



NDSU NORTH DAKOTA
STATE UNIVERSITY

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Soy Based Dust Control Agent

Update on scale up and field trials

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Overview

- Brief History of the Development
- Field Testing 2020
- Expanded Markets
- Manufacturing and Distribution
- Future Plans for RAP Treatments

Development at NDSU

6 years in the making..

Scale Up to 50+ Totes

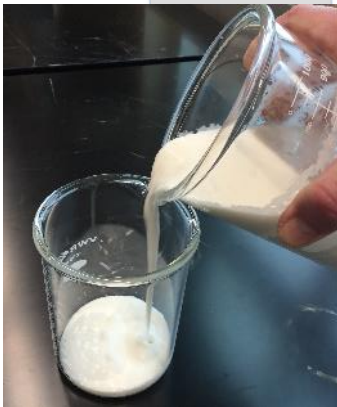
Field Trial



20 More Field Trials



Lab Work



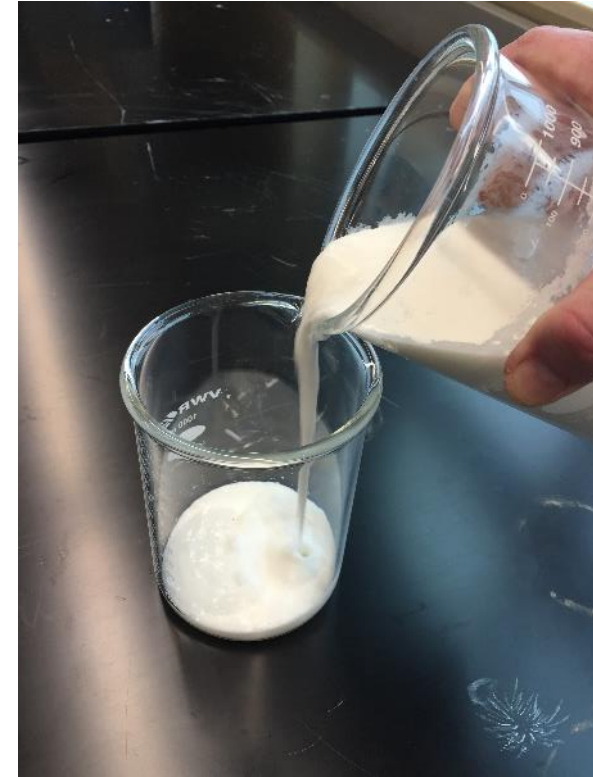
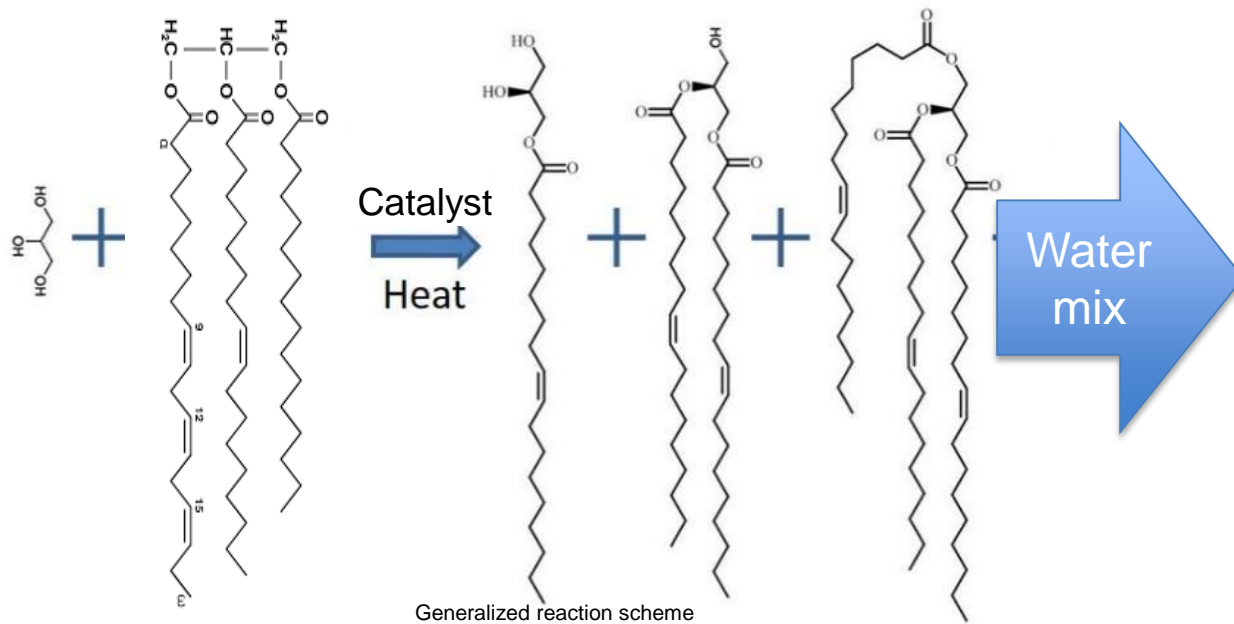
Adjustments



