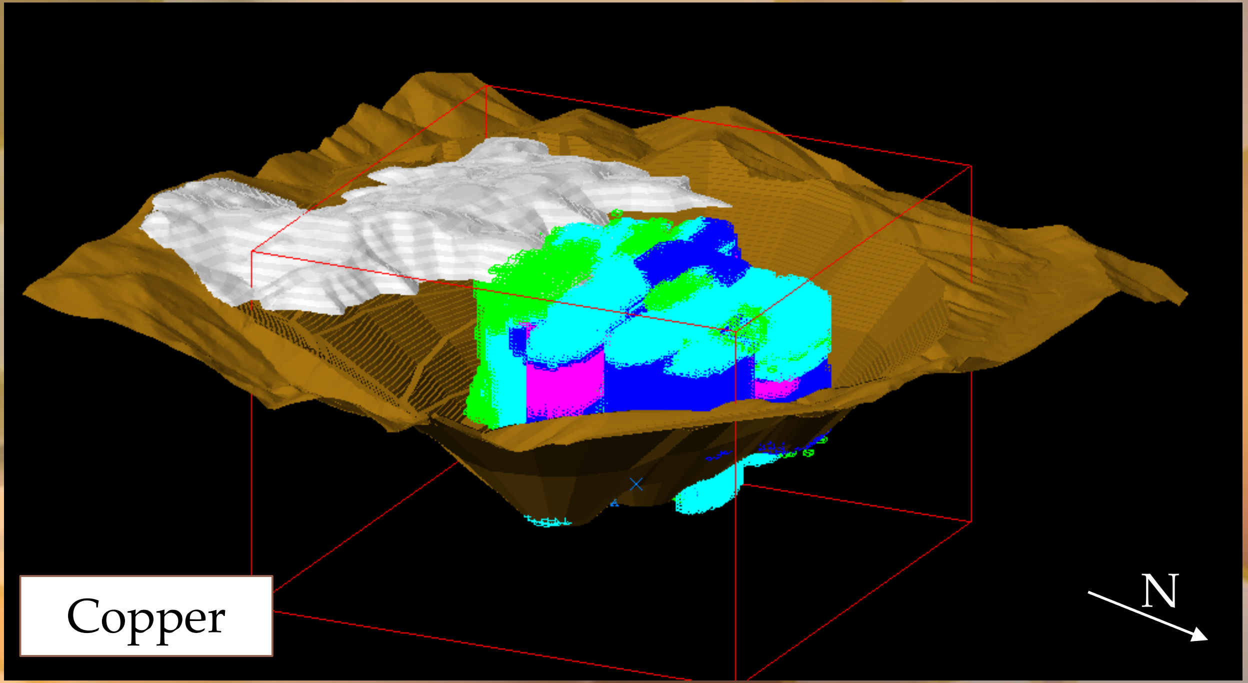
Tons or Ore	
STRIPPING	601,334,431
COPPER ORE	232,391,781
MOLY ORE	183,514,001
SILVER ORE	48,819,899
TUNG ORE	3,017,420
CUMO ORE	1,033,682,953
CUAG ORE	386,417,492
CUW ORE	67,556,697
MOAG ORE	14,664,800
MOW ORE	122,135,145
AGW ORE	722,924,774
WASTE	3,545,300,413

- New cutoff grades based around 43-101 Report on the CUMO Property.*

* G. Giroux, S. Dykes and J. Place, "Summary Report on the CuMo Property, Boise County, Idaho.," American CuMo Mining Corp, 2015.

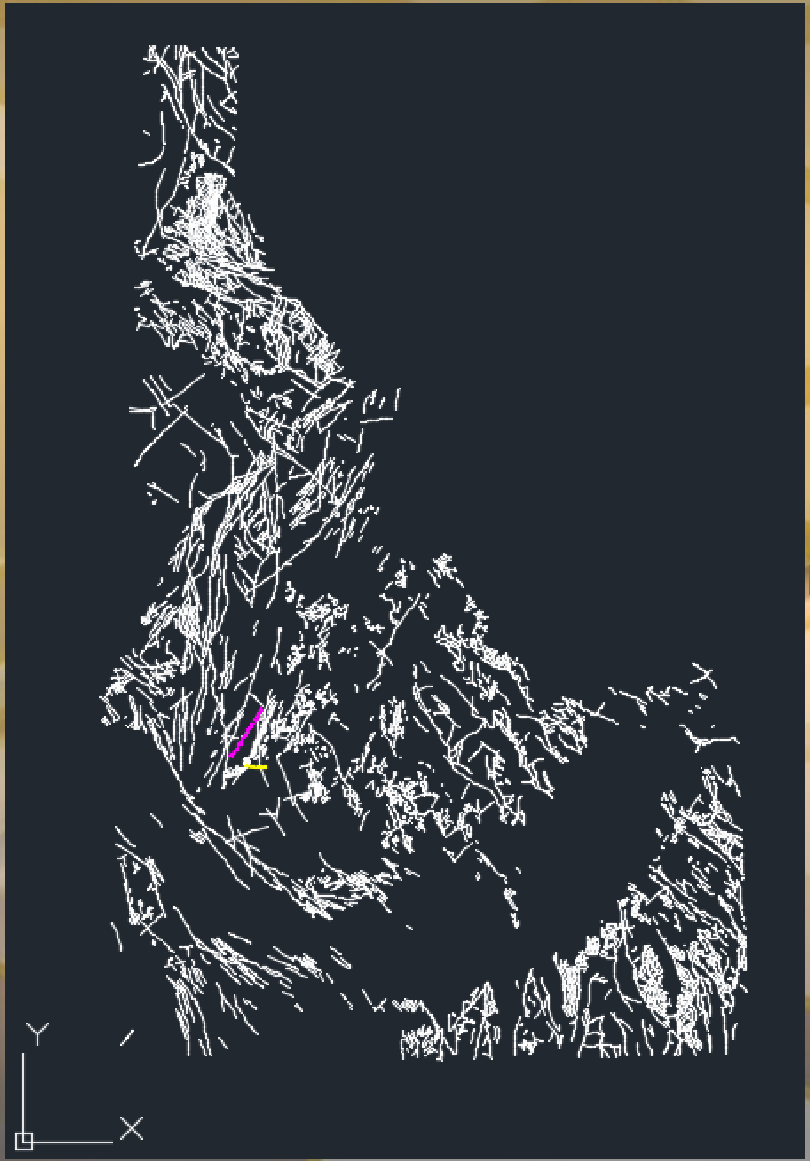
Reserve Calculation: Stripping Explanation



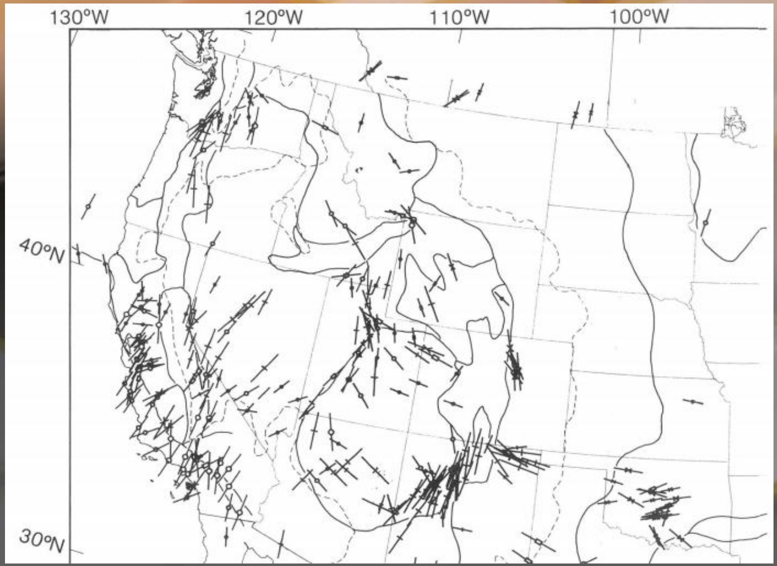


- Stripping can be done at an average of $.50/ton, and either done in house, or contracted out.
- Shells can't be split horizontally, only vertically.
- Decided to classify all waste material from the 5400 level to the 7050 level as stripping to be done separately from mining.

