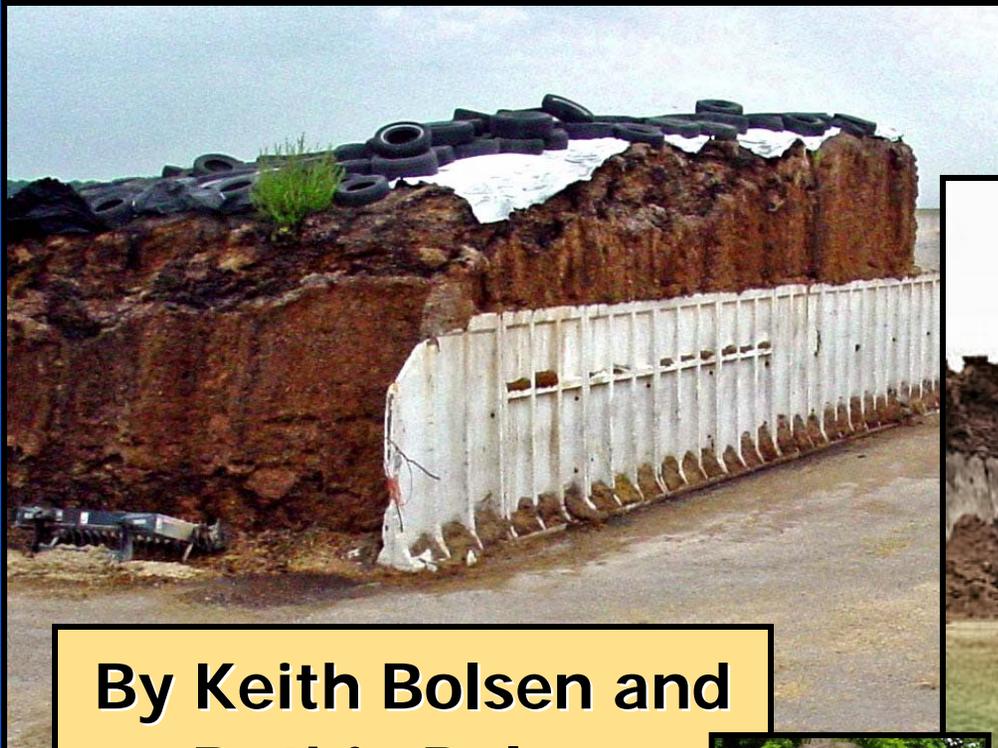


20 Worst Bunker/Pile Silos We've Seen and How to Avoid Them



**By Keith Bolsen and
Ruthie Bolsen**



**Dairy Forage Tool Box
World Dairy Expo
October 3, 2007**



K-State Silage Web site

http://www.oznet.ksu.edu/pr_silage

K-State Silage Team Members

1972-2007 MS & PhD Graduates under Keith Bolsen

Recent Articles and Presentations by the KSU Silage Team



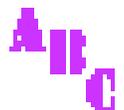
Silage Team



Silage Team Alumni



Publications



Silage Basics



Silage-L



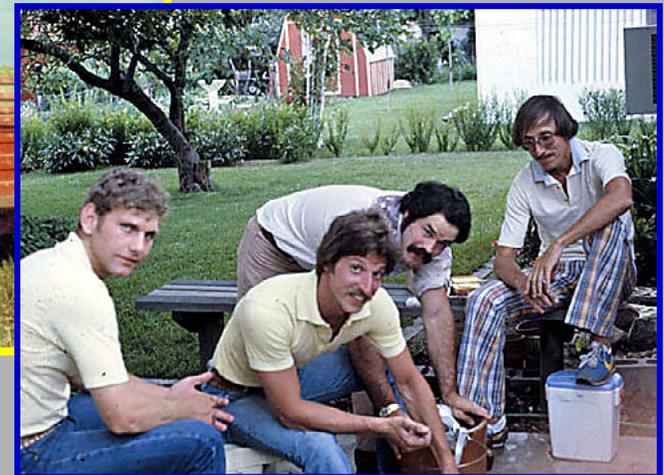
Links

Basic Principles of Silage

Instructions to join the listserv Silage-L and links to the archives

Links to other university and commercial forage Web sites

Keith's career at K-State: 1971 to 2003





How do I tell the owner his bunker is a disaster?