**Commercialization
2021**



Material Description



Glycerol + Soybean Oil \rightarrow Mono, Di and Triglycerides

Water Based Emulsion

Goal: Create new uses for Ag-Based products while offering an alternative to chlorides for dust control

Scale Up in 2020

Produced 55+ Totes at ADM in Decatur IL.



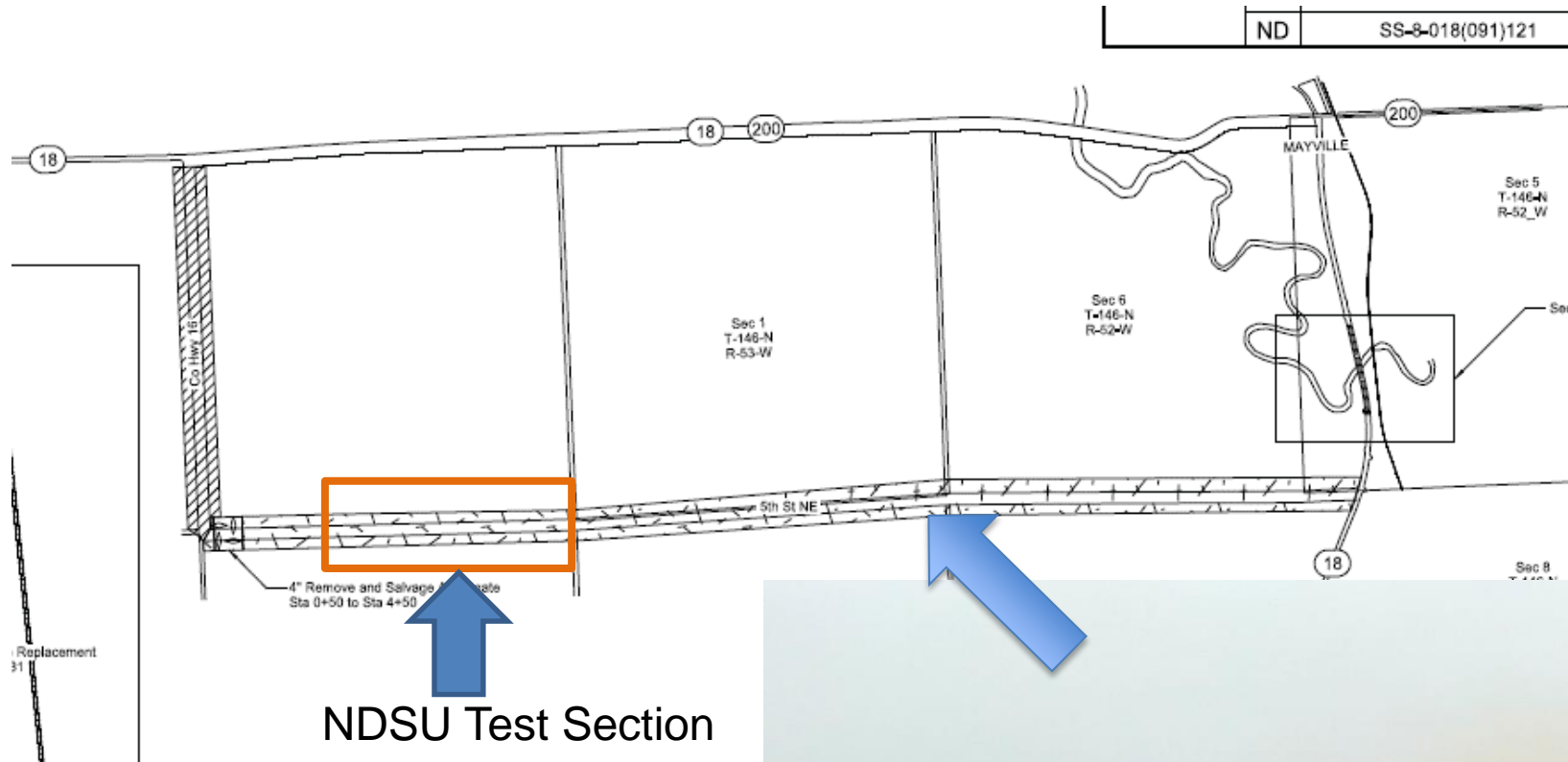
2020 Test Sites

Road Test Sites							
Test #	Date	Road Test Location	Site Description	Applicator	Rate	Dilution	Length
1	19-May	Sioux City, IA	Hard surface with chloride residue	Marx Dist.	0.4 gal/yd ²	3 to 1	1,000 ft
2	12-Jun	Mayville, ND	New gravel construction	Glacier	0.2 - 0.6 gal/yd ²	7 to 1	3,300 ft
3	15-Jun	Woodbury County, IA	Park road	Marx Dist.	0.4 gal/yd ²	7 to 1	600 ft
4	15-Jun	Woodbury County, IA	County road	Marx Dist.	0.4 gal/yd ²	7 to 1	600 ft
5	24-Jun	Jamestown, ND	Township road	Allied Ag	0.4 gal/yd ²	7 to 1	1,300 ft
6	13-Jul	Jamestown, ND	Township road	Allied Ag	0.4 gal/yd ²	7 to 1	600 ft
7	16-Jul	Sioux City, IA	Adjacent to lignin and chloride	Marx Dist.	0.4 gal/yd ²	7 to 1	1,000 ft