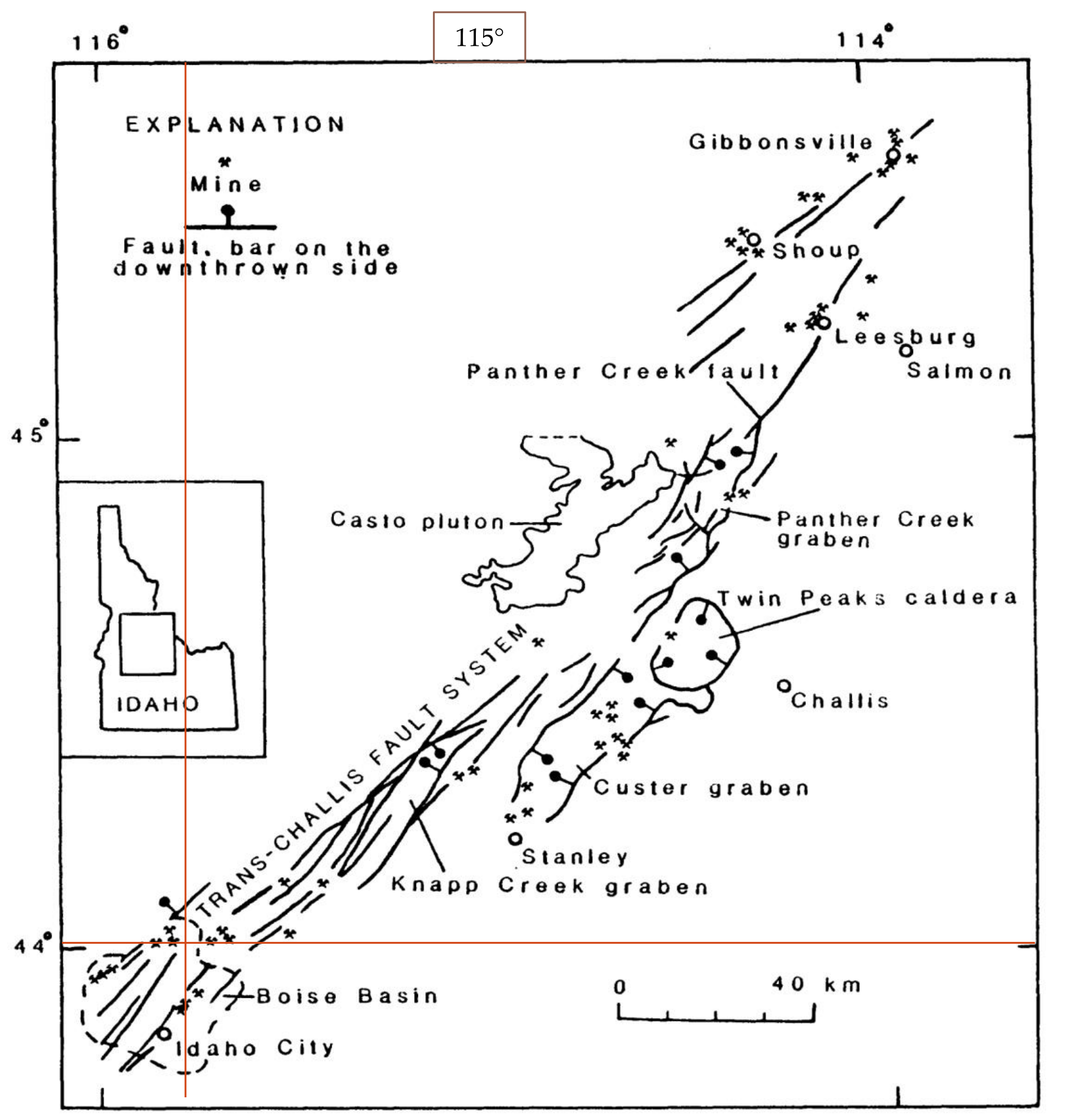
Local and Regional Geology



- Provided by USGS, locations of state and localized faults show affected regions relevant to CUMO property.
- Regional tectonic stresses are low to moderate which correspond to historically mild magnitudes of seismic events

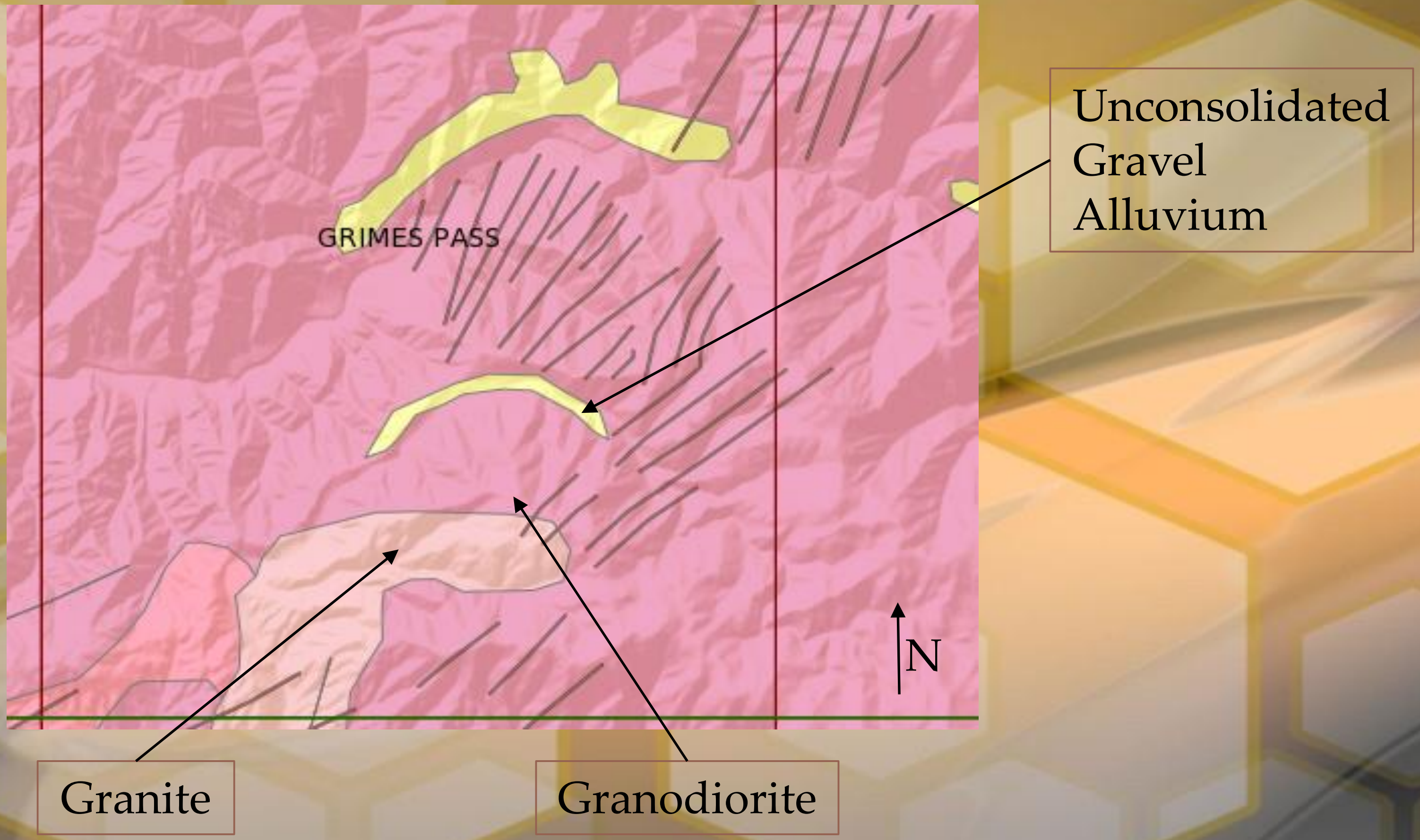


Relevant Fault Geology



- Center of CUMO Property:
  44.0332, 115.7926 in Lat. Long.
- Trans- Challis Fault System comprised mainly of normal faults striking NE-SW & dipping toward each other creating grabens in some areas.
- Local relevant fault systems also strike NE-SW and dip to the NW.
- According to USGS, faulting in this region typically follows a dip angle of approximately 36°.
- In last 70 years, 13 seismic events greater than 2.5 magnitude occurred in region; average 3.2 magnitude.
- Largest in 1978; 4.1 magnitude @ 3 miles depth & 12.5 miles to the NE of CUMO. Could cause minor rock slides.

Regional Rock Units



- Parent rock types encompassed include Granite, Granodiorite, & a small portion of unconsolidated gravel with negligible thickness.
- Lab testing of UCS & DST on intact samples of granite and granodiorite rock types yield very similar results in respect to geo-mechanical properties.
- Results show an average in-situ cohesion & friction angle of 28 MPa and 60° respectively for both rock types studied.

Stability Calculations

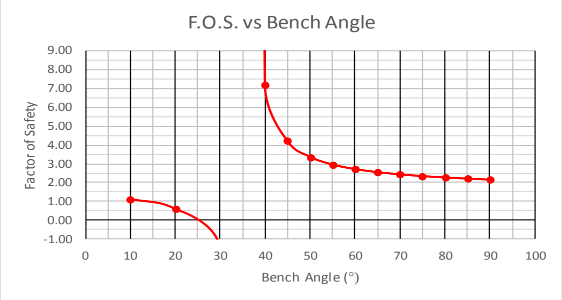
Unconsolidated Oxide Overburden

Stability w/ Dry Conditions

$$F.O.S. = \frac{\tan\varphi}{\tan\beta} + \frac{2C}{\gamma H(sin^2\beta)(\cot\beta - \cot\alpha)}$$

Constant Factors		Units
Fault Angle (β)	36	Degrees
	0.628318	Radians
Unit Weight (γ)	156	Lb/ft^3
Friction Angle (ϕ)	45	Degrees
	0.785398	Radians
Bench Height	50	Feet
Cohesion	1440	Lb/ft^2

Bench Angle (α)	F.O.S.	Bench Angle (α)	F.O.S.
10	1.13	55	2.96
20	0.60	60	2.71
30	-1.63	65	2.55
35.9	-209.67	70	2.43
		75	2.34
36.1	213.44	80	2.27
40	7.16	85	2.21
45	4.22	90	2.15
50	3.37		

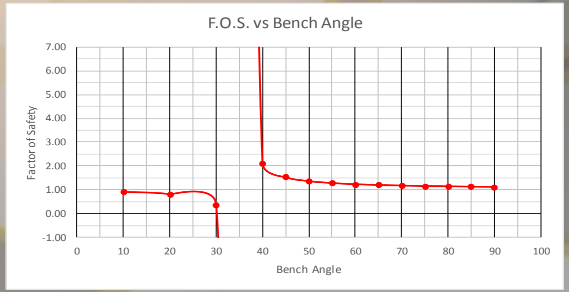


Stability w/ Wet Conditions

$$F.O.S. = \frac{\tan\varphi}{\tan\beta} + \frac{2C}{\gamma H(sin^2\beta)(\cot\beta - \cot\alpha)}$$

Constant Factors		Units
Fault Angle (β)	36	Degrees
	0.628318	Radians
Unit Weight (γ)	156	Lb/ft^3
Friction Angle (ϕ)	35	Degrees
	0.610865	Radians
Bench Height	50	Feet
Cohesion	288	Lb/ft^2

Bench Angle (α)	F.O.S.	Bench Angle (α)	F.O.S.
10	0.91	55	1.28
20	0.81	60	1.23
30	0.36	65	1.20
35.9	-41.25	70	1.17
		75	1.16
36.1	43.38	80	1.14
40	2.12	85	1.13
45	1.53	90	1.12
50	1.36		



- Soil type overburden is typically less than 2 foot thickness throughout property.
- Geotechnical properties taken from study data of similar rocks in central Iran.
- Geotechnical properties of gravel neglected due to insignificant thickness.

