



Cargill Salt Group

Bulk Rock Salt – Where & How

Titletown Brewing Company
Green Bay, Wisconsin
April 4th, 2018

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Salt three ways



Rock Salt

Cargill miners work underground to bring up millions of tons of rock salt each year. Using strategically positioned explosives to fracture the salt from the mine face, crush it / screen it and either package or sell as bulk.



Vacuum Evaporation

We force fresh water down a shaft to dissolve the salt in the deposit, then pump the saturated brine up to the surface and heat it in a vacuum to evaporate the water, making the purest of all salts.



Solar Evaporation

In shallow ponds, we capture sea water or other naturally occurring brine and let the sun and wind do the work. When a salt bed forms, we harvest the salt, wash it, screen it and package it.

Salt Deposits in the US



Cargill Bulk Salt Mines



Avery Island, Louisiana

Underground mining began in 1898
(first in western hemisphere)
Mining 1,850 ft below surface
No storage, loaded direct to barge

Cleveland, Ohio

Underground mining began in 1962
Mine floor 1,800 ft under Lake Erie
Ability to load truck, rail, barge and
“Great Lake boats”

Lansing, New York

Underground mining began in 1923
Mine floor 2,300 ft under Lake Cayuga
(deepest salt mine in N. America)
Ability to load both truck and rail

Salt mining

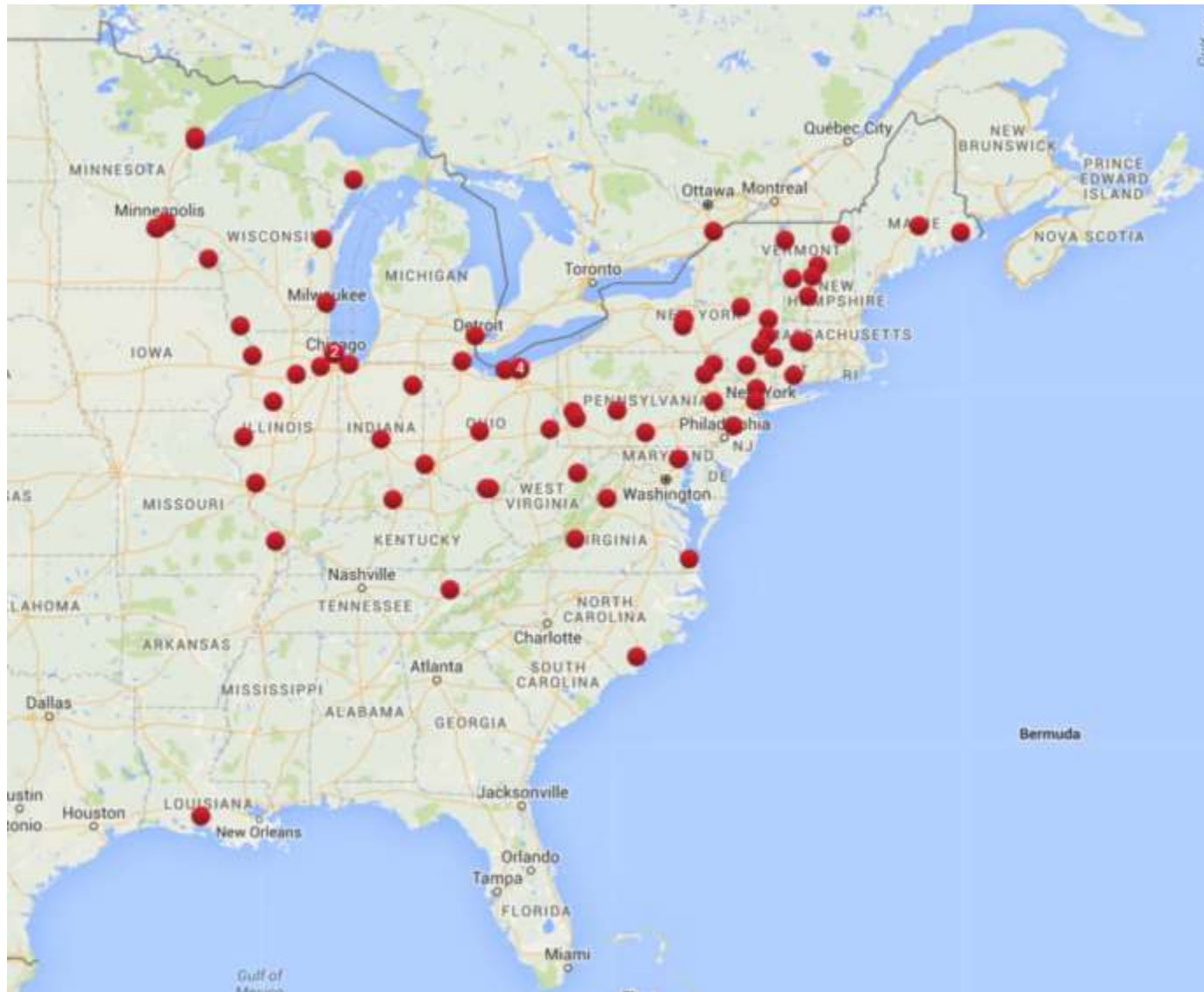
How long does it take to mine the demand for next year's winter?

