

## MAMMOTH MINE

BY

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### Introduction

The Mammoth Mine has been one of the major producers of gold, silver, copper and lead ores in the Tintic Mining District and it is considered advisable to prepare a report on the property for reference and to note the outstanding possibilities for recovery of future ores. Many of the interesting incidents as well as a great deal of information about the property have passed on to the "Happy Hunting Grounds" with the passed operators and workmen, however recent operations have proven that the machinery and workings have survived the years.

### Geographic Position

The Mammoth Mine is located in the southern section of the Tintic Mining District Juab County Utah, approximately 60 air line miles south west of Salt Lake City, Utah. The property is connected with a paved road joining U. S. highway 6 and 50. It is 4 miles by road from Eureka, Utah the largest town in the district.

The Union Pacific Railroad Company services the mine with a spur line at the tunnel level of the mine where the mine plant is located and ore is loaded for direct shipping to mills and smelters.

### Ownership

The Mammoth Mine is controlled by the Mammoth Mining Company a Nevada corporation licensed to do business in the State of Utah. The company is incorporated for 400,000 shares of stock with 56.98% or 227,920 shares owned by the Samuel McIntyre Investment Company, the remaining being listed on the Salt Lake stock exchange. The value during 1953 varied from a low of \$.15 to a high of \$.70 per share.

Subsidiaries of the Mammoth Mining Company are: The Gold Chain Mining Company, Utah Consolidated Mining and Milling Company, Ophongo Mining Company and Cleveland Mining Company. These properties are joining the Mammoth Mine and have been producers in past years. The Grand Central Mine north of the Mammoth Mine is owned by the descendants of the late Earl McIntyre.

The Mammoth Mining Company and its subsidiaries own 58 patented claims totaling 380 acres located in the Tintic Mining District Juab and Utah Counties.

Adjoining properties are owned by International Smelting and Refining Company on the south, Chief Consolidated Mining Company

on the north, Tintic Standard Mining Company to the east and Tintic Gold Co. at the west boundary.

### History

The historical features of the Mammoth Mine are numerous, the original mineral discovery was made in 1870 by three prospectors named Wimmer, Moore and Wilson, who filed the first claim. One of the locators impressed by the size of the outcrop exclaimed: "Boys, she's a mammoth - we've got a Mammoth Mine." Subsequent work on the Mammoth claims placed them in the hands of George and Charlie Crimson who sank a 50 foot shaft and mined very rich gold copper ore.

Around 1871 Samuel and William McIntyre, who had trailed a herd of cattle from Texas and were grazing them in Tintic Valley, became interested in the mining ventures starting up around the area. They became associated with the Mammoth Mine and in 1873 traded long horn cattle to the Crimsones for the mine. An interesting though ironical sidelight is that due to a severe winter the Crimsones lost practically all the cattle they had acquired during the transaction.

Under the direction of the McIntyres the mine produced ore fabulously rich in native gold to the extent an English promoter became interested and acquired a lease and option. Under this management the Mammoth Mining Company was incorporated for 400,000 shares. A smelter was constructed in the area for treating the ores. The smelter soon proved a failure due to inadequate fuel supply resulting in frozen furnaces, the smelter was abandoned at an early date.

About 1881 the English interests failed on the lease and option leaving the company's shares scattered considerably with the McIntyres holding the largest interest. By 1886 the McIntyre brothers held control again and were in charge of mining operations. An underground steam plant was installed to operate a hoist on the 300 level and shaft sinking operations began with development headings at 100 foot intervals. The exploration proved successful as ore bodies were discovered on each level.

Approximately 1893 a combined stamp and amalgamation mill was built by the company and operated with slight success. About this time horn silver was mined and sacked for shipment providing funds for deepening the shaft to the 900 level and construction of a 15 mile eight inch pipe line from Cherry Creek to Mammoth, to provide water for mine, mill and culinary purposes. The shaft was continued on reaching the 2100 level in 1904. At this time a first motion steam hoist was located at the collar of the shaft. This hoist is still in use being supplied by steam made in three boilers on the surface near the portal of the 300 level.