Stability Calculations

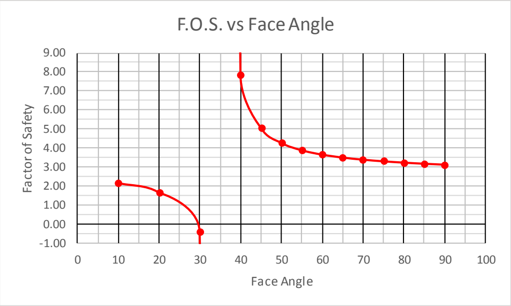
Granite to Granodiorite

Stability w/ Dry Conditions

$$F.O.S. = \frac{\tan\varphi}{\tan\beta} + \frac{2C}{\gamma H(sin^2\beta)(\cot\beta - \cot\alpha)}$$

Constant Factors		Units
Fault Angle (β)	36	Degrees
	0.628318	Radians
Unit Weight (γ)	165.4	Lb/ft^3
Friction Angle (ϕ)	60	Degrees
	1.047197	Radians
Bench Height	50	Feet
Cohesion	1440	Lb/ft^2

Bench Angle (α)	F.O.S.	Bench Angle (α)	F.O.S.
10	2.15	55	3.87
20	1.65	60	3.65
30	-0.45	65	3.49
35.9	-196.67	70	3.38
		75	3.29
36.1	202.39	80	3.22
40	7.84	85	3.17
45	5.06	90	3.12
50	4.26		

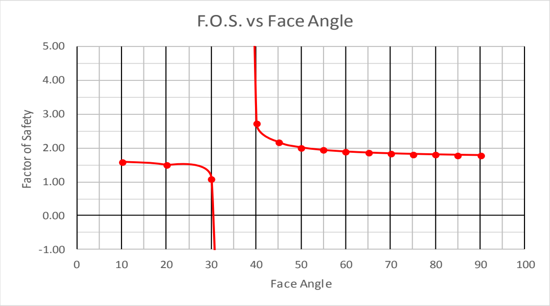


Stability w/ Wet Conditions

$$F.O.S. = \frac{\tan\varphi}{\tan\beta} + \frac{2C}{\gamma H(sin^2\beta)(\cot\beta - \cot\alpha)}$$

Constant Factors		Units
Fault Angle (β)	36	Degrees
	0.628318	Radians
Unit Weight (γ)	165.4	Lb/ft^3
Friction Angle (ϕ)	50	Degrees
	0.872664	Radians
Bench Height	50	Feet
Cohesion	288	Lb/ft^2

Bench Angle (α)	F.O.S.	Bench Angle (α)	F.O.S.
10	1.59	55	1.94
20	1.49	60	1.89
30	1.07	65	1.86
35.9	-38.17	70	1.84
		75	1.82
36.1	41.64	80	1.81
40	2.73	85	1.80
45	2.18	90	1.79
50	2.02		

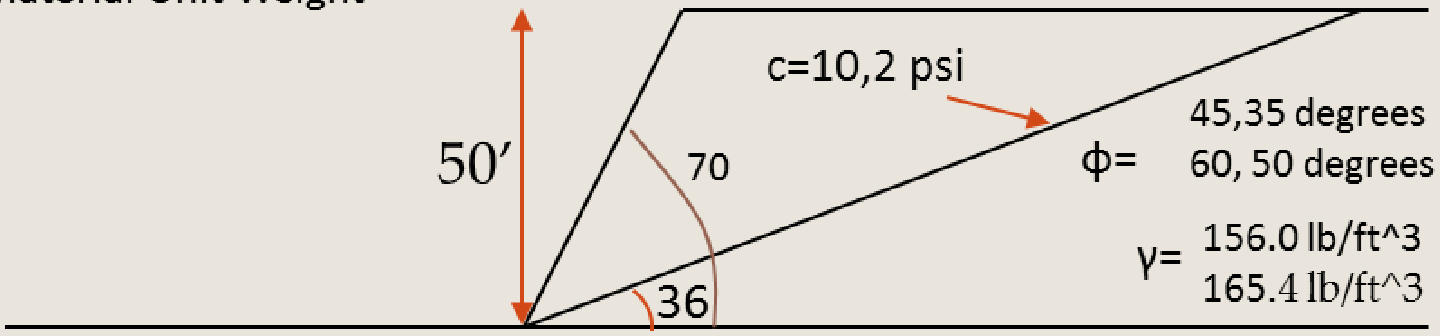


- Geotechnical properties taken from study data of similar rocks in eastern Sweden.
- As previously mentioned, granite & granodiorite display indistinguishably similar mechanical properties; considered as one.

Determination of Stable Bench Configuration

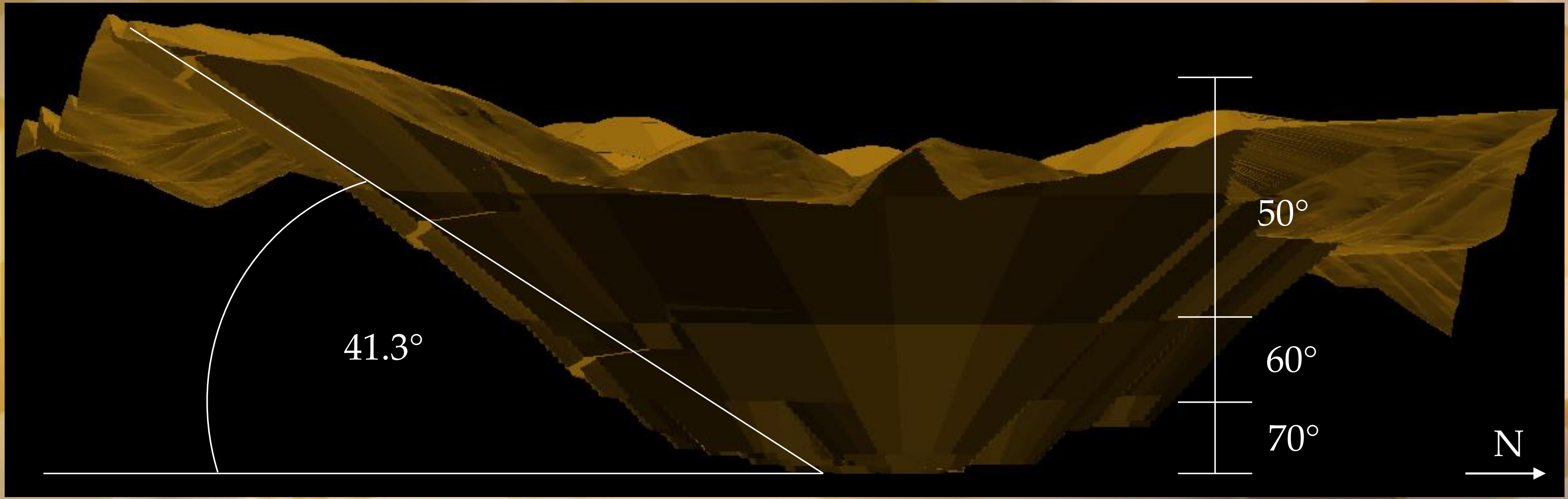
Representation of Planned Benches

C=Cohesion of Discontinuity
Φ=Internal Angle of Friction
β=Angle to Discontinuity
α=Bench Face Angle
γ=Material Unit Weight



- Considering a linearly trending dip of 36° to the NW, slope stability estimates assume the characteristics of planar failure behaviors when intersecting pit walls.
- Shallow angle of faulting allows for high factors of safety in dry conditions for many face angle orientations (approx. 80% of block weight acting normal to fault).
- Consideration given to wet & dry fault conditions due to possible changes between areas.

