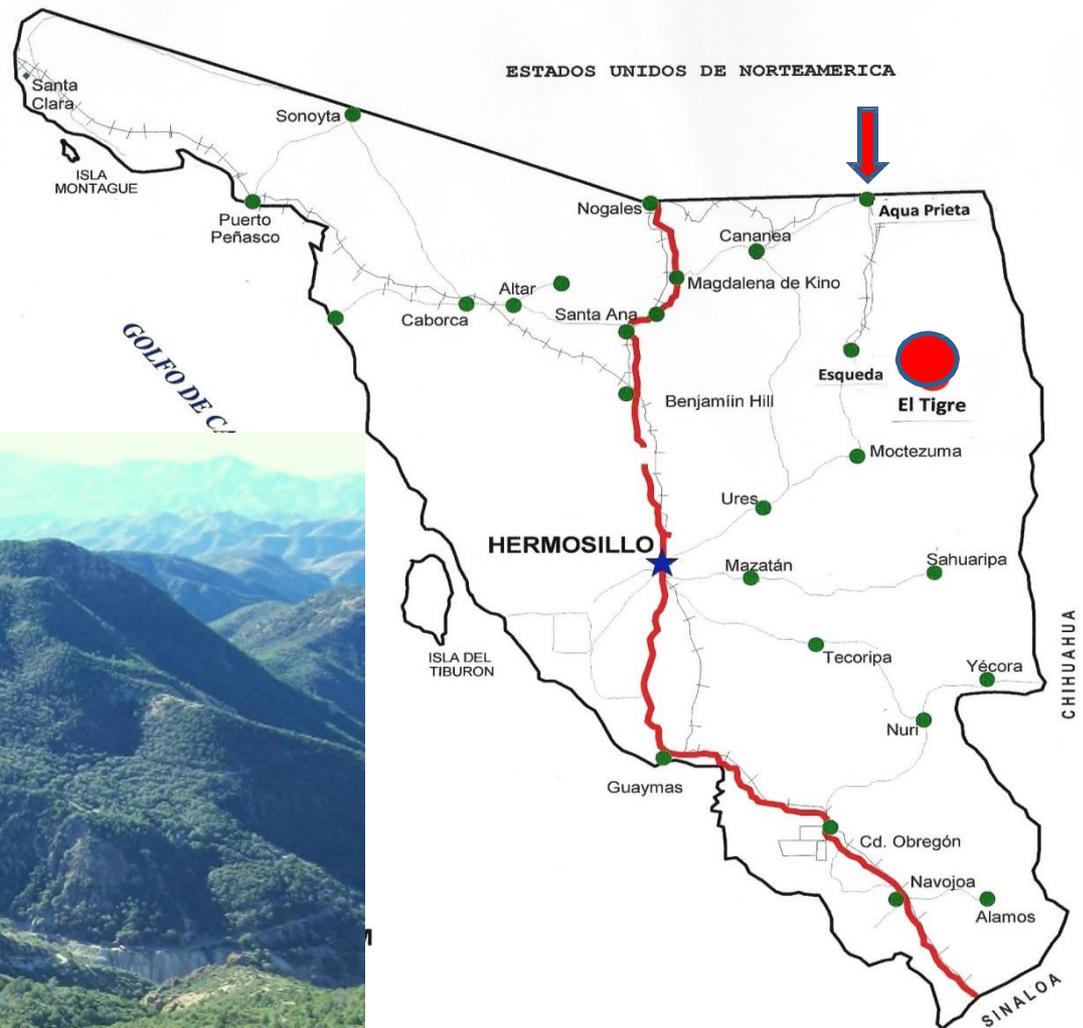




History, Production and Geology of the El Tigre District

Location of El Tigre District

- Located in the Sierra El Tigre, northeastern Sonora, Mexico
- District located 90 kilometers SSE of Aqua Prieta on the US-Mexico border