We mine salt 12 months out of the year, to move within 3-4 month period. The biggest cost of salt is supply chain expenses (handling, transportation, storage)



Mining is an extraction industry and costs increase the farther out the operation goes.

Our Terminal Network



Domal Salt mine

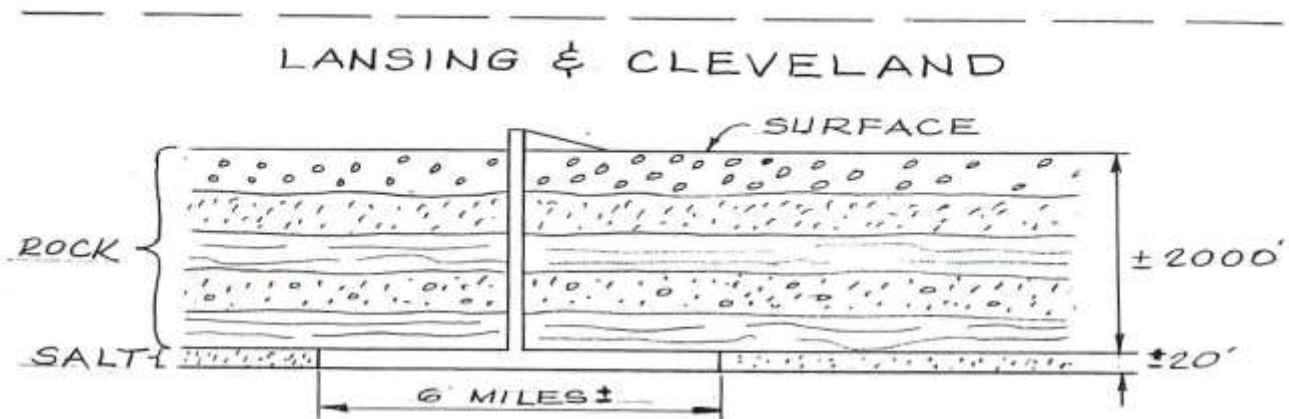
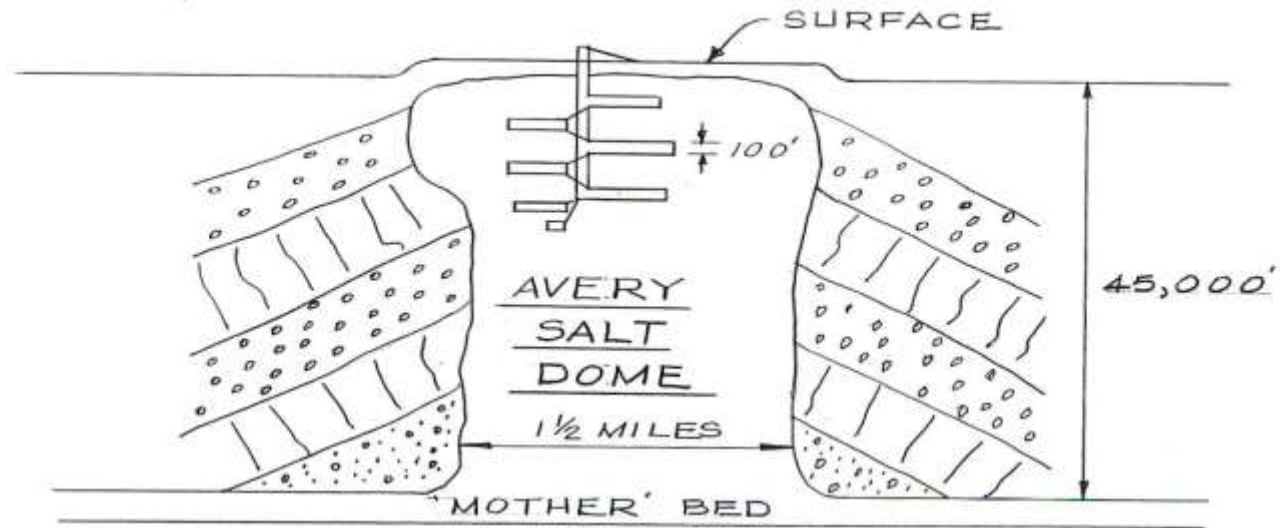
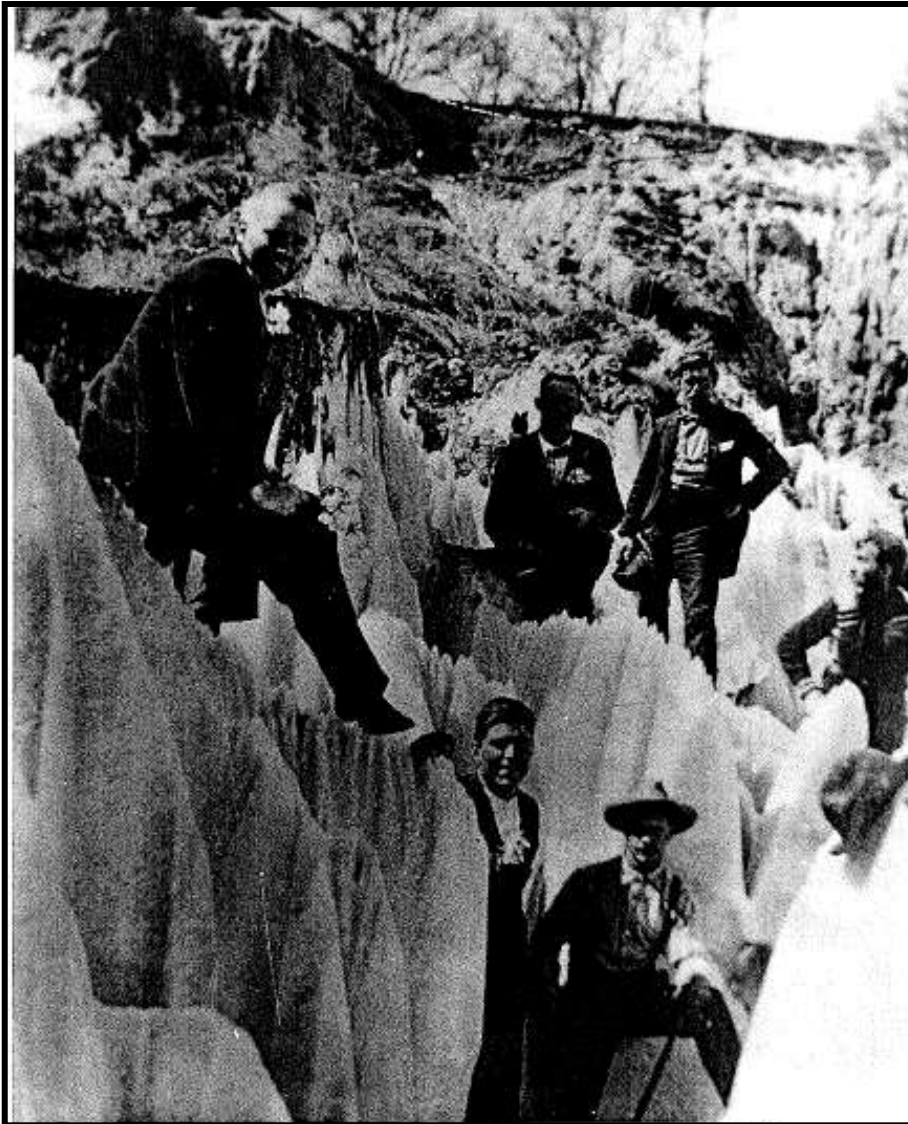