Ultimate Pit Slope Configuration

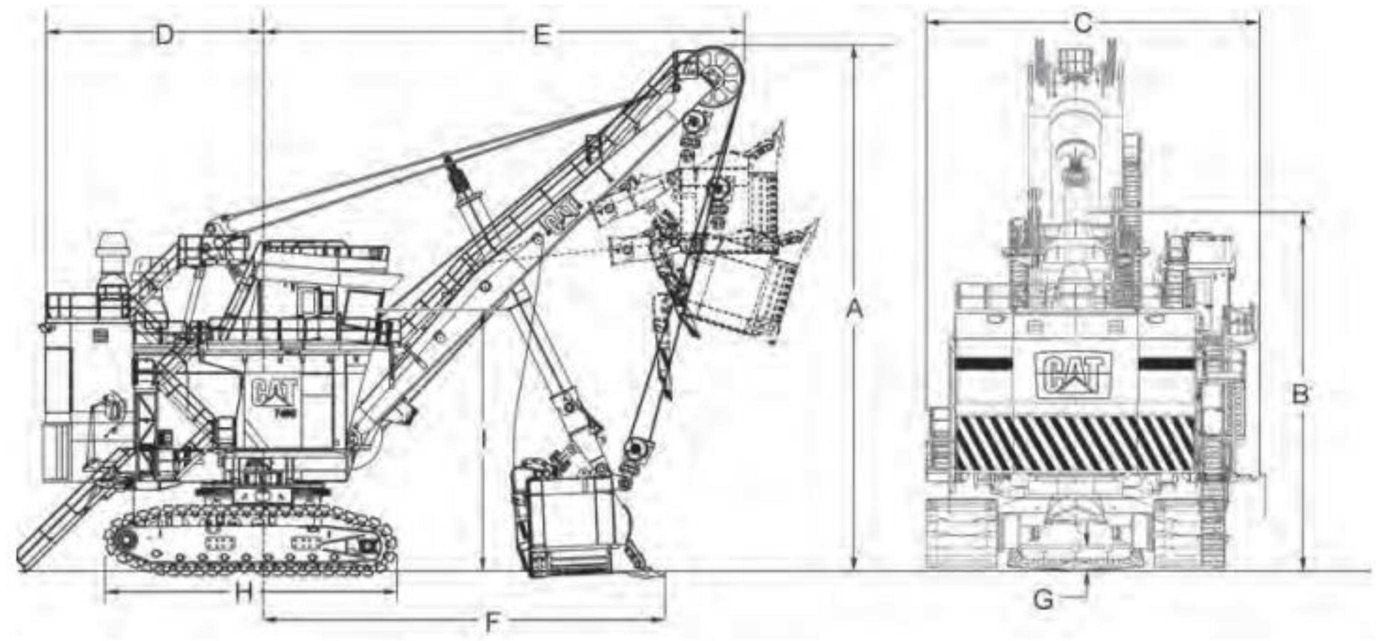


- Competent surrounding host rock shows that designers have the option to choose a bench face angle that suits pit configuration needs.
- Considering this, bench face angles ranging from 70 degrees in the bottom of pit to 50 degrees towards the top of the pit were selected in the design process to increase overall stability and mitigate effects of rock slides.

Production Equipment Selection

- 4, CAT 7495 Electric Rope Shovel (120 ton payload)
- 45, CAT 797F Off-Highway Trucks (360.5 ton payload)
- @ 80% dipper fill, takes 4 passes to fully load truck.
- Average availability of about 85% for both.

Production Bench Planning



MODEL	7495	
Boom Length	20.40 m	67'0"
A Height	20.87 m	68'6"
B A-Frame Height	14.00 m	46'0"
C Overall Width	13.11 m	43'0"
D Tail Swing Radius	9.34 m	30'8"
E Clearance Radius	19.65 m	64'5"
F Radius of Level Floor	17.47 m	57'4"
G Minimum Ground Clearance	0.90 m	3'0"
H Track Length	11.43 m	37'6"
I Operator Eye Level	10.52 m	34'6"

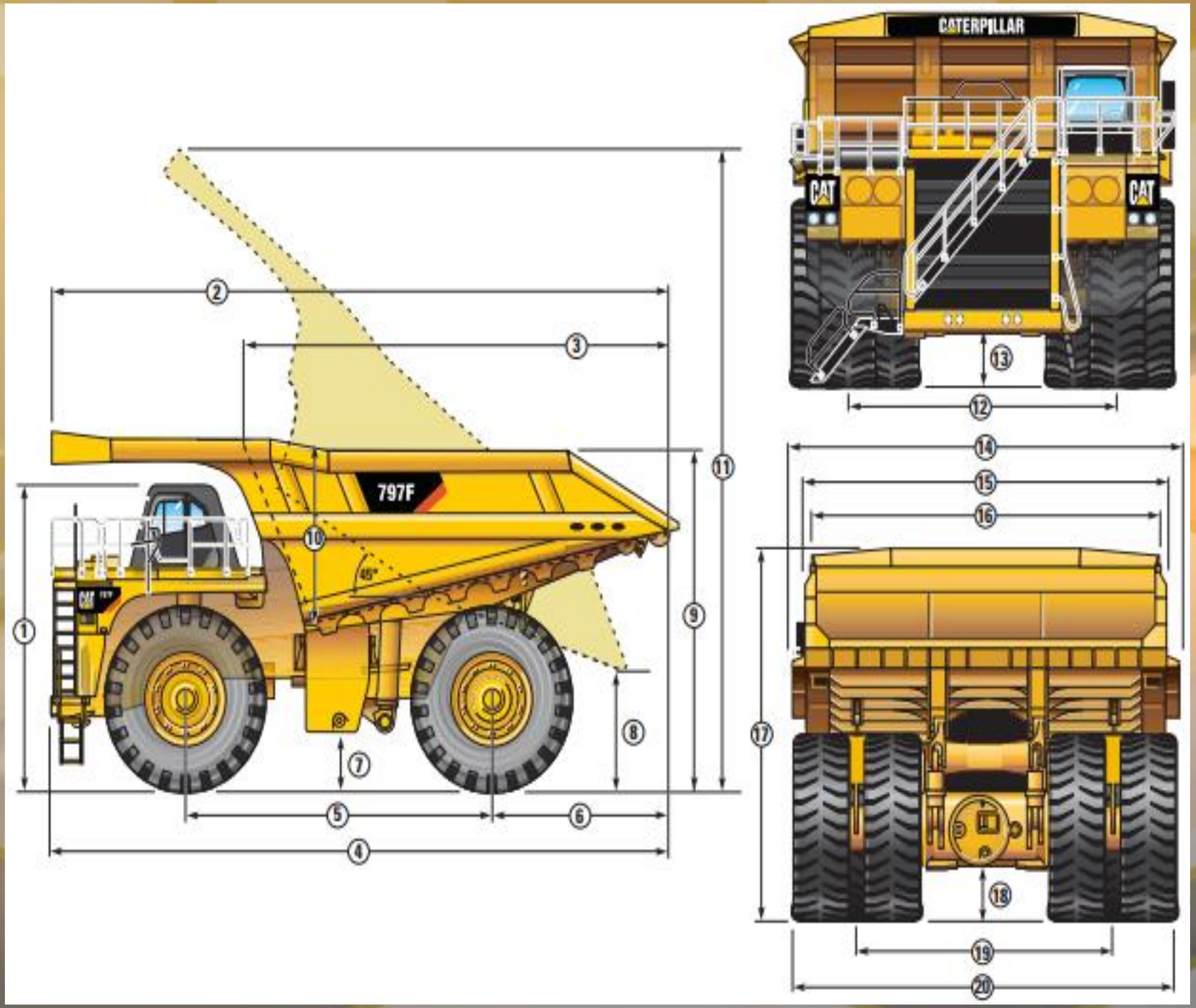
- Planning dimensions of working benches, need to account for equipment size, berms, wiggle room.
- Main considerations here include operating length & clearance radius.
- According to Cat Performance Handbook v.45, good truck match is a 797F.

MODEL	7495	
Dumping Height at Maximum Hoist Limit	8.61 m	28'3"
Dumping Radius	21.64 m	71'0"
Cutting Height	17.80 m	58'5"
Cutting Radius	25.20 m	82'8"
Effective Length of Dipper Handle	10.9 m	35'10"

	Payload	7295	7395	7495 HD	7495	7495 HF
MODEL	tonne (ton)	45 (50)	64 (70)	82 (90)	109* (120*)	109* (120*)
785D	136 (150)	3				
789D	181 (200)	4	3			
MT4400D AC	221 (244)		4	3		
793F	227 (250)		4	3		
MT5300D AC	291 (320)			4	3	3
795F AC	313 (345)			4	3	3
797F	363 (400)				4	4

*Indicates maximum payload.