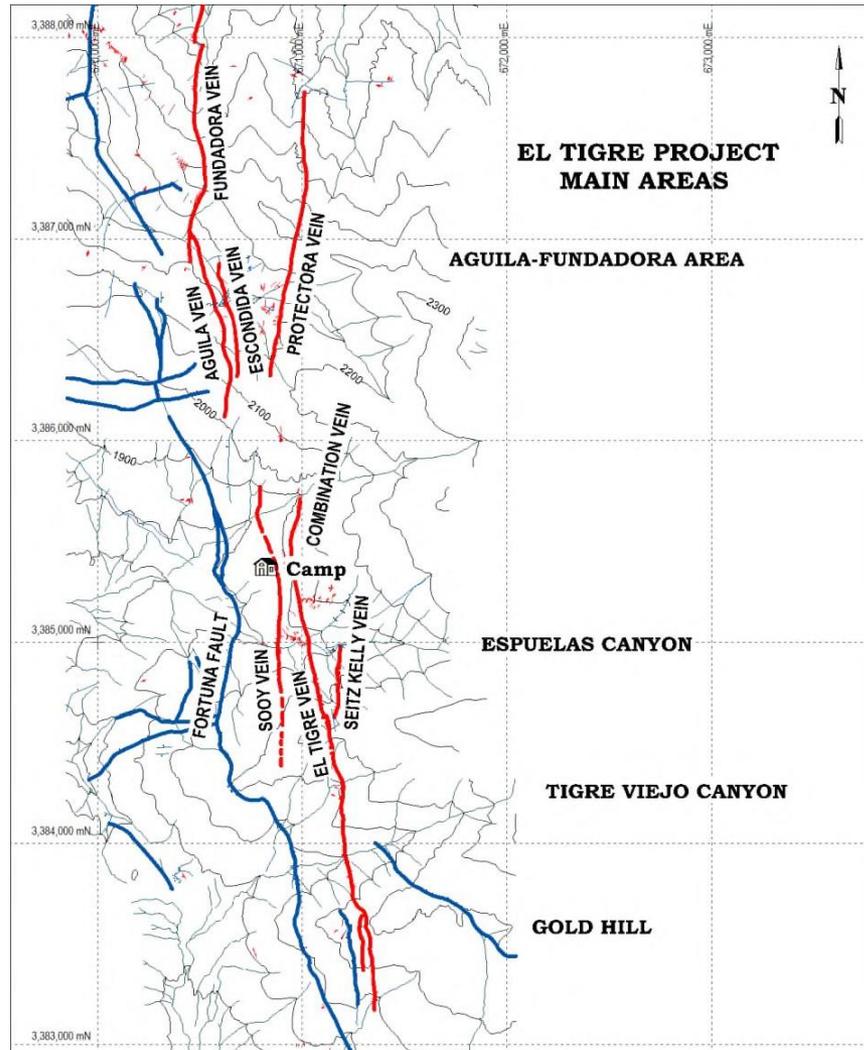


Location of Main Features

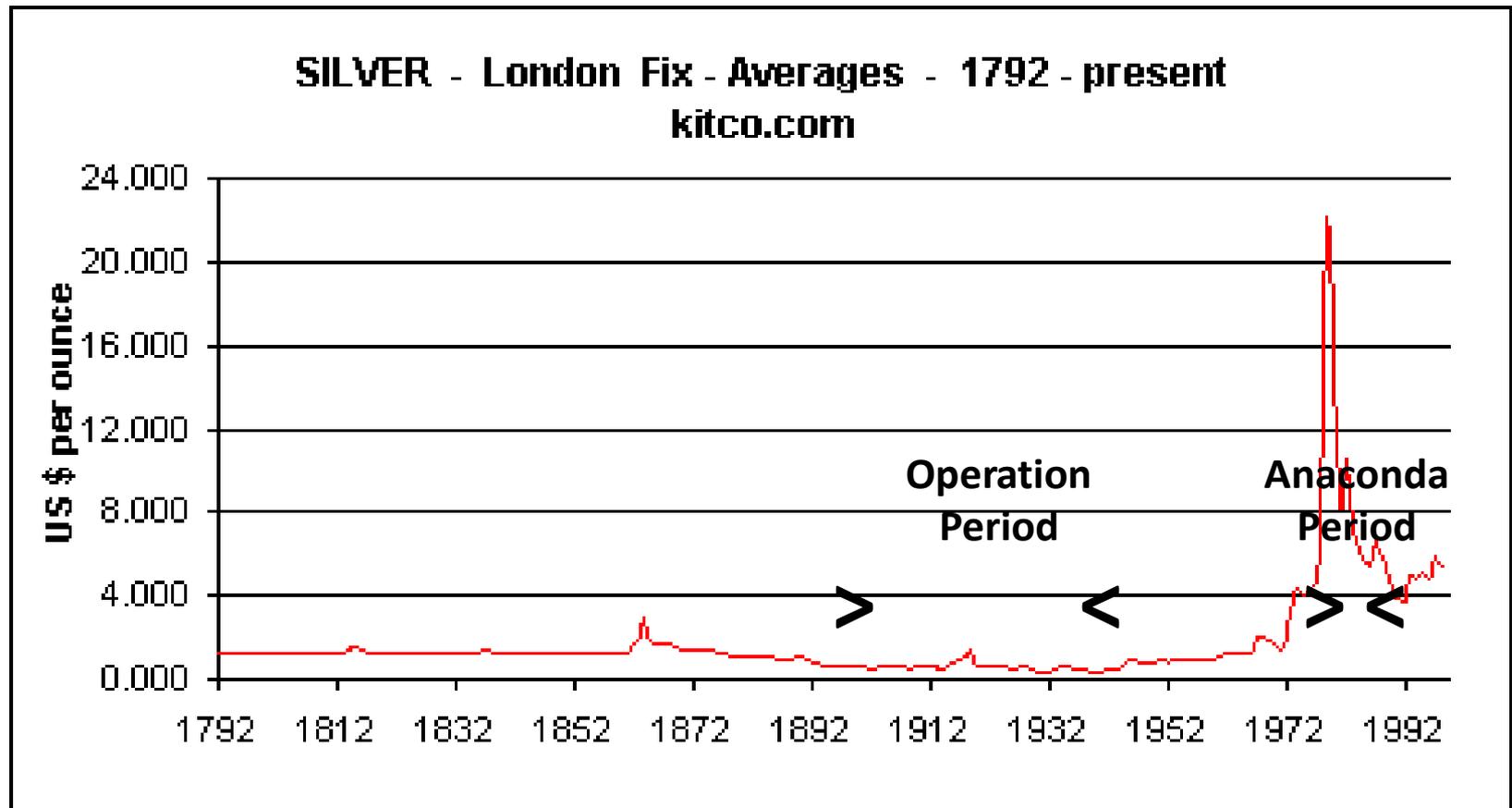
North Area

El Tigre Town Site

South Area
Main Production



Economic Term of Reference-Silver Price



1896 to 1903—The Discovery Period

- **The district was discovered in about 1896 by James Taylor, an American prospector**
- **Taylor found gold streaks in the Gold Hill area near the Brown shaft**
- **The name “El Tigre” comes from one of Taylor’s men shooting a mountain lion or ocelot near the discovery. This person was later killed by a bear.**
- **Taylor formed Lucky Tiger Combination Gold Mining Company**