Photo circa 1890's

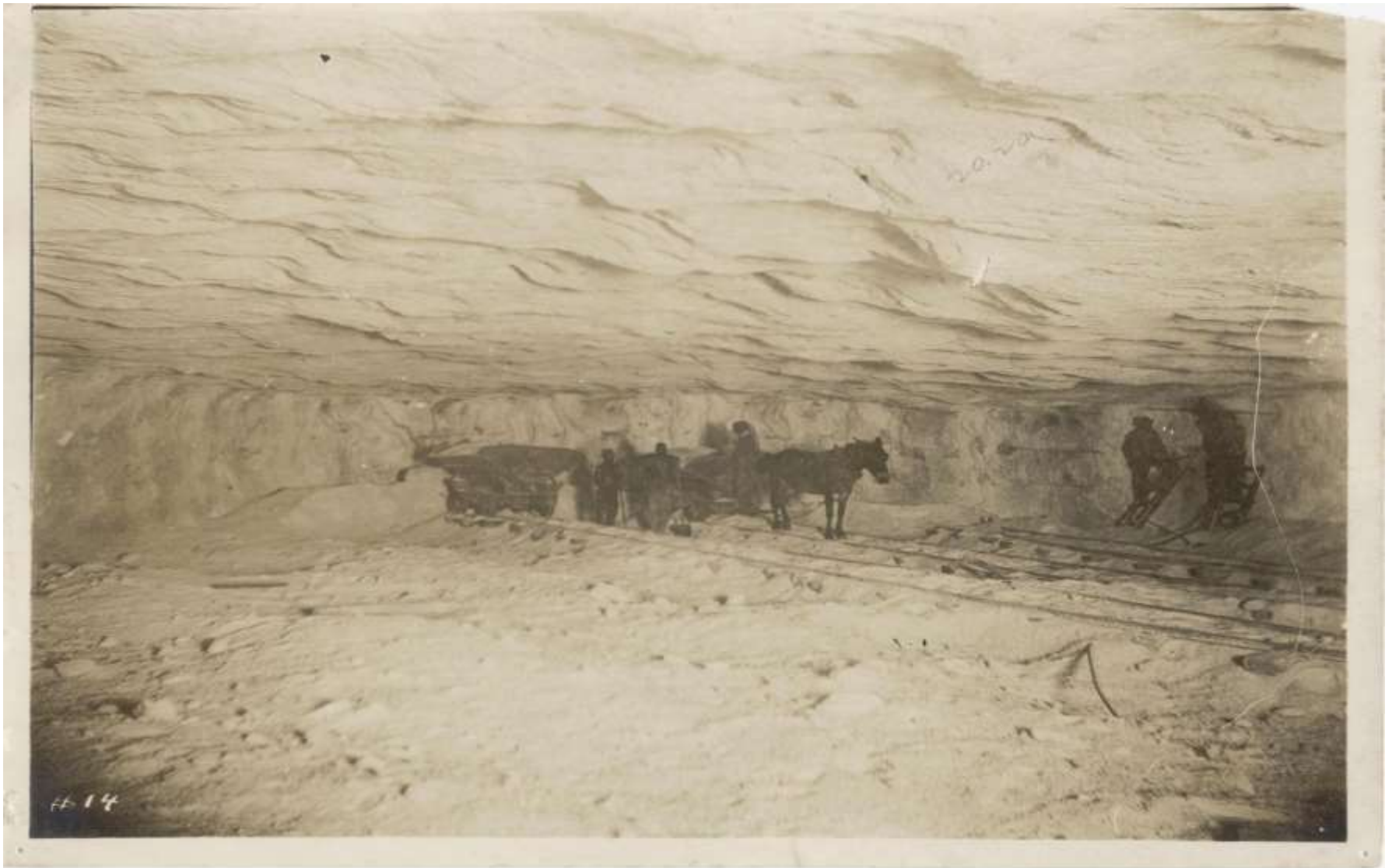


A very salt dome is very near to the surface and was originally quarried from the surface.