By 1903 reduced smelting rates and increased railroad facilities made it uneconomical to operate the mill. Since that time

all ore produced has been marketed at smelters in the vicinity of Salt Lake City. Similar to many of the early day mines a large portion of the ore receipts was expended in lawsuits. The McIntyres, Sam and William had an agreement to the effect if one desired to sell his interest the other had first option to buy. In 1899 the owners of the neighboring Grand Central Mine approached William McIntyre and offered to purchase his interests. Samuel immediately separated family interests by paying William \$250,000.00. The Grand Central owners then brought suit against the Mammoth claiming ore had been mined by the Mammoth Mining Company on their property. This resulted in many years of legal battle with the Mammoth interests claiming extra-lateral rights. One of the supreme court judgments amounting to \$190,000.00 was made against the Mammoth Mine, which was paid for from receipts of three carload lots of ore (approximately 150 tons). Finally by 1929 the main contenders of the lawsuits had retired so legal differences were discontinued.

The mine supported mining operations continuously until 1945 when war time conditions caused a labor scarcity forcing it to cease underground operations. Recent operations (1953-1954) consisted mainly of maintenances, repair and development work necessary to gain entry into areas caved during the years of inactivity.

### Geology

The original discovery was an outcropping of high gold and copper ore in the Bluebell Dolomite about one-half mile north of the Silver City monzonite intrusion, or what is known as the Swansea Stock. The country rock is of sedimentary origin with the general strike of the bedding being north 35 deg. west to north 70 deg. west dipping from 20 to 60 deg. northeasterly.

The structural features at the Mammoth Mine are the Sioux Ajax and Mammoth faults. The Sioux Ajax fault strikes N 65 deg. W with a displacement of over 400 feet the north section being down. The Mammoth fault strikes N 20 deg. E with a displacement in excess of 120 feet and west side down.

The shaft was sunk near the original outcropping and started in Bluebell dolomite advancing through Ophongo limestone, Ajax limestone into Opex dolomite on the 2100 level. The Ajax limestone has proven to be the most favorable horizon for ore replacement throughout the district and has been the most productive at the Mammoth. However, production has not been limited to this formation. Rich ore has been mined in the Bluebell dolomite, Ophongo limestone and Opex dolomite, indicating that the horizon was a determining factor as to size of ore deposition but the mineralization was not limited to favorable limestones.

### Ore Bodies

The largest production has come from vertical ore shoots not over 200 feet from the main shaft. These ore shoots were formed by a series of northeast fissuring intersecting the Sioux

Ajax fault depositing ore in nearly vertical and cylindrical shaped bodies. The ore bodies cross the bedding and are up to 200 feet in diameter where replacement has taken place in the favorable limestone.

The largest and consequently most productive of these ore shoots is named the Apex. The Apex fissure intersects the Sioux Ajax fault and has deposited ore on a vertical plane extending from the surface to the 2300 level. Branches of this ore shoot have been traced to the 2400 level and it is still continuing below the permanent water table. This ore body is unique due to the various metals that it produced. High gold silver and copper ores were mined from the outcrop to the 2100 level. On the 1500 level a branch of this ore shoot produced what is known as the lead stope and high grade lead silver ore was stoped to the 2100 level. The main section of the ore shoot continued to the 2100 level producing gold, silver, and copper ore. The third branch of the Apex ore shoot on the 1500 was mainly gold silver ore and extended from the 1400 level following northeast fractures to the 2200 level.

The next large ore body, the Silveroplis was discovered just north of the shaft beginning just below the surface at what is named the Cunningham stope. This ore deposit continued following the bedding on a northeasterly pitch to the 800 level, where it flattened out and continued on a northeast strike to the Grand Central and Chief Consolidated properties.

The ore deposit known as the Copper stope apexed above the 300 level and continued to the 800 level. This ore body is noticeably different from the others as it occurs along a northwest fracture. This deposit was mainly gold silver and copper ore, the maps note it averaged 15% copper from the 250 level to the 800 level.

One of the larger producing ore shoots is known as the East Stope due to its respective location from the main shaft. Again this was a vertical ore shoot formed by northeast fissuring intersecting the Sioux Ajax fault. It produced Gold, silver and copper ores from below the 800 level to the 2100 level.