- **Mining started in 1903 under subsidiary El Tigre Mining Company**

1896 to 1903—The Discovery Period



Looking North



Looking South

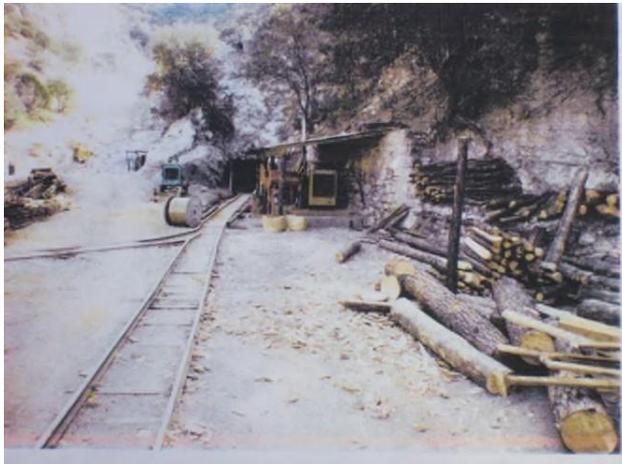
Gold Hill

El Tigre Vein

Silver averaged \$0.56/oz

1903 to 1910 Early Mine Development

- Mining initiated in 1903 in the Brown Shaft area for gold
- Focus soon switched to silver because of very high grades
- Milling operation started at 75 tons per day, soon after increased to 100 tons per day
- Level 7 driven to haul ore from mine to mill
- Concentrate was shipped to the Douglas smelter via mule train to Esqueda and then by rail