**The K-State Silage Team made four of the
'WORST' Bunker/Pile Silages in my 32 Years
of Silage Research!!**



KSU 'mini' bunker silos; October 1989

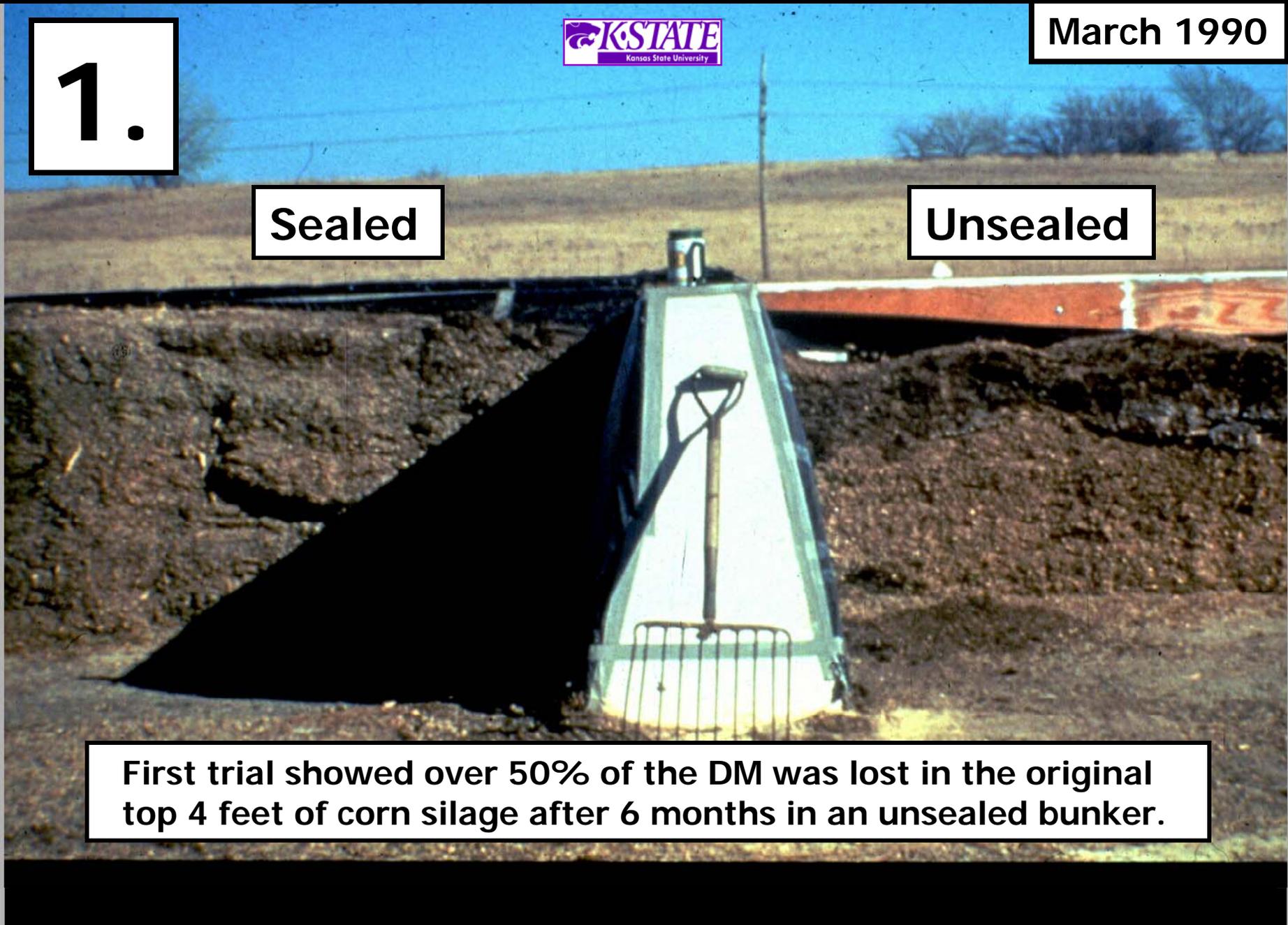


1.

Sealed

Unsealed

First trial showed over 50% of the DM was lost in the original top 4 feet of corn silage after 6 months in an unsealed bunker.



2.



March 1991

Unsealed



A second trial also showed over 50% of the DM was lost in the original top 4 feet of corn silage after 6 months in an unsealed bunker.

3.