The welding ore shoot was first discovered on the 800 level. No ore outcrops on this fissure, but it extends to below the 2100 level being a large producer of gold, silver and silica type ore. It is a northeast fissure dipping west and has given the ore shoot effect where it has bedded out in the limestones, reaching its largest cross sectional dimensions at the 2000 and 2100 levels.

Fissure deposits other than those forming vertical ore shoots have been secondary in production, but several fissures of this type have been productive not only in gold, silver and copper ores, but rich silver lead and zinc ores were recovered.

The fissure termed the Back Fissure is one of the outstand-

ing. It is a northeast fissure dipping steeply to the west and varies in width from four feet to thirty feet. It was productive from the 300 level to the 900 level and was mined on the 1300 level. On the 300 level this fissure was so rich in gold that it was called the Gold Stope. Along the strike it has been productive for over 100 feet from the 300 level to the 900 level. Below the 900 level it's mined on the 1300 level only.

Another highly productive fissure is the North Extension on the 1200 and 1500 levels. It is a north - northeast fissure dipping to the east with a mineralized width up to 40 feet. This fissure was mined 1200 feet north of the main shaft above the 1200 level and down to the 1500 level. It produced silver and copper ores between the 1200 and 1500 levels with rich silver lead ore occurring above the 1200 level. This fissure zone continues north beyond the property line and is productive in the Plutus section of the Chief Consolidated Mine.

South of the Sioux Ajax fault zone a series of fissures extending from the Gold Chain Mine have been producers of gold, silver and copper ores and silver, lead, zinc ores. These extensions on to the Mammoth property were not given a great deal of consideration until the Mammoth Mining Company acquired the Gold Chain mine in 1931. At this time what is known as the Gold Chain fissure was mined from the Mammoth ~~to~~ 1300 level continuing on to the 1650 level recovering high grade silver, lead zinc ore. The fissure is continuing beyond the 1600 level, but stoping was discontinued pending a drift from the 1900 level.

Between the 2100 and 2360 levels the relationship of the various ore shoots and fissures is still undetermined as sufficient development work has not been done to locate them at this lower elevation. However, on the continuation of what appears to be a branch of the Apex fissure has been followed to the 2400 level, and continues with ore assaying .25 to 1.0 Au 4.0 Ag 5.0 Cu.

### The Ores

The ores in the Mammoth Mine vary to the extent that a brief adequate description is difficult. Oxidation has taken place completely to the water table causing the ore bodies to be compromised mainly of oxidized minerals, but in numerous places particularly in the lead stope sulphide minerals were part of the mineralization. The gangue usually consists of a fine grained silicified limestone with a fine grained quartz. All the ores contain some gold with extremely rich spots containing native gold occurring from time to time. The gold ores occur in quartz, barite (locally termed spar) and manganese. From the outcrops to about the 800 level the manganese contained high gold values. In the vicinity of the 1000 level the gold occurred in the barite. It is not uncommon to obtain two pieces of barite from the same stope looking identical one assaying high in gold values and the other not.

Silver is present in all ores varying from small amounts to wire silver. The lead stope on the 1500 and north Extension fissure has produced the ore richest in silver, however, fissures now re-

maining on the 2150 level assay as high as 300 oz. per ton in silver.

Copper is widely distributed and occurs as malachite, azurite, arsenates and enargite. Copper minerals occurred in most all the ore zones, it is noted that the Silveroplis ore chute ranged in copper values as high as 40%.

Lead is present in small amounts as galena or carrisite in most of the ores, but principal lead production came from the Apex ore shoot on 14, 15, 16, levels, the north extension on the 1200 level and Gold Chain fissure on the 1600 level. Zinc in carbonate form occurred with some of the lead ores principally the Gold Chain fissure, but has been considered detrimental due to its penalty at the smelters to the extent the ore records do not list the zinc content.

### Production

The mine was a steady producer from the time of location until 1945 when underground operations were discontinued due to the labor shortage prevailing in the district during World War II.

A detailed itemization of early day production is impossible as the records were destroyed by a disastrous fire in October 1927. From publications shipments similar to the previous mentioned, 150 tons netting \$190,000.00 are known facts. In 1907 one 30 ton lot was sold to a local smelter netting \$107,000.00, the second shipment was refused by the smelter as they claimed it salted their sampling system. However, it was sold to a New Jersey refinery bringing receipts over \$100,000.00. Other high grade shipments were made as rich ore deposits were mined. In 1934 free gold was mined on the 2100 level causing a great deal of speculation. However, during the past years of operation a mixing of ores was practiced to take advantage of lower freight and smelter rates, consequently the ore records show a lower value per ton.