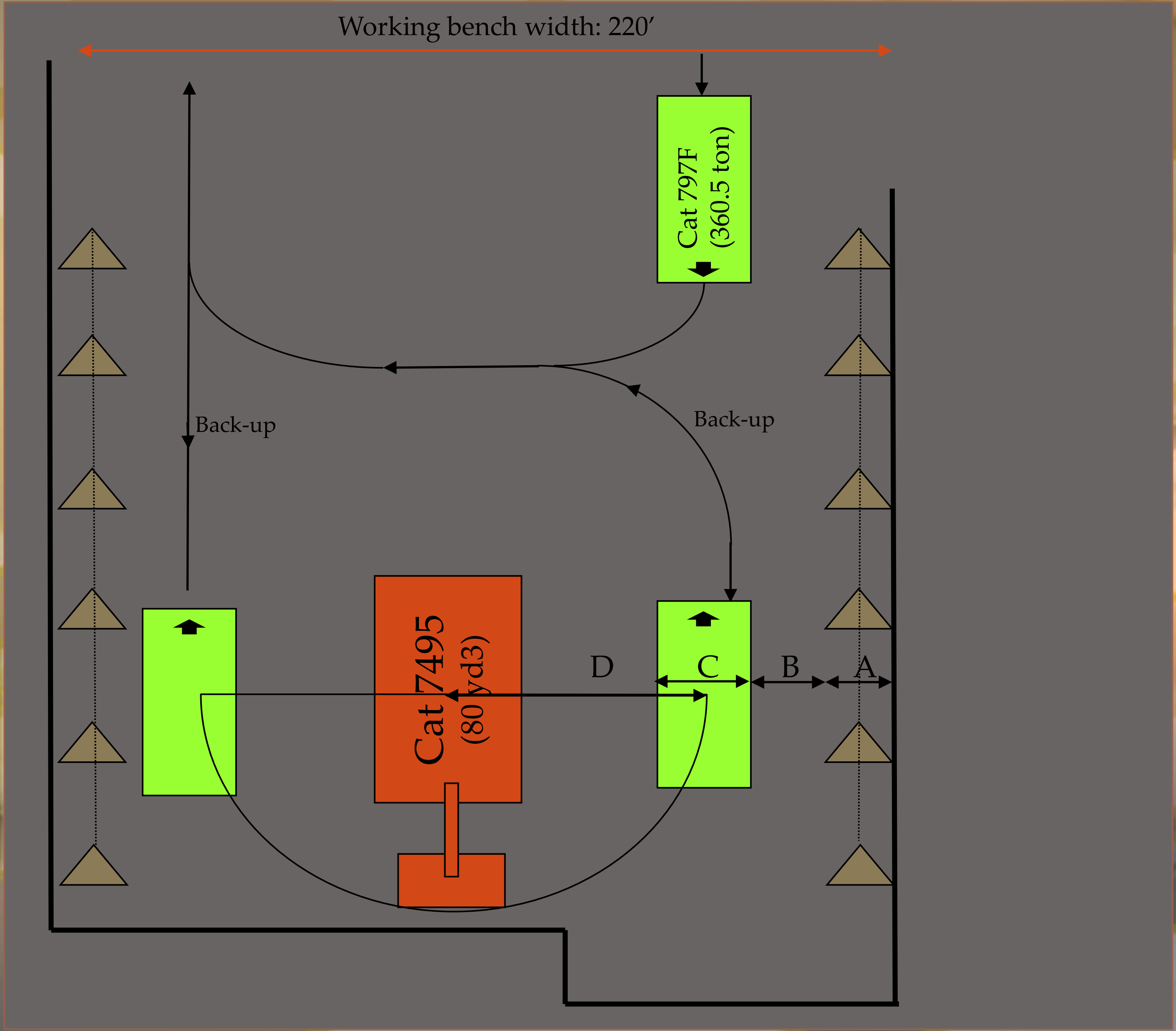
Production Bench Planning cont.



	797F	
GENERAL DIMENSIONS (Empty):		
Height to Canopy Rock Guard Rail	7.71 m	25'4"
Wheelbase	7.20 m	23'7"
Overall Length (Base Body)	15.08 m	48'9"
Loading Height (Base Body)	7.00 m	23'0"
Loading Height (Empty)	—	
Height at Full Dump	15.70 m	51'6"
Body Length (Target Length)	9.98 m	32'6"
Width (Operating)	9.76 m	32'0"
Width (Shipping)	9.76 m	32'0"
Front Tire Tread	6.53 m	20'5"
Machine Clearance Turning Circle	42.1 m	138'1"

- 797F model chosen due to high payload capacity and low number of buckets to fill.
- Main dimension to account for in working bench planning is machine clearance turning circle.

Production Bench Setup



- A) Berm Width = 10′
- B) Between Berm and Loading Point = 10′
- C) Truck Width = 32′
- D) Shovel Clearance Radius = 75′
- Truck turn radius is 69′ but will be covered by shovel clearance.
- Mirroring this minus the berm width gives us Working bench width

Shovel & Truck Production

Stripping		
		Capacity (t)
Trucks (797F)	36	360.5
Shovels	3	120
Shifts	2	
Hours per shift	10	
min/truck	2.3	
With # of Shovels	27.6	minutes/set of 36
	0.46	hrs per set
Sets per working day	43.48	
Sets/w.d @ 85% ava.	37	
Tons per set	12,978.00	
Tons per day	479,621.74	
Tons to be stripped	601,334,431.00	
# of 20 hr days to complete	1,254	
Working days in a year	365	
Working years to complete	3.4	

Mineable		
	Number	Capacity (t)
Trucks (797F)	36	360.5
Shovels (cat 7495)	3	120
Shifts	2	
Hours per shift	10	
min/truck	2.3	
With # of Shovels	27.6	minutes per set of 36
	0.46	hrs per set
Sets per working day	43.48	
Sets/w.d @ 85% ava.	37	
Tons per set	12,978.00	
Tons per day	479,621.74	
Tons to be mined	6,360,425,367.00	
# of 20 hr days to complete	13,261	
Working days in a year	365	
Working years to complete	36.3	

- Daily production needs:
  - 450,000 tons of material moved/day in order to get a throughput of 200,000 tons/day to crusher.
- Calculations show this can be completed in two, 10 hr. shifts/day with 36 trucks and 3 shovels.
- Availability averages 85% for producing fleet
- 601,334,431 tons of stripping can be completed in ~3.5 yrs.
- 6,360,425,367 tons of mineable ore can be completed in ~36.5 yrs.

Actual Truck Needs					
N	n	nCN	Pa^n	Pna^(N-n)	Quantity
45	36	8.86E+08	0.002878	3.84434E-08	0.098043
	37	2.16E+08	0.002446	2.56289E-07	0.13514
	38	45379620	0.002079	1.70859E-06	0.16122
	39	8145060	0.001767	1.13906E-05	0.163976
	40	1221759	0.001502	7.59375E-05	0.139379
	41	148995	0.001277	0.00050625	0.096319
	42	14190	0.001085	0.003375	0.051982
	43	990	0.000923	0.0225	0.020551
	44	45	0.000784	0.15	0.005293
	45	1	0.000667	1	0.000667
				Sum	**87%**

- Establishing actual fleet size is a function of availability/truck.
- Assuming 85% truck availability, actual number of trucks given by

$$\sum_{n=36}^{46} nCN * (Pa)^n * (Pna)\hat{}(N-n)$$

- Probability of 36 trucks being available shows 45 trucks needed.

Secondary Production: Blasting

Blasting Dimensions	
# of Drills	5.00
Drills Per Bench	1.00
Production Per Week (tons)	3,164,000.00
Tons Per Bench	1,054,666.67
Volume Per Bench (ft^2)	13,225,520.00
Bench Height (ft)	50.00
Bench Width (ft)	220.00
Bench Length (ft)	1,202.32
Diameter of Drillhole (in)	15.00
Area of Drillhole (ft^2)	1.23
Stemming Height (ft)	30.00
Subdrilling Depth (ft)	10.00
Hole Utilization (ft)	30.00
Amount of ANFO (lb)	1,884.59
Amount of Rock Broken (tons)	3,769.17
Volume of Rock per Hole (ft^3)	47,265.45
Burden (ft)	24
Spacing (ft)	39
Holes Per Bench	280
Holes Per Row	31
Rows	9

ANFO Specs	
Density of ANFO (lb/ft^3)	51.19
Loading Density of ANFO (lb/ft)	62.82
Powder Factor of ANFO (lb/ton)	0.5

Bulk Truck Per Bench	
Amount of ANFO Per Bench (lb)	527,333
Fill Rate of Truck (lb/min)	1320
Time to Fill (min)	399
Time to Fill (hours)	7

- Production will be split into 3 benches.
- Bench dimensions of 1,202ft x 220ft x 50ft.
- ANFO to be used as primary bulk agent explosive.

Secondary Production: Drilling

One MD6640 w/ 280 Holes	
Drilling Rate (ft/min)	10.00
Feet of Hole Per Week	16,789
Time to Drill (min)	1679
Time to Drill (hours)	28
Time to Drill w/ Delays	56
Shifts to Complete Bench (10 hr w/ 90% availability)	6.22

One MD6640 w/ 200 Holes	
Drilling Rate (ft/min)	10.00
Feet of Hole Per Week	12,000
Time to Drill (min)	1200
Time to Drill (hours)	20
Time to Drill w/ Delays	40
Shifts to Complete Bench (10 hr w/ 90% availability)	4.44

One MD6640 w/ 240 Holes	
Drilling Rate (ft/min)	10.00
Feet of Hole Per Week	14,400
Time to Drill (min)	1440
Time to Drill (hours)	24
Time to Drill w/ Delays	48
Shifts to Complete Bench (10 hr w/ 90% availability)	5.33