8	2-Sep	Walsh County, ND	Township road	Property owner	0.35 gal/yd ²	3 to 1	625 ft
9	15-Sep	Mayville, ND	New gravel construction	Jim Bahr	0.6 - 0.8 gal/yd ²	3 to 1	50 ft
10	29-Sep	Woodbury County, IA	Some residual chloride	Marx Dist.	0.4 gal/yd ²	3 to 1	1,200 ft
11	30-Sep	Kittson County, MN	Township road	Property owner	0.34 gal/yd ²	3 to 1	750 ft
12	6-Oct	Jamestown, ND	Township road	Allied Ag	0.45 gal/yd ²	3 to 1	1,200 ft
Non Road Sites							
1	25-Sep	Limestone quarry, Wichita, KS	Weigh Station -	Summit Materials	.30 gal/yd ²	3 to 1	2 x 600'
2	25-Aug	Riding arena, Arizona	2-3 inches of mason sand	Performance Footing		3 to 1	5 gal
3	5-Aug	Eldorado Mine Quebec	Underground Mine Shaft	Interlube	.15 gal/yd ²	3 to 1	
4	7-Nov	Fertilizer plant, Beulah, ND	Urea production	DGC	1LBper/1000 ton	3 to 1	1800 gal
5	30-Sep	Minto, ND	Parking Lot/Road to Fert. Plant	Minto Ag	.15 gal/yd ²	3 to 1	N/A
6	TBD	Minto, ND	Parking Lot/Road to Fert. Plant	Minto Ag	.75 gal/yd ³	3 to 1	1000 ft
7	7-Nov	Goldex Mine Quebec	Underground Mine Shaft	Interlube		3 to 1	