Production up to 1913 is listed by U.S.G.S. Professional Paper 107 as approximately 402,095 tons of ore containing \$6,003,614 in gold, 6,942,314 ounces of silver, 17,184,124 pounds of copper and 17,679,058 pounds of lead, valued at \$14,660,197 with total dividends amounting to \$2,529,205.

Classification of ore is based on type of smelting contract ore was sold by.

<u>Year</u>	<u>Class Ore</u>	<u>Tons</u>	<u>Weighted Average Settlement Assays</u>				
			<u>Am</u>	<u>Ag</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
1925	Lead	13,311.2	04	25.8	.96	10.4	
"	Copper	8,211.6	.195	2.8	.32	-	
1926	Lead	27,580.4	043	26.67	1.37	10.05	
"	Copper	7,410.8	.045	16.67	1.56	-	

<u>Year</u>	<u>Class Ore</u>	<u>Tons</u>	<u>Weighted Average Settlement Assays</u>				
			<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
1927	Lead	24,603.9	.05	18.56	2.02	5.79	
"	Copper	1,304.5	.03	15.91	1.35	-	
1928	Lead-Copper	14,685.4	.05	20.11	1.4	2.21	
1929	Lead	8,159.5	.05	21.57	.96	8.51	
1930	Lead	2,773.6	.05	20.79	1.07	9.03	
	Copper	15,798.7	.115	10.46	1.43	1.91	
	Dump	8,826.0	.16	3.7	.5	.4	
1931	Lead	2,764.7	.03	30.4	1.2	12.8	
	Copper	15,633.6	.278	5.18	.8	2.83	
	Dump	9,634.0	.21	2.92	.48	.67	
1932	Lead	1,119.0	.09	20.5	.83	7.7	
	Copper	15,666.0	.24	11.4	.62	.3	
1933	Copper	20,261	.35	2.9	.5	-	
	Dump	1,163	.14	3.0	.6	-	
1934	Lead	3,235	.17	3.9	.5	2.3	
	Copper	13,404	.24	4.3	.4	-	
	Dump	9,844	.12	2.3	.4	-	
* 3777 Tons assayed 14.2%Pb							
1935	Lead	288.1	.22	11.16	3.42	9.04	
	Copper	20,855.0	.35	6.12	1.96	.6	
	Dump	2,809.3	.11	2.04	.3	-	
1936	Lead	96.0	.04	12.92	6.4	11.70	
	Copper	17,576.9	.25	6.75	.3	.95	
	Dump	10,072.6	.15	2.41	.42	.1	
1937	Lead	57.9	.13	8.48	.3	7.80	
	Copper	34,159.7	.19	5.61	.4	.63	
1938	Copper	31,568.9	.18	5.2	.7	1.5	
	Dump	8,248.1	.15	3.4	.4	.32	
1939	Copper	32,633.6	.21	7.6	.33	.9	
	Dump	8,168.0	.09	2.7	.7	.8	
1940	Copper	34,237.4	.15	4.1	.24	.6	
	Dump	6,367.2	.09	2.7	.5	.7	
1941	Lead	<del>55.7</del>	.08	11.7	-	13.1	16.5
	Copper	21,290.02	.15	3.0	.4	1.12	
	Dump	799.0	.19	4.8	.7	.3	
1942	Lead	203.9	.12	11.1	.2	11.8	16.0
	Copper	28,276.8	.11	2.2	.4	.4	
	Dump	15,415.4	.07	2.0	.2	-	
1943	Copper	25,481.3	.16	3.7	.7	.7	
	Dump	1,198.8	.06	1.6	.4	.2	

<u>Year</u>	<u>Class Ore</u>	<u>Tons</u>	<u>Weighted Average</u>		<u>Settlement</u>		<u>Assays</u>	
			<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	
1944								
1949	Dump	36,670.4	.07	2.5	.6	.4		
1953	Copper	2,187.1	.10	2.50	.9	.3		

### Profit

Gross receipts in excess of \$18,000,000.00 with dividends paid amounting to \$3,432,742.00.