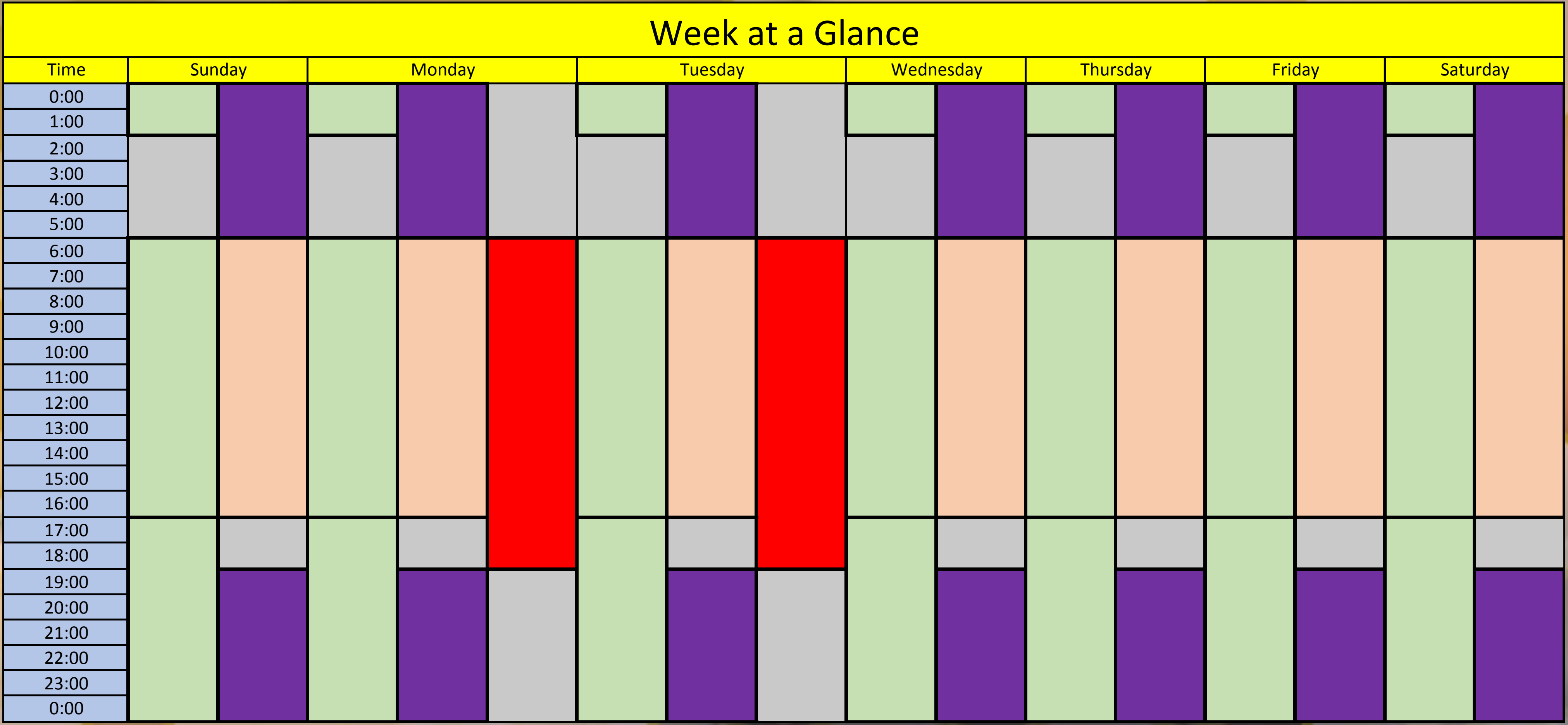
- 280 holes per bench.
- Takes one drill ~ 6.5 shifts to complete, too long.
- Using 2 drills, one drilling 200 holes on one bench, and another drilling 80 holes ~ 5.5 shifts to complete, which is acceptable.

Scheduling

Shifts Per Week	
Excavation	14
Drilling	6
Blasting	2
Maintance	7

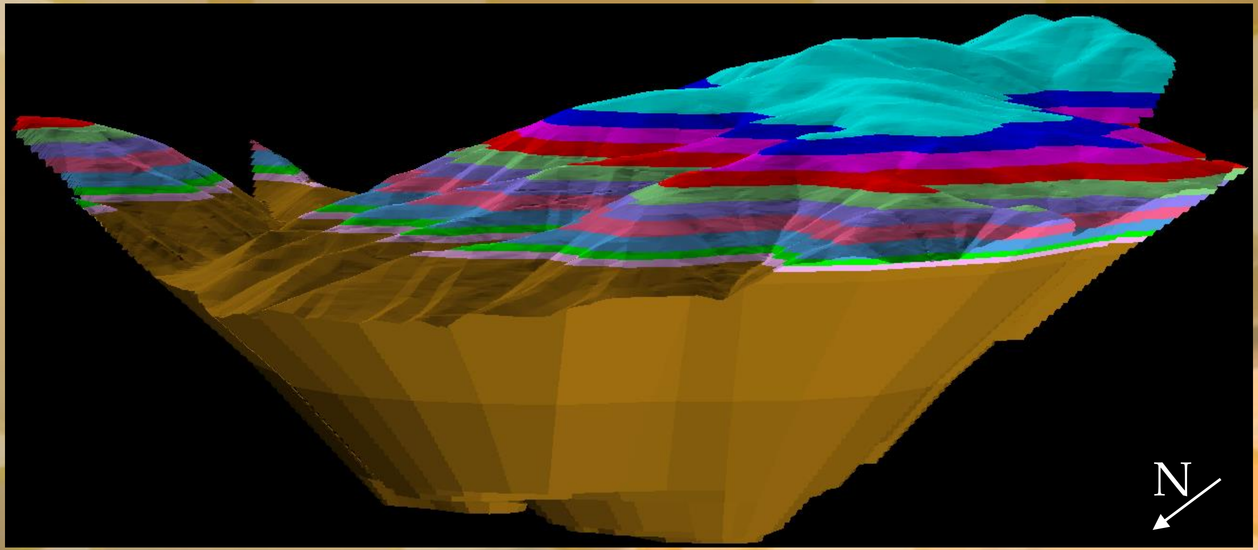
Shift Period (hours) Assuming 90% Availability	
Excavation	10
Drilling	10
Blasting	12
Maintance	12

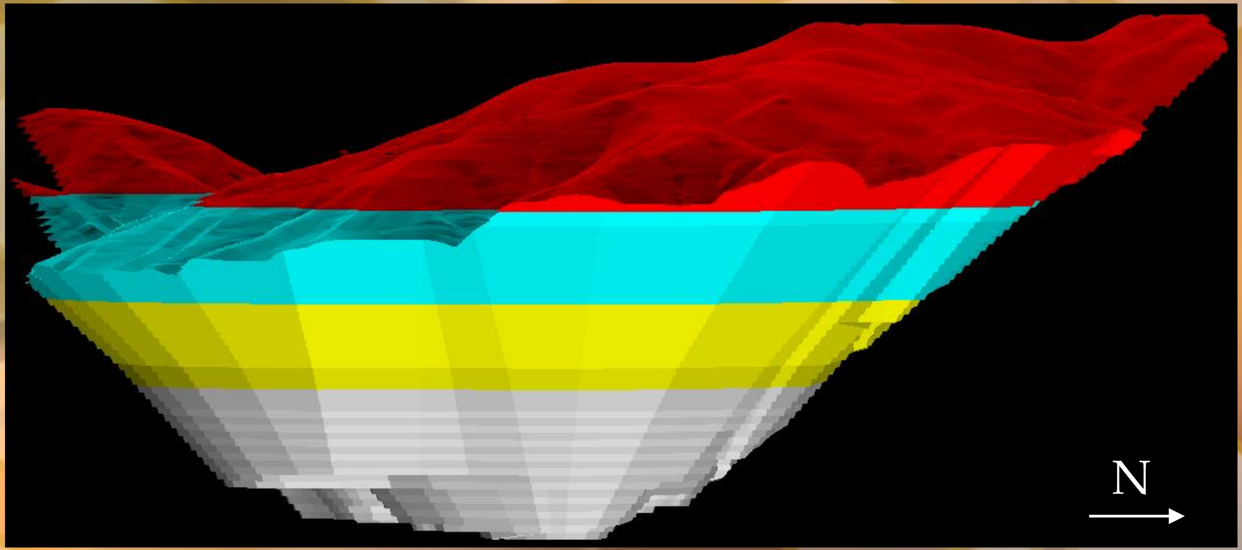
Yearly Overview	
Production days/yr	355
National Holidays	10
Hours/day	20
Production hrs/yr	7100
Plant days/yr @ 95% avail.	336
Plant hrs/yr	8064



- Mining ops conducted 355 days/year, all federal holidays off.
- "Week at a Glance" based on capabilities of production equipment calculated from manufacturer specifications.