2020 Test Sites



Mayville Detour Test Site



Mayville Test Site *cont.*

Plan for the Mayville Test Site Dust Control Test

Make 3 passes at the rate of 0.2 gal/yd²

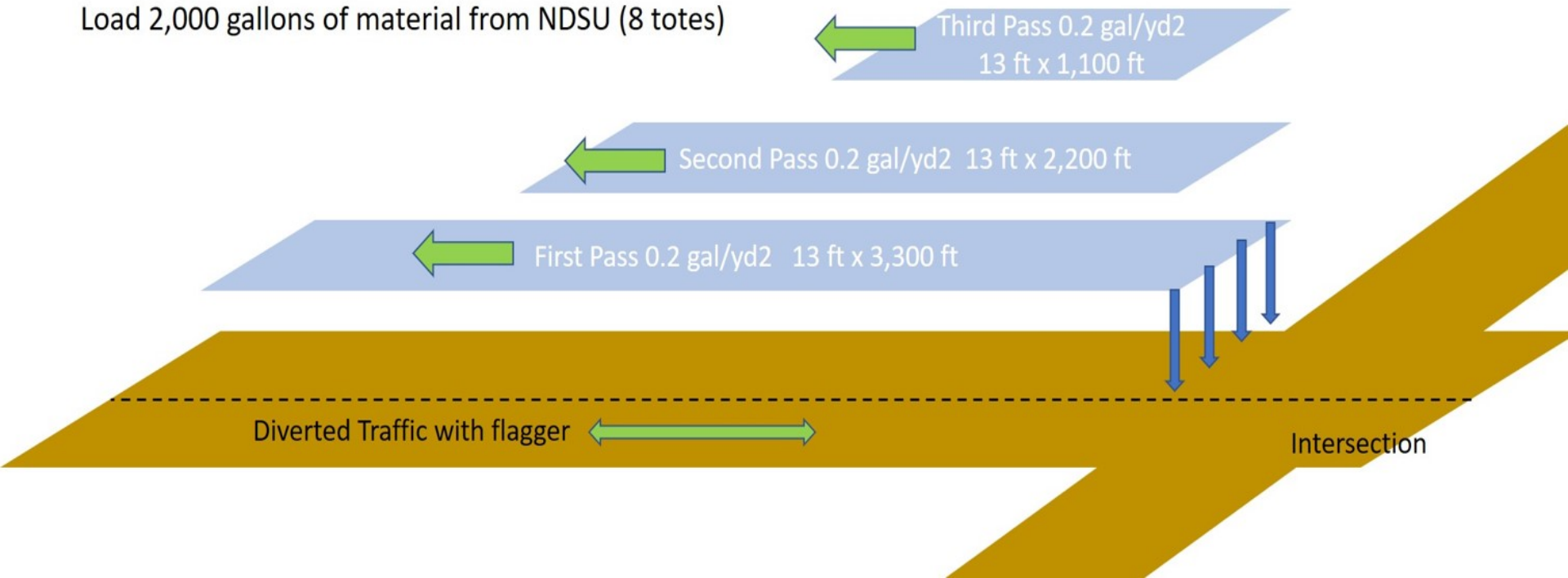
Each pass partially overlaps the previous section resulting in 3 levels of application rate.

One lane will be applied at a time with traffic diverted.

This process will then be repeated for the East bound lane.

Preload your tanker with 2,000 gallons of water

Load 2,000 gallons of material from NDSU (8 totes)



Mayville Test Site *cont.*

First Pass



Overlapping Treatments



Final Sprayout



Mayville Test Site *cont.*

Problems with this site

Day 1- Application day seemed to go well and according to plan.