### Mine Workings

The shaft is operated from a tunnel 250 feet below the collar of the shaft. The hoist is located at the collar next to the original outcrop of the Apex ore shoot and is a vertical shaft to the 2100 level. The levels are 100 feet apart from the 400 level down excluding the 2000 level which does not have access from the main shaft. On the 2100 there is a vertical winze to the 2360 level, the lowest level being at an elevation of 4692 feet above sea level. From the 2360 level an inclined winze extends the vertical workings to below the 2400 level where the first water was encountered. The total length of drifts (not including adjoining properties controlled by the Mammoth Mining Co.) is in excess of 17 miles. The 1300 level is connected with the Gold Chain and Lower Mammoth shafts to the south. Northward the 700 and 800 levels joins the Mammoth shaft to the Grand Central shaft.

Recent operations proved the workings to be in good shape and a large portion of the dead work required after a period of in-activity was completed. Entry to the 2360 level was not accomplished as the timber has rotted out of the winze and complete rehabilitation at this time was not advisable.

### Plant and Equipment

The shaft is serviced by a first motion steam hoist located at the collar. On the tunnel level approximately 250 feet below the hoist is the main plant which furnishes steam for operation of the hoist. The boiler plant consists of three marine type manual fired boilers. The compressor and power generator comprises a section of the boiler room and produces compressed air and electricity for underground operations. Change room, machine shop and blacksmith shop are joining at the portal of the tunnel level. The plant is complete with assay office, company offices and carpenter shop located near the main plant. The majority of the equipment is operated by steam, which is considered obsolete compared with present day mining methods but sufficient and useable to carry on mining operations. The shops are equipped with tools and machinery adequate to maintain mining and development work. Underground equipment and tools are adequate, with the exception of drilling and transportation equipment, to carry out a limited scale mining program.

## Ore Reserves

The irregular fissure type deposits have never been the type where large tonnages of known ores reserves could be systematically blocked out. The practice has been to follow the ore shoots and fissures developing ore during stoping operations and intersecting favorable ore zones at the next lowest level. Consequently, the known ore reserves have never been a comforting factor. During the last three years of continuous operations sufficient labor was not available to carry out the required development work, therefore at present the known ore reserves have been some what depleted. However, it is estimated that there remains 40,000 tons of gold silver siliceous type ore on the 2000 and 2100 levels. The stopes making up the Apex ore shoot contain an undeterminable tonnage of low grade gold, silver copper ore termed fill, that would be shipped by installation of a screening mechanism to eliminate the limestone boulders and expedite moving a larger tonnage.

An estimated 5000 tons of high grade gold, silver and copper ore remains as part of the Apex ore shoot from the 500 level to above the 300 level where the main shaft passes through the ore zone. This ore remains to safe guard the shaft and will necessitate remaining as long as there is a possibility of recovering ore from the lower levels. Numerous places will support a block leasing program if economical conditions change to interest miners in this type work.

## Labor

Recent operations indicate that sufficient personnel are now available to operate on any size program desired. There are men available from the neighboring town of Eureka and modern day transportation makes it convenient for commuters from the farming communities in Utah Valley. The present wage scale at the Chief Consolidated Company in Eureka has just been decreased; miners rate of pay was lowered from \$14.16 to \$12.05 per eight hour shift. However, this rate is still undergoing a final decision at this time.

## Possible Ore

The following possibilities for developing ore does not represent the total number of known possibilities but are included to represent the most outstanding exploration projects for developing ore.

### North Extension

As described above under ore bodies this series of fissuring has been a producer of gold, silver, copper and lead ores on the 1200 and 1500 levels. These ore deposits have never been explored below the 1550 level where mineralization is still present. Recent sampling in the area assayed:

	Au	Ag	Pb	Cu
3.0 ft. Cut	.05	21.4		
15.0 ft. Cut	.03	1.92		2.10
12.0 ft. Cut	.04	2.40		3.0

A review of the records during stoping operations in this area show settlement lots to be assaying:

Au	Ag	Pb	Cut
.02	40.0	30.0	2.1

It is considered that a drive from the 2100 level to intersect this ore zone would result in a substantial amount of ore. It is probable that northeast fissuring now developed on the 2100 level will project to this deposit. The drive would entail 1200 feet of drifting, exploring and area not previously explored extending possibilities of ore before reaching the 1500 objective.

