

# Charter Oak Mill



**1 Loadout Deck**  
Lead-silver ore excavated from the mine tunnels was carried in tram buckets or metal ore carts to the loadout deck. The ore was then dumped through the grizzly strainer into the first large ore bin in the upper part of the mill. Waste rock (gangue) from the tunnels was tossed outside the adits, forming huge, steeply pitched piles above the mill building.

**2 First Ore Bin and Chute**  
The wood ore bin and grizzly strainer separated the ore for either processing in the ball mill or discard into a nearby waste rock pile. Discarded, lower-grade ore was hand-sorted to find pieces worthy of processing.

**3 Pacific Jaw Crusher**  
The jaw crusher, powered by an electric motor, broke apart the ore. This was the first step in preparing ore for the ball crusher. This part of the operation was hard on fingers. Iron bars (cobbers) hanging on the wall were used to dislodge ore struck in the crusher.

**4 Conveyor Belt**  
The coarsely-crushed ore was carried from the jaw crusher on conveyor belts. Finely crushed ore was sent directly to the ball crusher on a lower conveyor belt. Coarser material was sent on an upper belt to a second bin for further processing. The conveyor drive belts were tightened or loosened by a counterweight made of a bucket filled with scrap iron.

**5 Second Ore Bin**  
Crushed ore requiring further pulverizing was stored in a second wood ore bin, located in the middle section of the mill building. It is still full of coarsely crushed ore.



**6 Ore Feed**  
Ore from the second bin was shoveled through a large-mesh screen, then further crushed into a flour-like consistency in a second jaw crusher. It was then fed into the ball mill along with the fine material run in from the lower conveyer belt.

**7 Ball Mill**  
The crushed ore was thoroughly pulverized into a fine concentrate in a huge metal cylinder containing many first-sized iron balls. This was a very noisy and dusty part of the operation! Discarded milling balls can be seen both inside and outside this area of the mill building.



**8 Rake Classifier**  
Ore pulverized in ball mill was sorted by size in the rake classifier to ensure that the concentrate was ground to the proper size needed for flotation. Out-sized pieces of ore were sent back to the ball mill to be pulverized again.

**9 Denver Sub-A Flotation Cells**  
Ore concentrate was mixed with various chemicals and water, then agitated in the flotation cells. Precious metals—lead, zinc, silver and some gold—were skimmed off the paddles. The waste water and froth was flushed from the cells in metal and plastic troughs and discarded in large (highly toxic) mill tailings piles on the Little Blackfoot River flood plain. The mill tailings were removed during mine reclamation.



**10 Drying Area-Loading Deck**  
The processed ore from the flotation cells was dried prior to shipment to East Helena smelters (water increased shipping costs). The metal concentrate was placed on large tables to dry. Vacuum filters were typically used to speed up the drying process but a filter is not present at Charter Oak. Tools and extra parts necessary to keep the mill process going were also stored in the lowest part of the mill building.