

Investigation of methodologies to control dust on county roads in western North Dakota

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Funding Sources

50 % from Dunn and Mckenzie Counties

**50 % from the Oil and Gas Research Program
through the ND Industrial Commission**

What the Counties Want

The “Silver Bullet” Counties are looking for to control dust should:

- 1. Be easy to handle and apply**
- 2. Provide control for a year**
- 3. Allow the road to be maintained**
- 4. Be cost effective – preferably inexpensive**
- 5. Safe for traffic and the environment**

Control Products

Water

Magnesium chloride

Calcium chloride

Soil stabilizers

Synthetic polymers

Enzymes

Petroleum emulsions

Control Products

Bio – based oils

Lignin sulfonate

Tall oil pitch

Oilfield brine

Crude oil

Aggregate modification

Products Applied

Magnesium Chloride

Calcium Chloride

Durablend – calcium chloride with polymers

WISP – synthetic organic oil

Rhino Snot – acrylic copolymer

Products Applied

Coherex – petroleum emulsion

Durabond – lignin with additives

Oil field brine

Native clay

Crude oil

Products we didn't try

Products the Counties had prior experience with

Road stabilization products

Very expensive products

Difficult to use

Site Conditions

- **Mckenzie County road received very heavy truck traffic immediately after the application of the control products as two gravel pits are located on this route**
- **Dunn County road did not experience the same volume of truck traffic; however, there was still a fair amount of oilfield related traffic on this route**

Preliminary Results

MAGNESIUM CHLORIDE

- **Most widely used product**
- **Reduced the amount of dust but the dry conditions this summer reduced its effectiveness**

Preliminary Results

CALCIUM CHLORIDE

- **Similar to Magnesium Chloride, it reduced the amount of dust but was affected by the dry conditions**
- **More expensive than Magnesium Chloride**

Preliminary Results

DURABLEND – Calcium Chloride with polymers

- **No discernible difference from the straight Calcium chloride**
- **Road surface did seem a little “tighter”**

Preliminary Results

WISP - A synthetic organic oil

- **Provided slight dust control for a very short period of time**

Preliminary Results

- **Rhino Snot - An acrylic copolymer**
- **A road stabilizer that increased the hardness of the road but provided a limited amount of dust control**
- **There was increased rutting in the road until the product “set”**

Preliminary Results

- **COHEREX - A petroleum emulsion**
- **Provided a veneer to the surface of the road that controlled dust until the veneer started breaking up due to traffic**
- **Some surface breaks to the veneer were apparent within a day**

Preliminary Results

- **DURABOND - Lignin with additives**
- **Provides a veneer to the surface of the road**
- **Experienced an application failure in Dunn County when the product reacted with the dilution water**
- **Veneer lasted only a couple days in Mckenzie County**

Preliminary Results

- **OIL FIELD BRINE – Water produced from an oil well in Dunn County**
- **Product was free except for delivery and application costs**
- **Consisted of 20% salt - primarily sodium chloride**
- **Provided dust control similar to other chloride products**

Preliminary Results

- **CRUDE OIL - Unprocessed crude oil with a pour point of about 70 degrees**
- **This product did not provide significant dust control**

Preliminary Results

- **NATIVE CLAY**
- **Used to increase the Plasticity Index (PI) of the Mckenzie County aggregate.**
- **Improved the overall road stability and improved dust control especially when treated with magnesium chloride**

Preliminary Recommendations

Counties should include gradation and P.I. specifications when bidding aggregate

Scoria should be used only on low traffic volume roads such as drilling pads and site access roads

To be effective, dust control products need to penetrate the road surface or be mixed in

Preliminary Recommendations

- **Several applications of the chlorides may be needed to provide satisfactory dust control**
- **Chloride application frequency can be reduced after three to four applications**
- **Effectiveness is affected by the volume and types of traffic as well as weather conditions**