### 2150 Level

During the last period of operations in 1943 a winze was sunk from the 2100 NE drift along a northeast fissure and 250 feet of drifting was accomplished on the 2150 level developing a mineralized zone of gold silver siliceous type ore. Samples taken in the winze assayed:

	Au	Ag
1953		
1 Ft. Cut	.28	5.32
Fines from 8 Ft. Cut	11.70	303.5
8 Ft. Cut	.94	91.06
1943	7.10	2.5
	2.0	2.0
	2.44	4.1
Drifts 7 Ft. Cut	.23	2.90
	.20	16.30
	6.6	7.7

Values are "spotty" but a good grade ore was mined during drift advance as shown by the following car samples.

	Au	Ag
Oct. 1953	7.80	4.0
	1.08	2.3
	4.96	5.2
	.12	2.4
	.32	7.7

During recent operations rehabilitation work for entry into this area was approximately 75% completed before discontinuing work on the 2100 level. It is proposed that with 200 feet of additional drift on the 2360 level that this fissure could be intersected increasing the known size of the ore zone and provide a more efficient means of mining this block of ore. The extent of the mineralization on the strike of the fissure has yet to be determined northeast of the 2100 drift.

### 2360 Level

There are numerous possibilities on the lowest level of the mine namely: extension of the Welding ore shoot and projection

of known fissures from above. One stope has been mined from the 2100 level to the 2300 level attaining up to 200 feet in width. This ore shoot was followed by an inclined winze to the permanent water table just below the 2400 level. Ore mined in 1942 just a few feet above the water was assaying as follows:

Au	Ag	Cu
.20	4.5	4.5
.20	5.0	7.0

Projection of other ore shoots to this level are probable producers, the 2100 square set stope which produced native gold on the 2100 level and followed the bedding in the Ajax limestone to the 2200 level has never been disproved at this elevation.

### Back Fissure

The Back fissure previously discussed under ore bodies is a northeast fissure that could produce another vertical ore shoot at the intersection of the Sioux Ajax fault. This has been a producer from the 300 level to the 900 level but is not developed below, except on the 1300 level. The Back fissure projection with the Sioux Ajax fault is a short drive from present workings. Further exploration and study of the projection of this fissure could be rewarding south of the Sioux Ajax zone on to the Gold Chain property.

### 900 Level

Southwest of the east stope on the 850 level a silver, lead, zinc, fissure has been developed by 320 feet of drifting on the fissure. This was done during the thirtys when metals were at their lowest. Since that time the entry to this heading has caved making an investigation impossible without driving approximately 55 feet of raise. The records do not include separate assays from this area but the maps indicate a strong southwest fissure with notations that it contained silver, lead and zinc ore. Discussions with the men that drove the heading are encouraging as they stated the fissure was a mineable width of good ore.

### Gold Chain Fissures

After the Mammoth Mining Company acquired the Gold Chain property stoping operations were conducted on what is termed the Gold Chain fissure. This fissure is a northeast fissure producing gold, silver, lead, copper and zinc ore. Later production was mainly limited to silver lead and zinc. The fissure was stoped from above the Mammoth 1300 level to the 1650 level when mining was discontinued pending a drift from the 1900 level. The 1900 cross-cut has 200 feet remaining to reach the projection of the fissure from the 1650 level. The last shipments from this area on the 1600 level assayed:

Au	Ag	Pb	Zn	Cu
.105	14.05	23.7	13.6	.32
.08	13.3	18.4	16.0	.325

This fissure varies in width from a few feet up to 15 feet. It is said to have obtained a width of fifty feet in the early workings of the Gold Chain Mine.

In closing it is considered that numerous probable ore bodies could be itemized by applying further geological study as very little scientific geological work has been done on the property. The main source of developing ores has been to get on a good streak and follow it. This method is given due respect however, it is believed that a conscientious study of surface geology, fissuring, favorable limestone and structural relationships etc. would bring results in finding new ore bodies. There is an unlimited amount of the ground comprising the holdings of the Mammoth Mining Company that have yet to be explored.