Irregular salt dome surface (top of salt) features caused by groundwater flowing across the top of the salt dome.



500' level



Mule transport

Everything goes down



Avery Mine Production



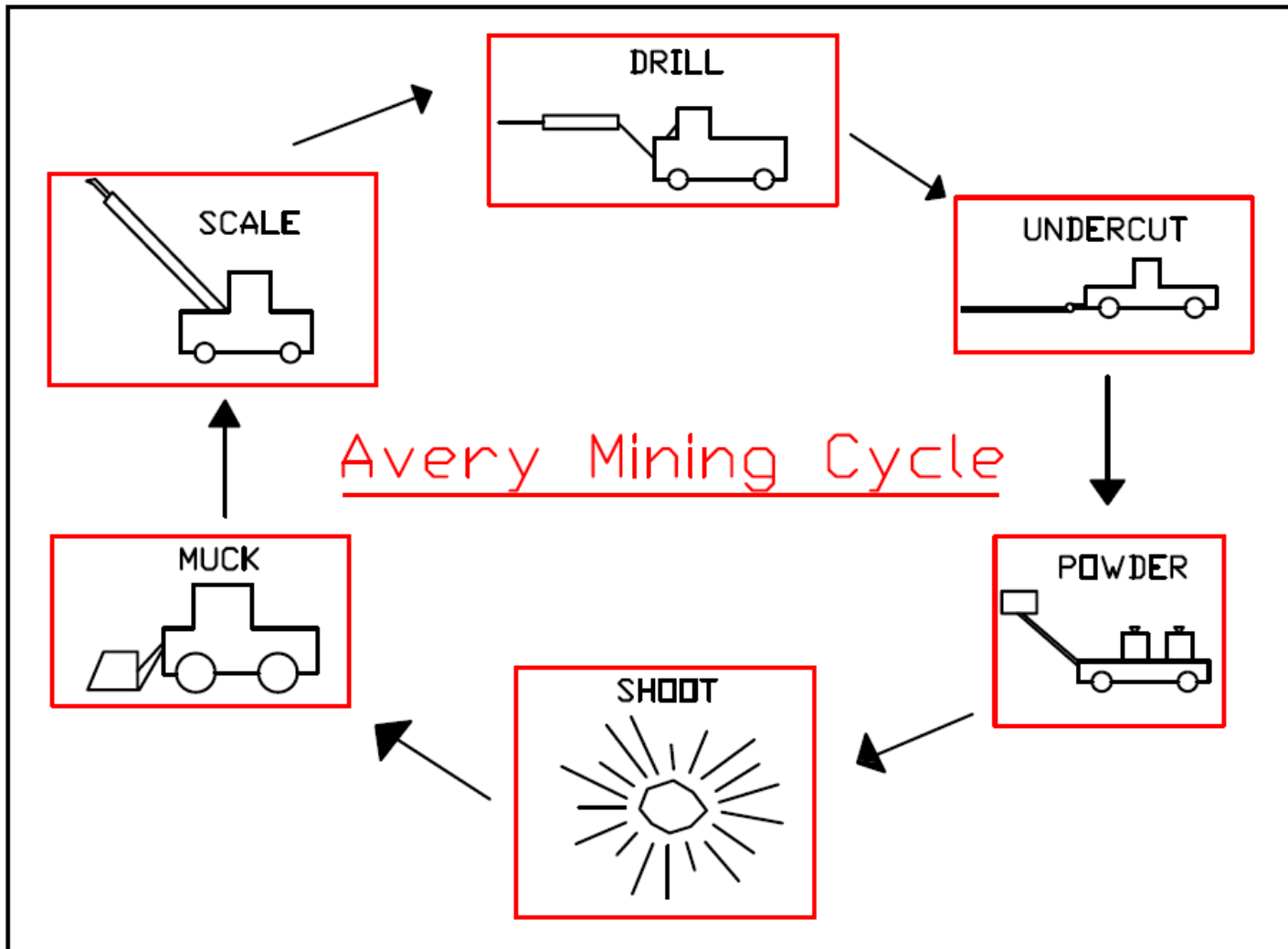
Avery Mine Production



Underground Life



The Mining Cycle



Shot Face



Loader at Work



Dumping into Crusher



Conveyor Belt Transfer



Scaler



Face Drill



Face Drilled



ANFO Powder Rig



Loading Holes



Setting Caps



Blasting Picture



Production Hoist



Production shaft 1300' deep

19.5 ton capacity skips

(2) 600 hp DC electric motors

“Laker” loading in Cleveland



Barges up the Mississippi



Challenges

Mission:

Protect lives & enhance commerce by providing sustainable road safety solutions.



Liquids – Salt Brine

- 2.28 lbs of salt to make one gallon of salt brine at 23.3% concentration
- Stop the binding of the snow & ice to the road surface
- *Does Cargill Deicing do that?*



Pre-Wetting Salt “at the spinner”

Anti-Icing the road before the storm



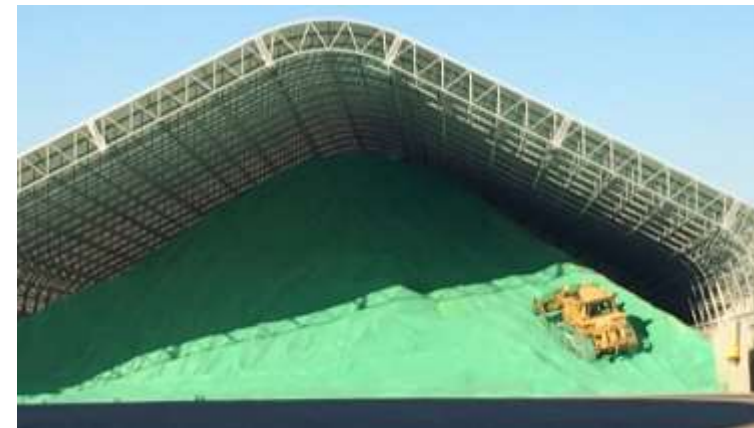
Treated Road Salt

