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# MSHA/NIOSH Diesel Partnership

Diesel Technology Workshop January 23, 2019

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Discovering what's possible with calcium

# Who is Mississippi Lime?

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- Mississippi Lime Company (MLC) is one of the most diversified producers of lime and calcium-based products in North America serving customers coast-to-coast and internationally in a variety of markets.
- As a privately held company, Mississippi Lime has been producing products from one of the richest limestone reserves in the world for over 100 years.
- Along with our Core Values, our culture is focused on safety.



# MLC Markets

- Calcium has played an integral part of everyday life for centuries.
- Today, lime products serve as essential industrial chemicals in a broad range of industries including steel, flue gas treatment, water treatment, paper, chemical manufacturing, construction, food, glass, fiberglass paints, coatings, plastics, & agriculture.
- An average person uses approximately 5 oz. of lime daily.



# MLC Mining Operations

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- MLC owns and operates a limestone mine in Ste. Genevieve, MO.
- The current footprint is nearly 1,900 acres.
- The floor to ceiling height where we operate is ~90 feet.
- Safety is a top priority!
- Our miners have been recognized with the Sentinels of Safety Award five times since 1980.



# MLC Mining Operations (continued)

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- We operate diesel equipment from 30+ different manufacturers with various degrees of tiered engines.
- Our mine ventilation plan is utilized to direct over 1,000,000 cubic-feet-per-minute of fresh air from over 60 ventilation shafts.
- Air quality is monitored with both hand-held gas monitors and periodic industrial hygiene sampling for Diesel Particulate Matter, dust, and other gases.



# DEMS Study

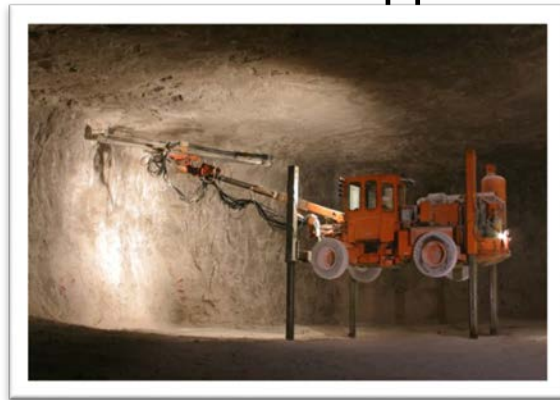
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- MLC voluntarily participated in a Diesel Exhaust in Miners Study (DEMS) conducted by NIOSH between 1995 and 2001.
- Overall, the study included information on 12,000+ people in eight non-metal mining facilities.
- MLC provided information on approximately 2,000 current and prior employees who worked in our mine between 1947 and 1997.
- General results were released to the public in March 2012 via Internet posting.

# What has Changed?

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- Diesel equipment was first introduced at MLC in 1947. Much has changed in the industry since then.
  - New regulations
  - New technologies
  - Diesel engines run more efficiently
- In 2008, a new crushing and screening plant was built in our mine.
  - Includes miles of electrically powered conveyors that reduced the size of our diesel powered haul truck fleet.
- Bio-diesel blends have been used for over 10 years which reduce elemental carbon emissions.
- A vast majority of our miners now work in climate controlled cabs.
- Our mine has increased use of water to suppress dust on roads
- More of our equipment has dust suppression systems.



# Barriers to Deployment of Technology

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- The rate of equipment replacement with life cycles of up to 10 years and the higher cost of tier IV engines.
- The number of different technologies between tiers of engines and equipment manufacturers and the challenge to maintain them.
- The high cost of specialized DPM filters and the time required for changing.
- The use of multiple fuels sources for different tiered engines – biodiesel on earlier tiers versus straight diesel on tier IV.
- The design of equipment versus application – how to regenerate a pick-up that never goes over 25 MPH and dealing with idle time of trucks.





# Progress Continues

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- Tier IV engine technology has evolved and reliability has improved.
- Approximately 10% of our mining equipment is now tier IV.
- Trialing network controls on ventilation system to optimize the flow of fresh air.
- Increased use and capability of machines to minimize miner exposure.