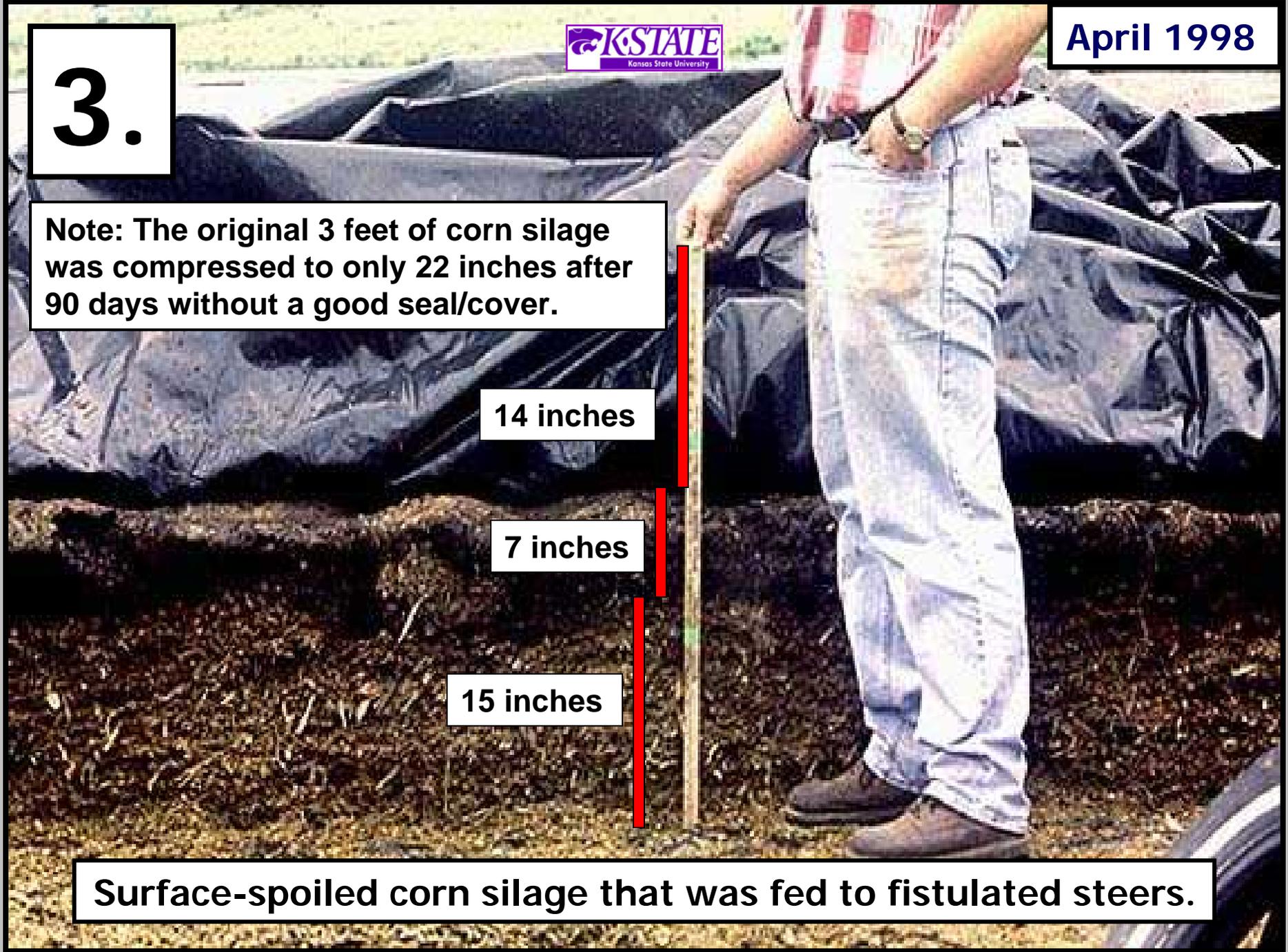
Note: The original 3 feet of corn silage was compressed to only 22 inches after 90 days without a good seal/cover.

14 inches

7 inches

15 inches

Surface-spoiled corn silage that was fed to fistulated steers.



"Bale bunkers" in Kansas in the 1990s.



4.