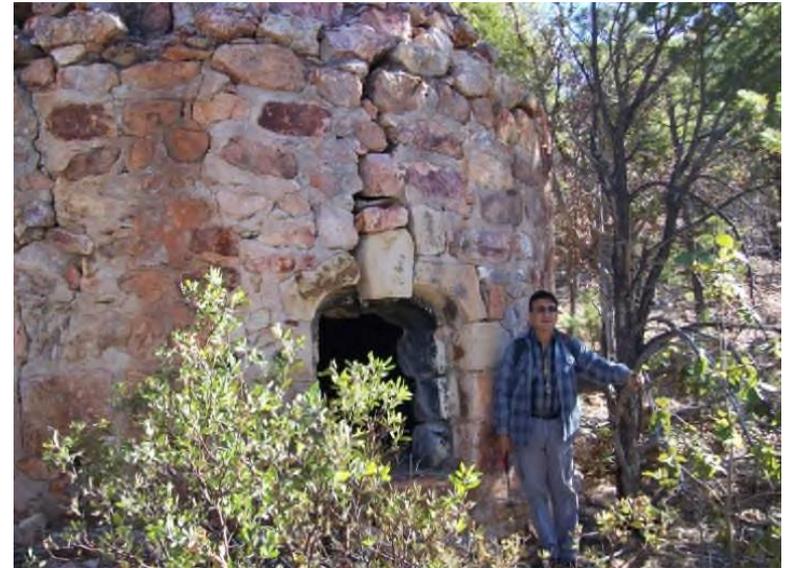


Silver Averaged \$0.58/oz



1903 to 1910 Early Mine Development

- Power for mill supplied by boilers fired by charcoal
- Charcoal cost \$15/ton, Wood at \$4.32/cord, 13,500 cords/yr
- Charcoal created in 4 ovens supplied by 50 men, 150 mules
- Forests extensively logged off above town site
- Continued mill expansion made charcoal production uneconomic



Silver Averaged \$0.58/oz

1903 to 1910 Early Mine Development



1910 to 1920 Mexican Revolution



Silver Averaged \$0.73/oz
High was \$1.33 in 1919



1910 to 1920 Mexican Revolution

Period of Major Expansion

- The Mexican Revolution was a revolt against a dictatorship and a desire for freedom
- The Revolution greatly impacted the mine in 1912
- Some Tigre miners joined the revolt
- All Americans were evacuated
- Nearby Mormon wheat farmers at Colonia Moreles evacuated
- Pancho Villa reportedly passed through the town in 1915, peacefully

Silver Averaged \$0.73/oz
High was \$1.33 in 1919

FEDERALS RETAKE EL TIGRE MINES

Mexican Rebels Flee American
Camp as Rescuing Troops
Enter Without Firing.

ASKED \$100,000 RANSOM

Salazar Threatened to Hold Ameri-
can Manager for Its Payment—
Decamp with \$20,000 Bullion.

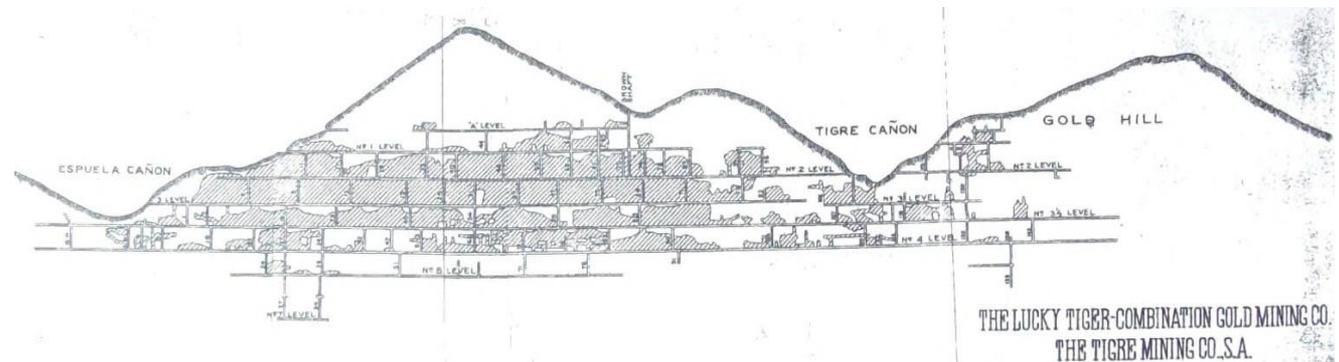
¹⁹¹²
DOUGLAS, Ariz., Sept. 18.—El Tigre,
one of the wealthiest mining camps in
Northern Mexico, was retaken by the
Mexican Federals at 4:30 this afternoon,
after having been in the hands of the
rebel band of Inez Salazar for two days.