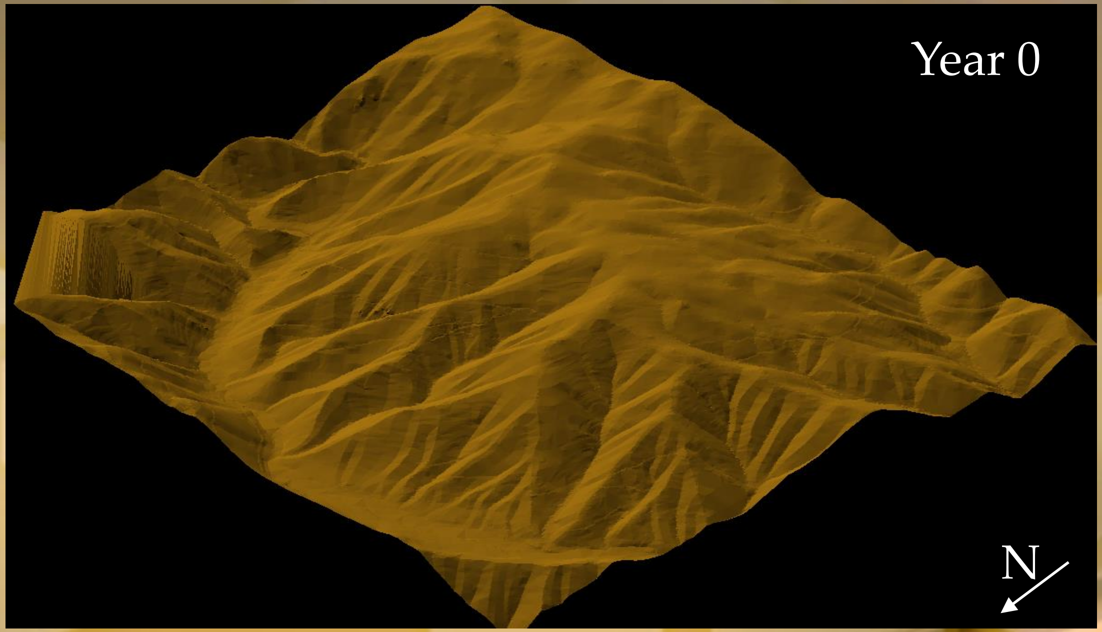
Visualization of Production Rates

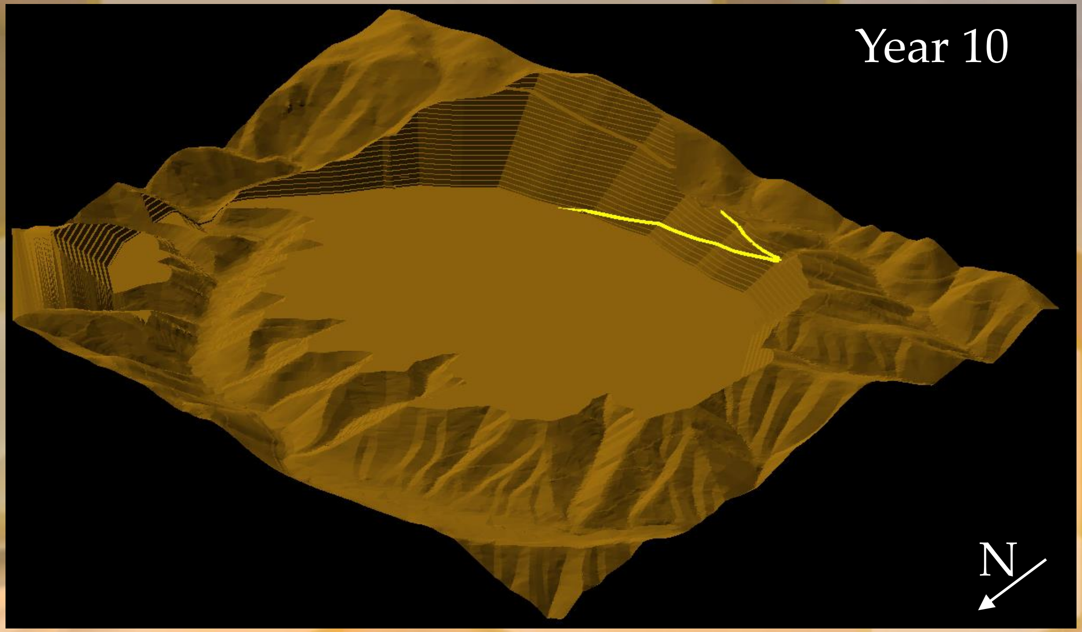


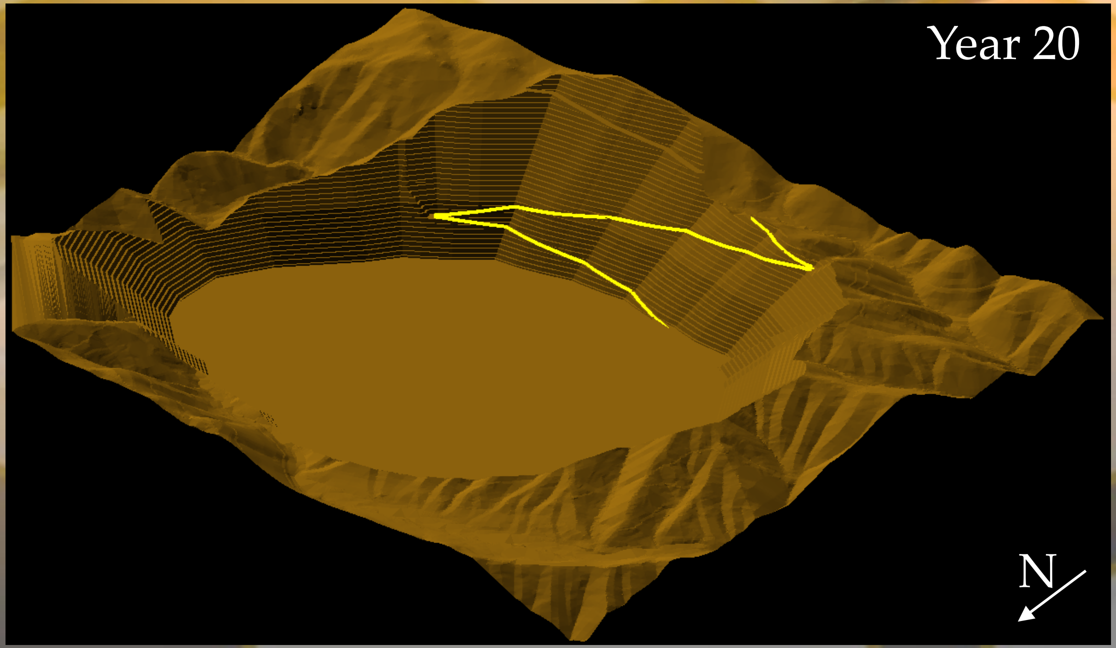


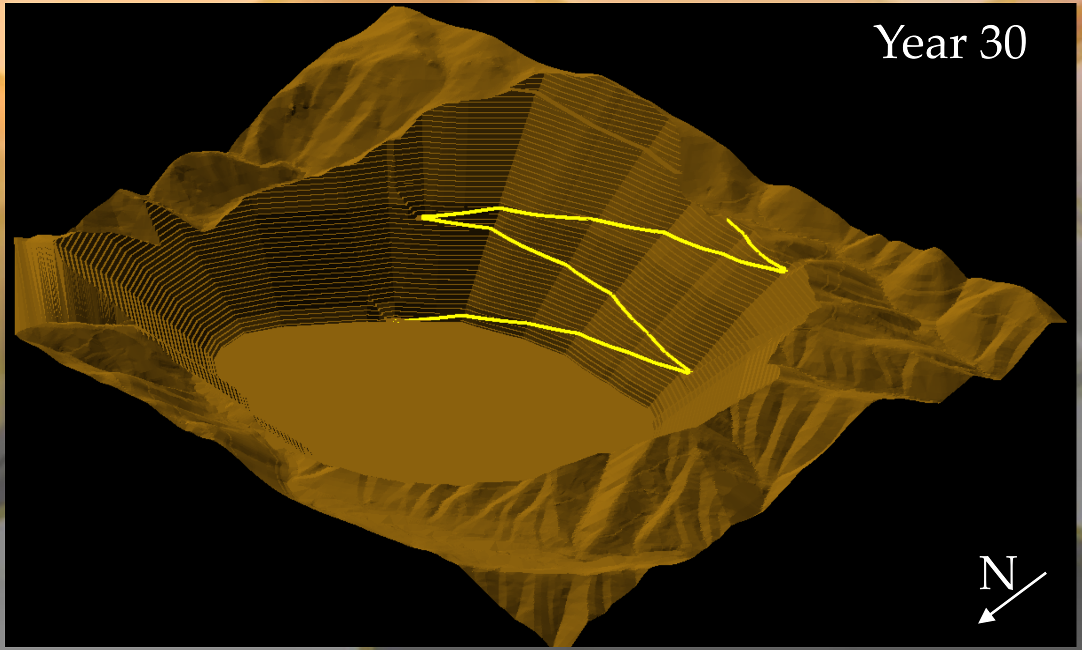
- Left-hand model shows a year-by-year depiction of production through the first decade of operations.
- Right-Hand model shows a Life of Mine depiction of progression through the pit from start to finish.

Visualization of Production Rates cont.