October 1992



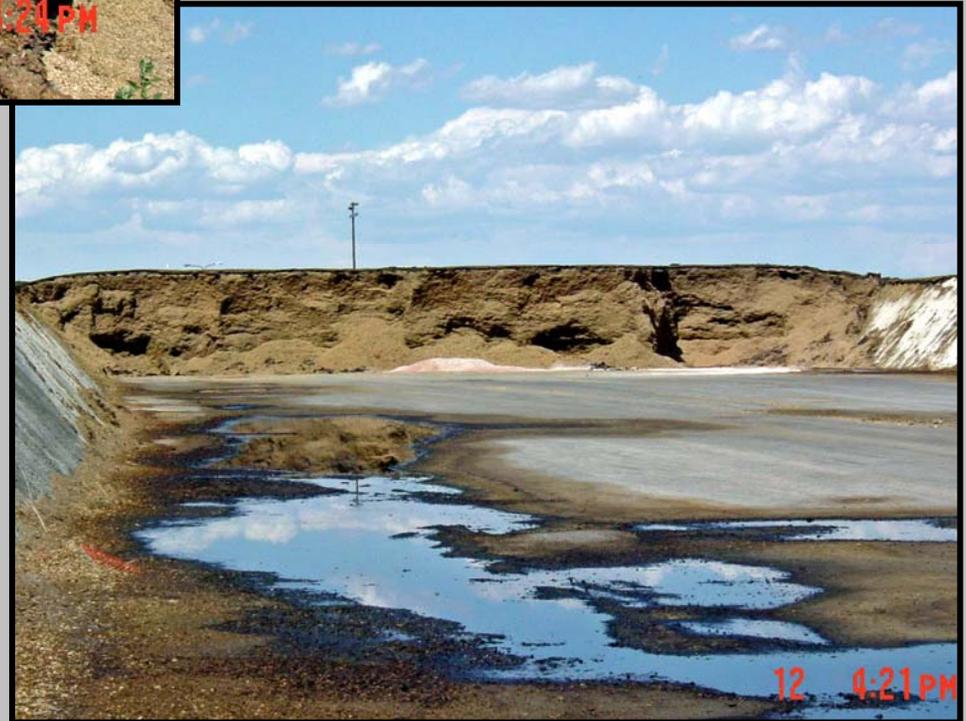
K-State trial showed that bale bunkers are total disasters, and they result in a high "shrink loss".

5.

**July 2006
Colorado feedlot**

**This bunker silo went from
a disaster to a very well
managed silage in 1 year.**

A fantastic achievement!!