1910 to 1920 Mexican Revolution

Period of Major Expansion

- Electric power from a 65 mile line is delivered from Douglas in June 1911 to run new mill
- Charcoal production abandoned
- Mining expanded into multiple levels
- Milling operation increased to 200 tons per day
- Cyanide introduced in 1910, dramatically increasing recovery
- Early 15 opt Ag tailings reworked with cyanide in 1911
- In 1912 the tailings impoundment established
- With mill expansion, value of the mill is set at \$2 million

1914 Stope map on El Tigre vein



Silver Averaged \$0.73/oz
High was \$1.33 in 1919

1910 to 1920 Mexican Revolution

Period of Major Expansion

A Crime is Committed

- **July 10, 1918 – Murder of the Mine Superintendent**
- **Byron Janes shot in back by Pedro Cabajal near mine office on trail from Level 4**
- **Disgruntled ex-employee, was a trammer**
- **Never captured**
- **Family settled for \$25,000 in gold or US dollars years later**

Silver Averaged \$0.73/oz
High was \$1.33 in 1919

1910 to 1920 Mexican Revolution

Period of Major Expansion

- **Technical Advances Recorded in Public Documents**
 - **1912, Forbes, Treatment of El Tigre Silver Ores**
 - **1913, Malcolmson*, Electric Power Installation**
 - **1917 – Mischler, Determining Capacities of Slime Tanks**
- * Malcolmson, Mine Manager up to Dec 1917, heart attack



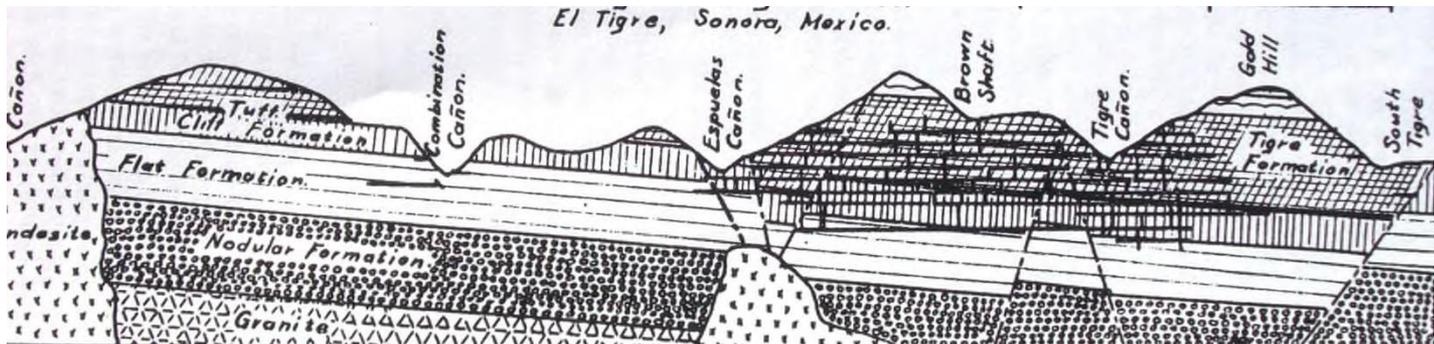
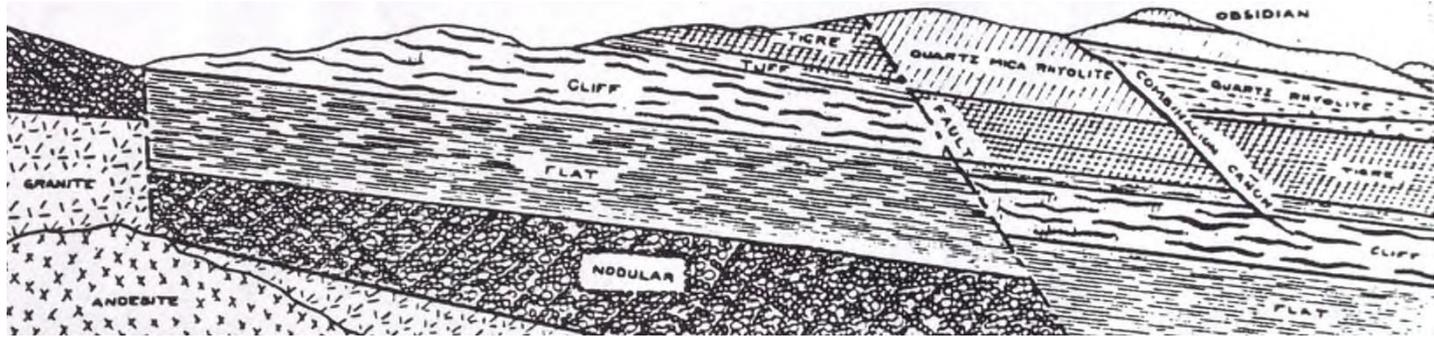
Silver Averaged \$0.73/oz
High was \$1.33 in 1919