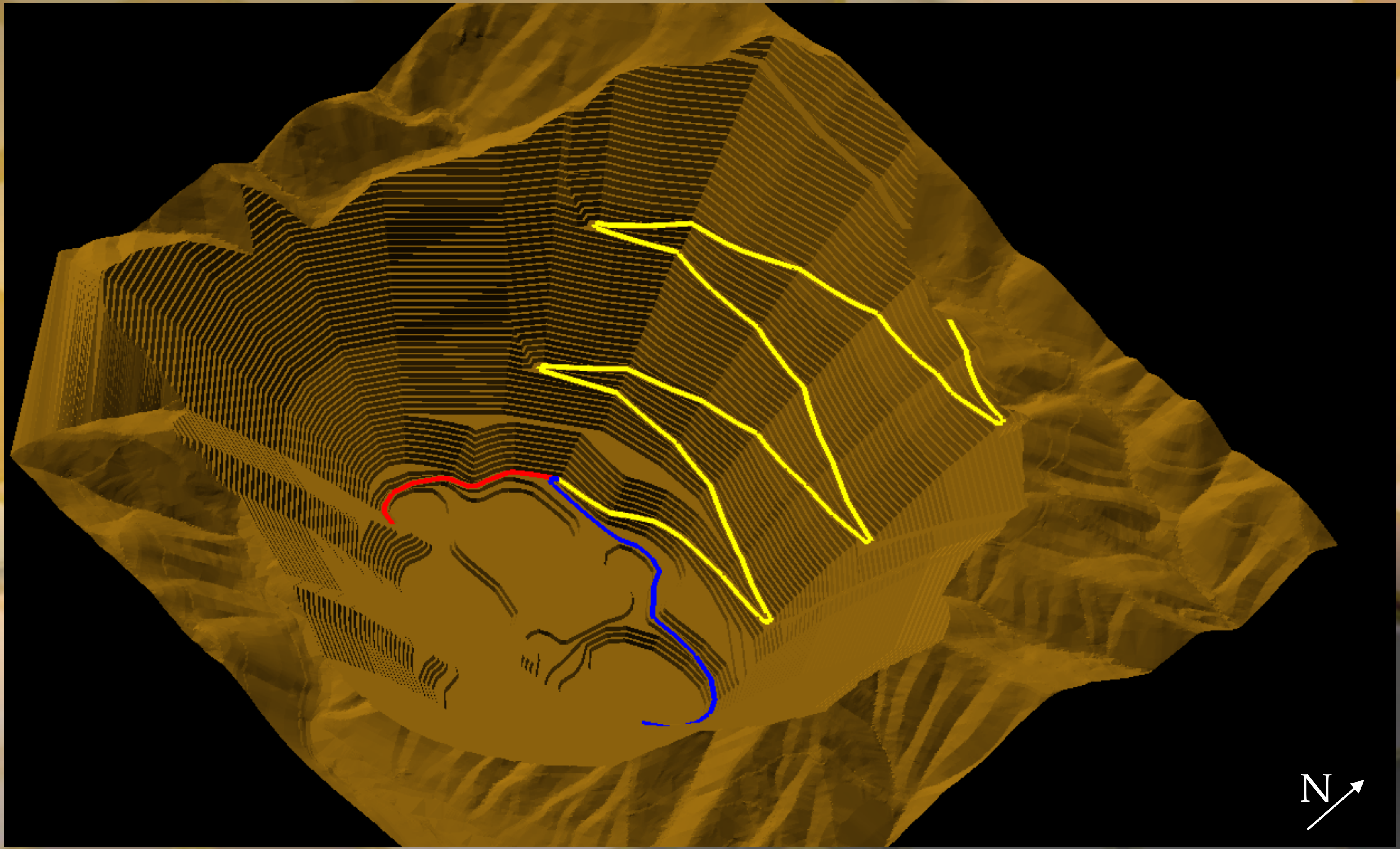








Ultimate Pit



Reserves by Decade

Years 0-10	ORE TONS	MATERIAL TONS	MATERIAL POUNDS	MATERIAL PRICE
COPPER	287,226,055	221,164	442,328,125	$1,136,783,281
MOLY (MoO3)	64,173,642	30,585	61,169,049	$423,289,819
TUNGSTEN	127,599,820	4,211	8,421,588	$96,427,184
SILVER	239,278,150	421	842,259	$246,882,984
WASTE	1,374,670,137		Total =	$1,903,383,267
Years 10-20	**ORE TONS**	**MATERIAL TONS**	**MATERIAL POUNDS**	**MATERIAL PRICE**
COPPER	259,980,789	200,185	400,370,415	$1,028,951,967
MOLY (MoO3)	238,879,301	113,848	227,695,036	$1,575,649,647
TUNGSTEN	309,354,939	10,209	20,417,426	$233,779,527
SILVER	420,878,893	741	1,481,494	$434,255,434
WASTE	1,371,276,631		Total =	$3,272,636,576
Years 20-30	**ORE TONS**	**MATERIAL TONS**	**MATERIAL POUNDS**	**MATERIAL PRICE**
COPPER	497,208,450	382,851	765,701,013	$1,967,851,603
MOLY (MoO3)	439,346,250	209,388	418,776,175	$2,897,931,131
TUNGSTEN	211,842,600	6,991	13,981,612	$160,089,453
SILVER	250,138,450	440	880,487	$258,088,450
WASTE	901,835,278		Total =	$5,283,960,637
Years 30-40	**ORE TONS**	**MATERIAL TONS**	**MATERIAL POUNDS**	**MATERIAL PRICE**
COPPER	456,301,663	351,352	702,704,561	$1,805,950,721
MOLY (MoO3)	611,597,706	291,481	582,962,863	$4,034,103,013
TUNGSTEN	266,836,677	8,806	17,611,221	$201,648,477
SILVER	262,531,473	462	924,111	$270,875,353
WASTE	498,852,798		Total =	$6,312,577,563

Stripping Ratio (yd^3/ton)	
Years 1-10	1.488
Years 10-20	0.828
Years 20-30	0.58
Years 30-40	0.26
Overall	0.68

- Calculating reserves per decade gives estimates of revenues over the LOM.
- Resulting revenues used in calculating NPV for the project.

Economic Evaluation: Capital Cost

Capital Cost		
Stripping Cost	$	330,733,936.78
Plant Cost	$	2,000,000,000.00
Roaster Cost	$	350,000,000.00
Initial Equipment Cost	$	270,000,000.00
Replacement Equip Cost	$	788,232,000.00
Infrastructure Cost	$	640,000,000.00
Tailings Dam Cost	$	540,000,000.00
Total Capital Cost	$	4,918,965,936.78

- Stripping costs were calculated at $0.50 per ton.
- Plant cost, roaster cost, infrastructure cost, and tailings dam cost were taken from the CUMO Project 43-101 report based similar production rates.

Economic Evaluation: Operating Costs

Operating Cost (million US $ per year)				
Description	**50 kt/d**	**100 kt/d**	**150 kt/d**	**200 kt/d**
Mining cost of mill feed	$13	$18	$21	$27
Mining cost of stockpile material	$29	$27	$26	$22
Mining cost of waste	$39	$40	$35	$32
Total Mining Cost	**$81**	**$85**	**$81**	**$81**
Plant	$91	$169	$251	$331
General & Administration	$5	$7	$8	$9
Closure and Reclamation Cost Allowance	$1	$2	$3	$4
Subtotal -Mine site Costs	**$178**	**$263**	**$344**	**$425**
Roaster	$17	$32	$48	$60
Realization costs	$8	$13	$19	$26
TOTAL OPERATING COST	**$200**	**$310**	**$410**	**$510**

- Operating costs based on CUMO Property 43-101 report for 200k tons/day plant throughput.

Operating Cost	
Op. Cost (per year)	$ 510,000,000.00
Mine Op. Life	39
Total Op. Cost	$ 19,667,311,382.72

Economic Evaluation: NPV/IRR

200 k tons/day					
Year	Investment	Cost	Total Cost	Revenue	Cash flow
0	4,918,965,936.78		4,918,965,936.78		-4,918,965,936.78
1		510,000,000.00	510,000,000.00	190,338,326.68	-105,476,108.46
2		510,000,000.00	510,000,000.00	190,338,326.68	-319,661,673.32
3	90,000.00	510,000,000.00	510,090,000.00	190,338,326.68	-319,751,673.32
4		510,000,000.00	510,000,000.00	190,338,326.68	-319,661,673.32
5		510,000,000.00	510,000,000.00	190,338,326.68	-319,661,673.32
6	90,000.00	510,000,000.00	510,090,000.00	190,338,326.68	-319,751,673.32
7	2,560,000.00	510,000,000.00	512,560,000.00	190,338,326.68	-322,221,673.32
8		510,000,000.00	510,000,000.00	190,338,326.68	-319,661,673.32
9	90,000.00	510,000,000.00	510,090,000.00	190,338,326.68	-319,751,673.32
10	14,000,000.00	510,000,000.00	524,000,000.00	190,338,326.68	-333,661,673.32
11	206,415,000.00	510,000,000.00	716,415,000.00	327,263,657.56	-389,151,342.44
12	10,405,000.00	510,000,000.00	520,405,000.00	327,263,657.56	-193,141,342.44
13		510,000,000.00	510,000,000.00	327,263,657.56	-182,736,342.44
14	2,560,000.00	510,000,000.00	512,560,000.00	327,263,657.56	-185,296,342.44
15	90,000.00	510,000,000.00	510,090,000.00	327,263,657.56	-182,826,342.44
16		510,000,000.00	510,000,000.00	327,263,657.56	-182,736,342.44
17		510,000,000.00	510,000,000.00	327,263,657.56	-182,736,342.44
18	90,000.00	510,000,000.00	510,090,000.00	327,263,657.56	-182,826,342.44
19		510,000,000.00	510,000,000.00	327,263,657.56	-182,736,342.44
20	95,712,000.00	510,000,000.00	605,712,000.00	327,263,657.56	-278,448,342.44
21	2,650,000.00	510,000,000.00	512,650,000.00	528,396,063.74	15,746,063.74
22	206,415,000.00	510,000,000.00	716,415,000.00	528,396,063.74	-188,018,936.26
23		510,000,000.00	510,000,000.00	528,396,063.74	18,396,063.74
24	10,495,000.00	510,000,000.00	520,495,000.00	528,396,063.74	7,901,063.74
25		510,000,000.00	510,000,000.00	528,396,063.74	18,396,063.74
26		510,000,000.00	510,000,000.00	528,396,063.74	18,396,063.74
27	90,000.00	510,000,000.00	510,090,000.00	528,396,063.74	18,306,063.74
28	2,650,000.00	510,000,000.00	512,650,000.00	528,396,063.74	15,746,063.74
29		510,000,000.00	510,000,000.00	528,396,063.74	18,396,063.74
30	14,090,000.00	510,000,000.00	524,090,000.00	528,396,063.74	4,306,063.74
31		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32
32		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32
33	206,505,000.00	510,000,000.00	716,505,000.00	631,257,756.32	-85,247,243.68
34		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32
35	2,650,000.00	510,000,000.00	512,650,000.00	631,257,756.32	118,607,756.32
36	10,495,000.00	510,000,000.00	520,495,000.00	631,257,756.32	110,762,756.32
37		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32
38		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32
39	90,000.00	510,000,000.00	510,090,000.00	631,257,756.32	121,167,756.32
40		510,000,000.00	510,000,000.00	631,257,756.32	121,257,756.32

	NPV@5% ROR	IRR@5% ROR
200k tons/day	-$5,743,499,454	-8%

- NPV calculated at 5% ROR, based on CUMO Property 43-101 report.
- The large negative NPV can be attributed to low metal prices, particularly Moly-trioxide.

Conclusions

- At current metal prices, mining operations are seemingly not economical.
- Historical fluctuations of metal prices show that mining will become economical once prices improve.
- Recommendations for optimization of pit design and grade estimation should be considered.

Questions?