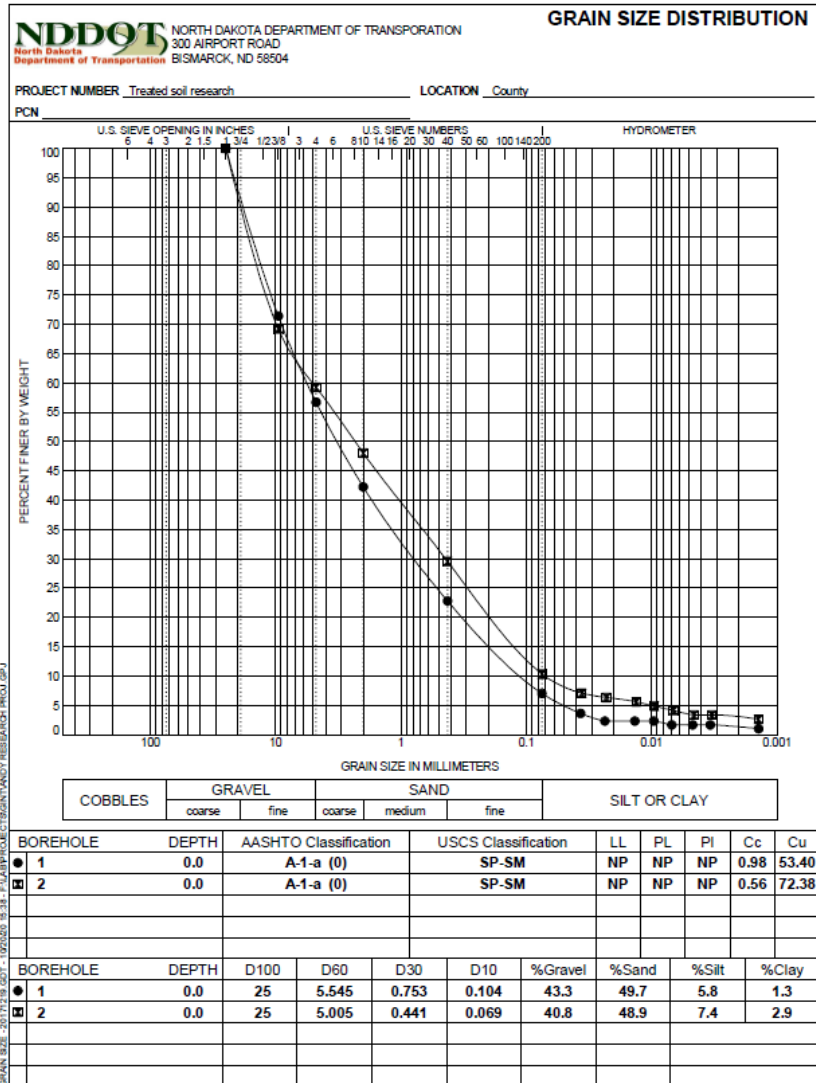
Day 2- The applicator found a significant amount of material as a stiff foam still in the tanker that did not get applied to the road.

Day 4- Road dust levels were already rising.

We believe that when the bulk material was diluted, a separation occurred resulting in a foam that could not be sprayed.

This meant that the material we applied on Day 1 was too thin and mostly water resulting in the short term dust control.