1910 to 1920 Mexican Revolution

Period of Major Expansion

- Technical Advances Recorded in Public Documents
 - 1920 – Mischler, Geology of El Tigre District



Silver Averaged \$0.73/oz
High was \$1.33 in 1919

1910 to 1920 Mexican Revolution

Rock Types



Granite Basement



Nodular Fm Devitrified glass

El Tigre Tuff



Cliff Fm

**Flat Fm-thin
bedded tuffS**

1910 to 1920 Mexican Revolution

Period of Major Expansion

- **Total Production of the mine from 1903 to early 1920**
 - **700,000 tons ore**
 - **Gold averaged 0.25 opt**
 - **Silver averaged 39.0 opt**
 - **Copper averaged 0.25%**
 - **Lead averaged 1.0%**
 - **Zinc averaged 1.5%**
 - **Total Silver produced was 27,300,000 ounces**
 - **Total Gold produced was 175,000 ounces**
 - **Ten levels developed**

Silver Averaged \$0.73/oz
High was \$1.33 in 1919

1920, Mischler, Geology of the El Tigre District

1921 to 1928 Peak Production to Decline

- **Total Production of the mine from 1903 to end of 1924**
 - **1,000,000 tons ore**
 - **Gold averaged 0.25 opt**
 - **Silver averaged 40.0 opt**
 - **Copper averaged 0.4%**
 - **Lead averaged 1.1%**
 - **Zinc averaged 1.5%**
 - **Total Silver produced was 40,000,000 ounces**
 - **Total Gold produced was 250,000 ounces**

Silver Averaged \$0.63/oz
High was \$0.69 in 1926

1925, Mischler, Mining Methods and Ore Estimation

1921 to 1928 Peak Production to Decline

- Technical Advances Recorded in Public Documents
 - 1925, Mischler, Mining Methods and Ore Estimation

TABLE 1.—*Approximate Dimensions and Assay of Veins*

Vein	Developed		Ratio Area Stopped to Area Developed, Per Cent.	Average Width of Ore, Feet	Average Assay Ounces, Silver	Stopping Width, Feet	Silver Assay to Stopping Width
	Length, Feet	Average Depth, Feet					
Tigre.....	6,000	1,200	35	1.9	68	3.5	40
Seitz-Kelley.....	5,000	1,000	11	1.1	105	3.0	44
Sooy.....	1,500	1,000	20	1.4	80	3.5	37
Totals.....	12,500						
Averages.....		1,100	25	1.7	73	3.4	40

Note: All of the vein assaying 15 oz. or more is considered as ore.

Silver Averaged \$0.73/oz
High was \$1.33 in 1919

1925, Mischler, Mining Methods and Ore Estimation

1921 to 1928 Peak Production to Decline

- **Ore Mineralogy**
 - **Tetrahedrite**
 - **Stromeyerite**
 - **Sphalerite**
 - **Galena**
 - **Pyrite**
 - **Chalcopyrite**
- **Gangue content**
 - **Kaolinized rhyolite**
 - **Silicified rhyolite**
- **Grade**
 - **Clean sulfide concentrate was 550 opt silver**
 - **Vein seams of 1.7 feet ran 73 opt Ag**
 - **Diluted grade delivered to mill was 40 opt Ag**
 - **Dilution was therefore 82%**