- Excellent alternative for those customers who have not gotten into a complete liquids program.
- Superior solution to customers who have been making their own treated salt in the past.
- *Does Cargill Deicing do that?*

\$10-15k per truck to outfit with pre-wetting tanks and accessories

Also customers who have only partially upgraded their fleet to liquids are purchasing treated road salt for the older trucks.

Liquids are not for everyone's toolkit. Some customers like the idea of purchasing a superior product delivered ready to go...

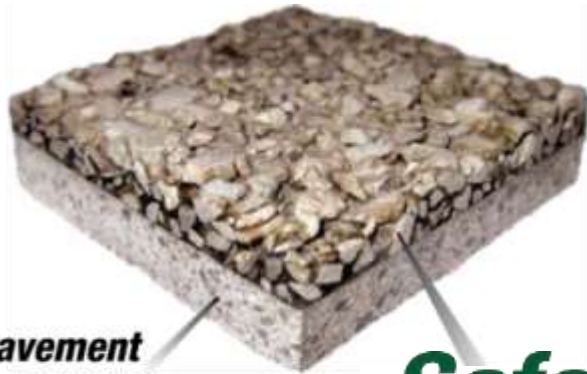


More than just Salt

- Progressive customers are always looking for new tools for their winter maintenance toolkit.
- Products that help prevent snowpack in “trouble spots” are becoming more popular.
- *Does Cargill Deicing do that?*

Surface overlays for bridge decks, sharp turns, dangerous intersections that help prevent snowpack.

Asphalt pavement additives that create a salt brine automatically to help prevent snowpack.



**Pavement
Substrate**

SafeLane[®]
surface overlay



Roger Wilson
Western Territory Manager
Cargill Salt Group