Mayville Test Site *cont.*



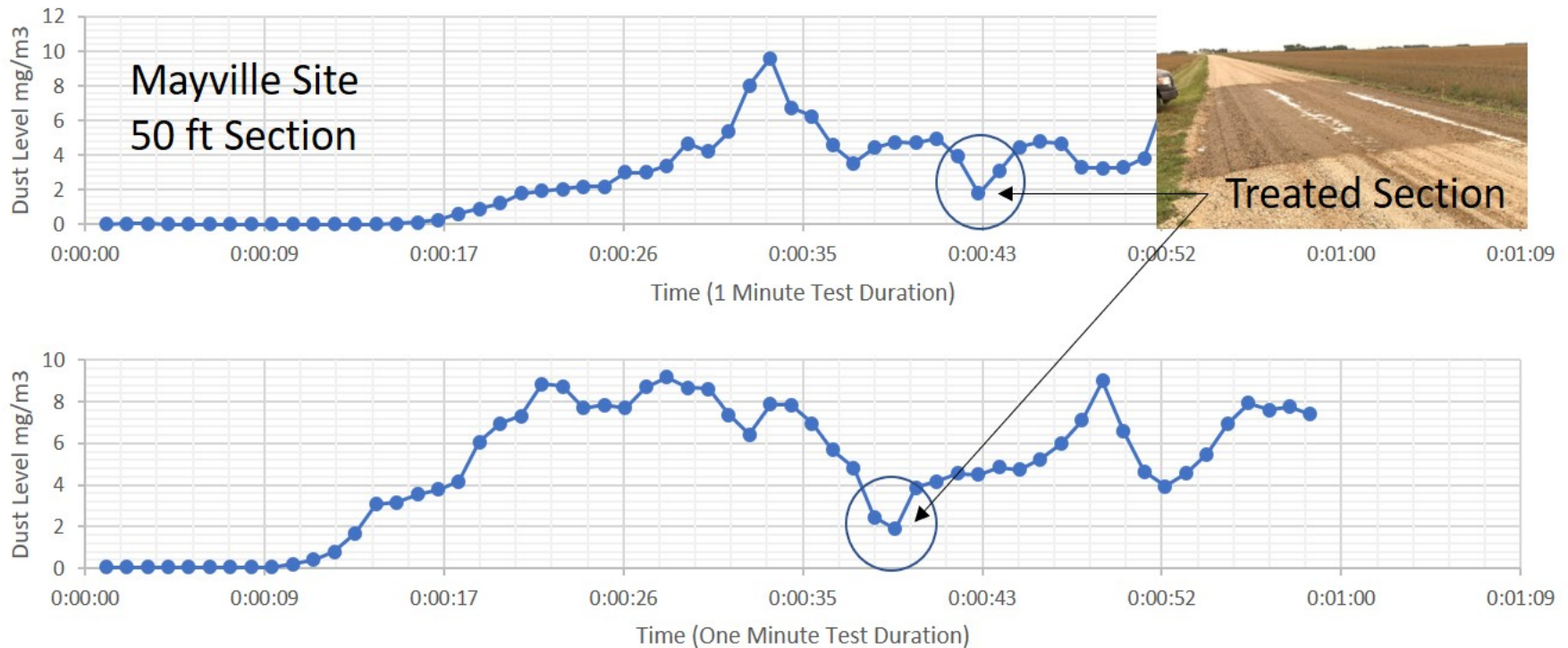
Samples of treated and untreated gravel where analyzed for grain size distribution.

The results indicated a reduction in fines for the treated gravel.

The product appears to be consolidating the fine clay and silt particles.