ET 26
731 gm Ag
1.26 gm Au

Silver Averaged \$0.63/oz
High was \$0.69 in 1926

1921 to 1928 Peak Production to Decline

➤ 1928 Annual Production

- 82,480 tons (about 225 tons per day)
- 2,599,485 oz Ag
- 9,684 oz Au

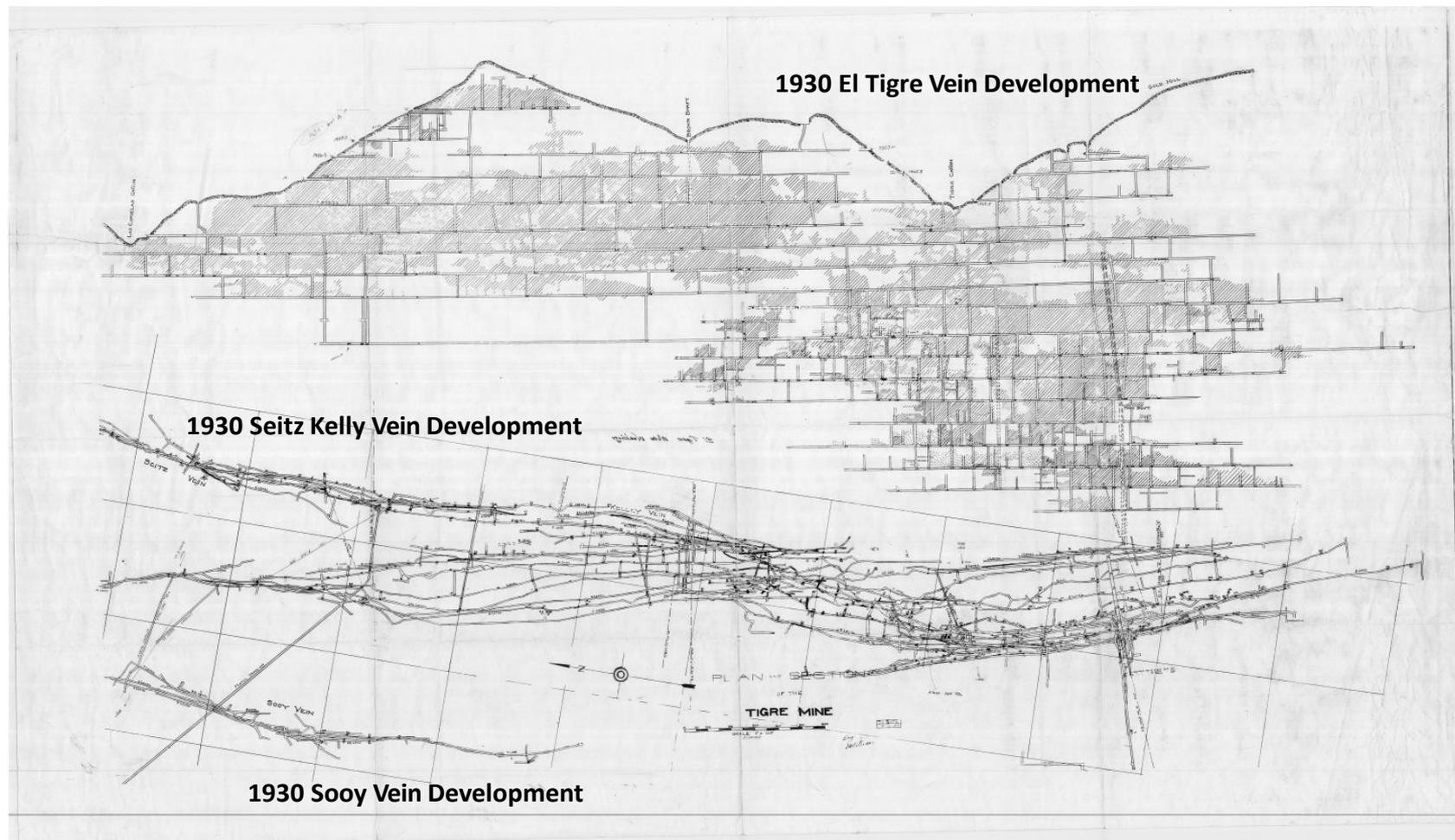
- Average grades calculated at 31.5 opt Ag and 0.12 opt Au

- Total forward calculated production through 1928 at 225 tpd is:
 - 1,330,000 tons
 - 50,400,000 oz Ag
 - 289,000 oz Au

Silver Averaged \$0.63/oz
High was \$0.69 in 1926

1928 Mining Journal

1929 to 1932 Decline



Silver Averaged \$0.34/oz

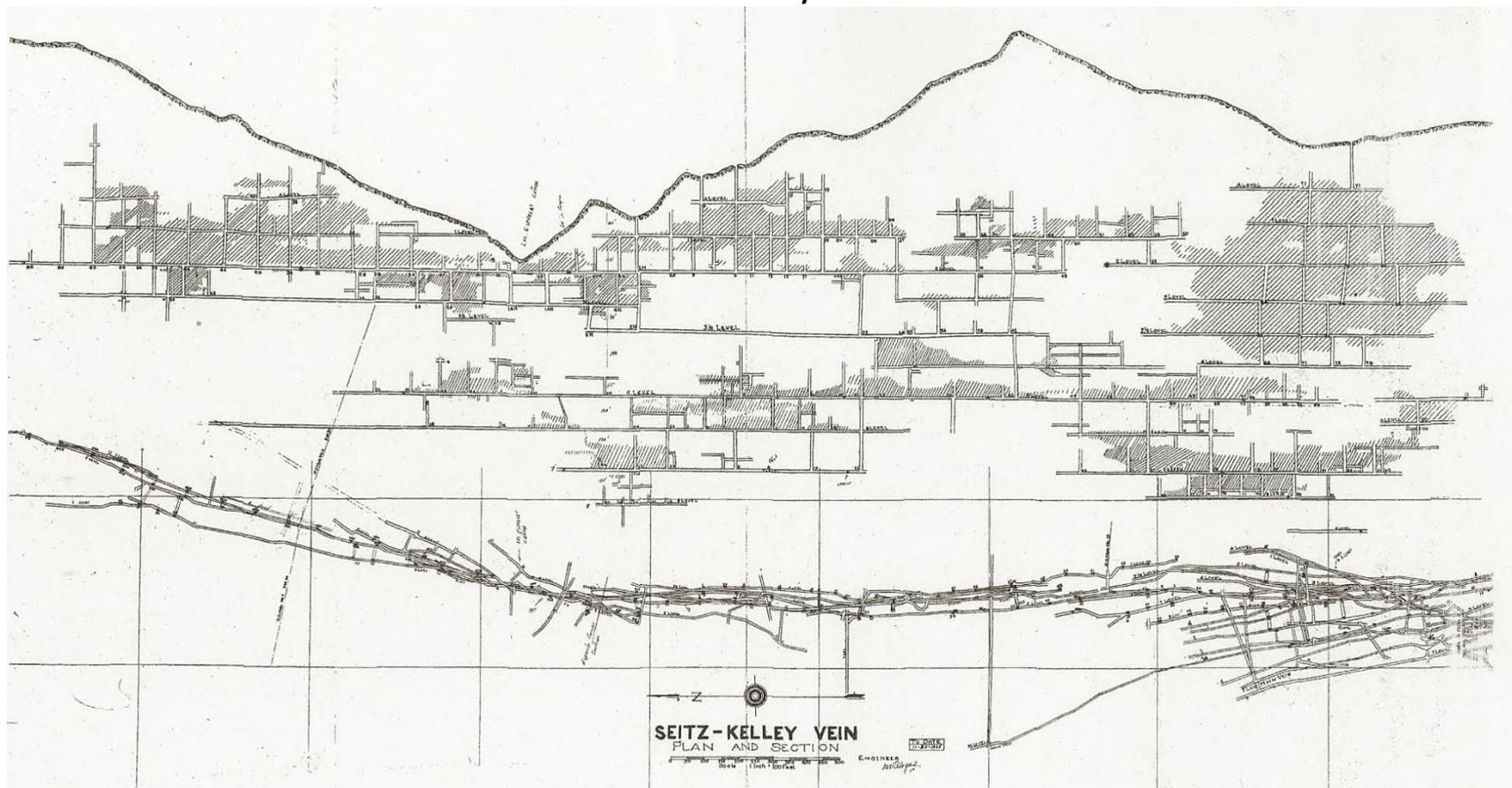
1933 to 1938 The End of the Early Era

- **Very little known about this Period**
- **Development focuses on Seitz Kelly vein and remnants**
- **Mine reported to be shut down in 1938 due to continued low silver prices and uneconomic grades remaining**
- **Abundant lower grade (10-15 opt Ag) remains in mine**
- **Estimated total production added to 1928 data using the last 10 years at 150 tpd, 31.5 opt Ag and 0.12 opt Au:**
 - **1,870,000 tons**
 - **67,410,000 ounces Ag**
 - **353,800 ounces Au**

Basically, 65 to 75 million ounces produced

1933 to 1938 The End of the Early Era

Seitz Kelly



Silver Averaged \$0.48/oz

Other Operations of Lucky Tiger

- **Lucky Tiger Combination Mining Company**
 - **El Tigre Mining Company—El Tigre Mine/Mill**
 - **El Tigre Leasing Company—La Quemada Mine/Mill, Jalisco**
 - **North Tigre Mining Company—Leased Protectora Vein Mine/Mill**
 - **Buckskin National Mine, Nevada**
 - **American Girl Mine, California**
-

1982 to 1984 The Anaconda Period

- **Exploration option obtained from Talaman Oct 81 to Feb 84**
 - **Extensive geologic mapping, rock sampling and general reconnaissance work**
 - **Drilled 21 core holes, 7,813 meters**
 - **Drove 352 meter tunnel into Fundadora vein, North Area**

- **Original objective was to find high grade silver deposits**
 - **Failed due to drilling below productive areas**

- **Recognized large low grade potential as halos to veins**

- **Studied tailings with assaying and metallurgy**
 - **Reported 1,100,000 tons of 83 gms Ag, 0.23 gms Au**