Mayville Test Site *cont.*

Vehicle Mounted Dust Meter Data



Pisek, ND Township Road



September 2nd



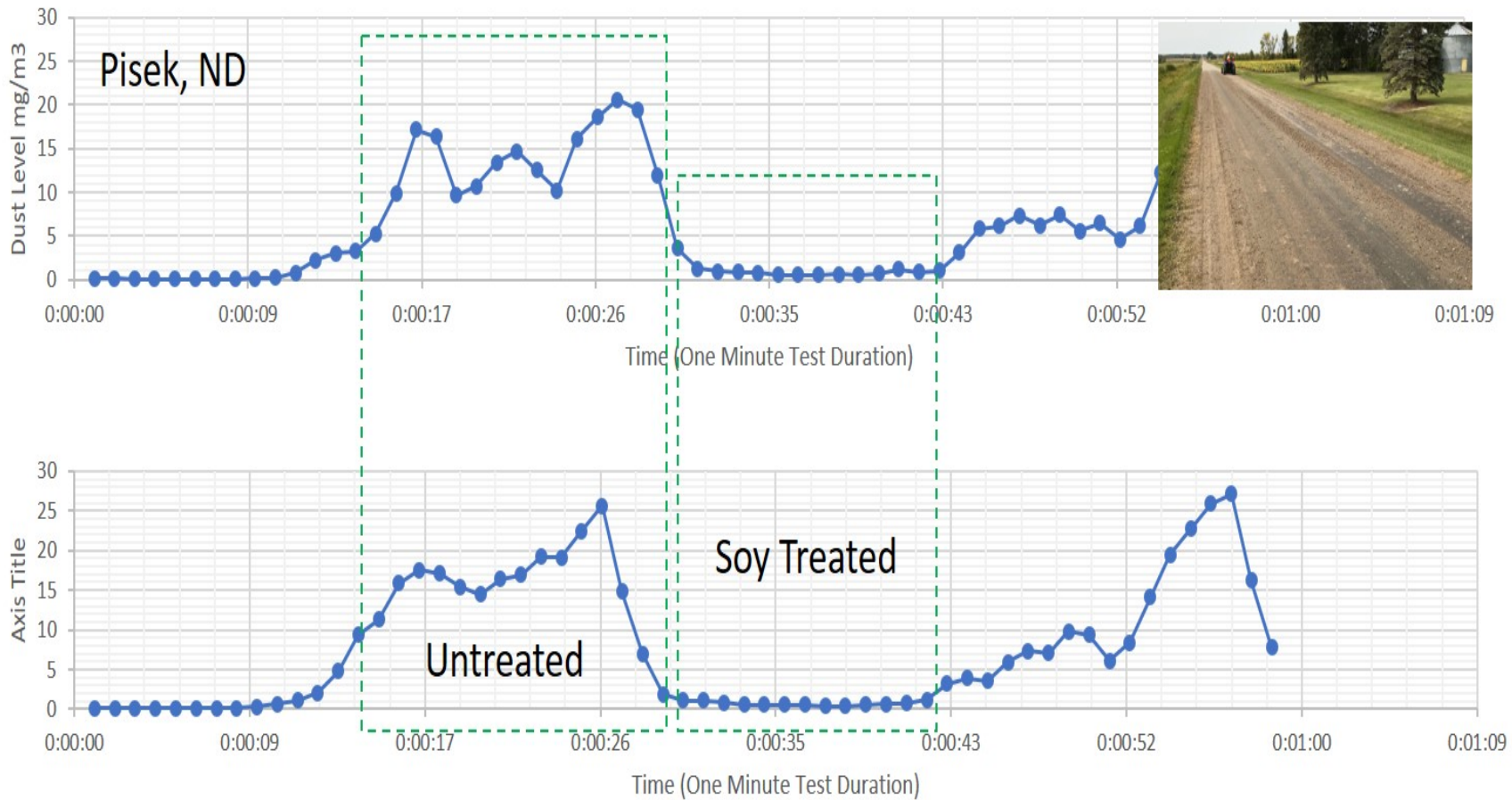
2 weeks later



Firmed up road base

Pisek, ND Test Site

Significant Dust Reduction



Field Testing Summary

Each of the 20 test sites was an opportunity to learn and try new methods.

Many test sites were successful, but not all.

Adjustments were made to the formula to prevent foaming and separation.

The new formula has 4 times the oil content for better dust control.

More tests are planned for next month in Texas and California.

Expanded Markets

Beyond Roads

- Gravel quarries and mining operations
- Fertilizer plants
- Grain elevators and other Ag facilities
- Horse riding arenas
- Dog parks
- National parks and protected areas
- Almond orchards
- Driveways
- Trucking lots
- Cement recycling

Manufacturing and Distribution

BioBlend Renewables is working with several manufacturers now.

The product will be sold this spring as **EPIC-EL** dust suppressant.

They are working with regional distributors and blenders to make the material available to counties, townships and property owners in various packaging options (pails, totes, tanker).



RAP Rejuvenation



Past RAP Research

RAP Binder Extraction



Our lab results showed that when treating RAP with 10% soy/asphalt binder, the cold temperature properties can be restored while increasing the compressive strength.

Compression Testing of Rejuvenated RAP



Future RAP Trials

How can we make more use of RAP?



**Utilize soy treated RAP for
shoulder construction
Instead of gravel**



**Base Stabilization
Temporary Roads
Driveways**



Contact Information

Questions or Sales Inquiries

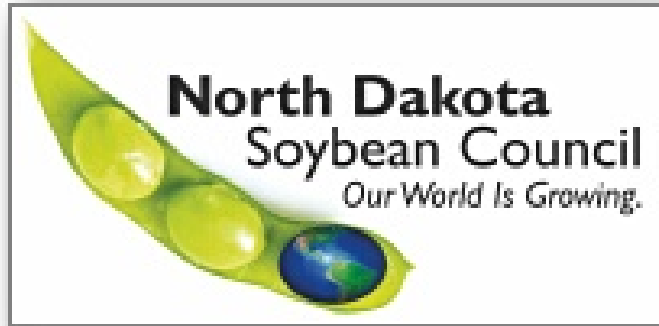
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Acknowledgements

Thank You for Your Financial Support!



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