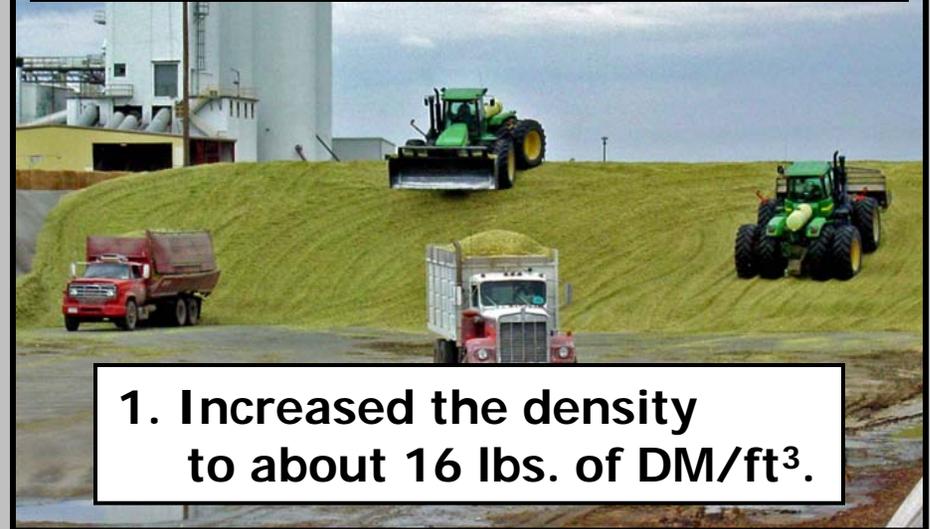


Colorado feedlot

July 2006

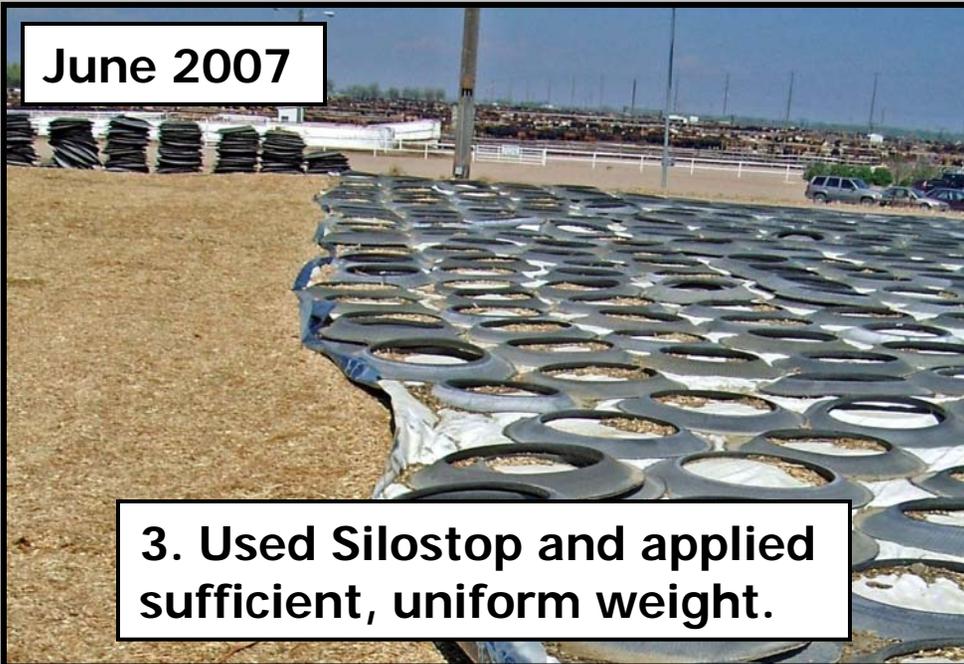


3-step solution in September 2006



1. Increased the density to about 16 lbs. of DM/ft³.

June 2007



3. Used Silostop and applied sufficient, uniform weight.



2. Prepared the proper surface to seal.

6.

Over-filled bunker silo in TX

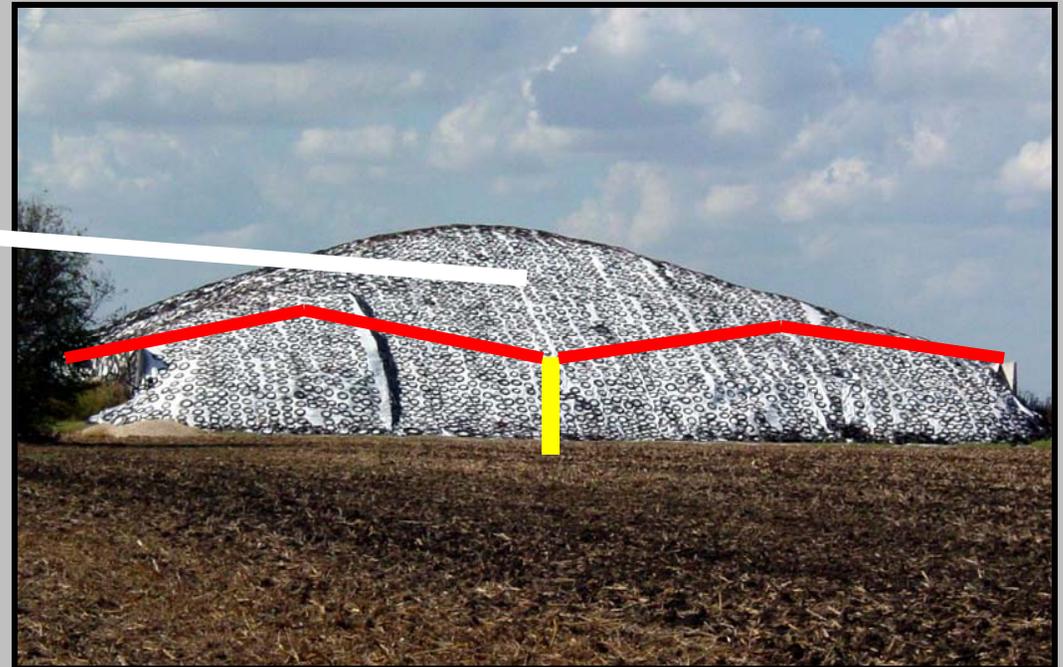
August 2005



6.

Solution?

- 1. Put a wall down the middle.**
- 2. Do NOT over-fill the two bunkers!**
- 3. Put all the tons/acres of forage that would have been above the red lines in a well managed drive-over pile!!**



7.

Near Leon, Mexico

August 2003

**A classic
“swimming pool”
bunker silo!**



7.

Solution?

**Put a roof over
the bunkers!**



8.

Feedlot in IA

Another over-filled bunker silo.



8.

Solution?

- 1. Fill the existing bunker silo correctly.**
- 2. Put all the tons/acres of forage that would have been above the red lines in a well managed drive-over pile!**



9.

Dairy in OH



The many problems encountered in this bunker silo do NOT have easy, simple SOLUTIONS!



10.

Dairy in FL



A wet, long chop length, low density, high acetic acid content whole-plant corn silage with a very high shrink loss and low DM intake potential!



11.



Dairy in PA

“Don’t let the other drivers do this”!!



Solution? Put sight rails on the top of the walls and do NOT fill above the walls.

12.

Dairy in MN

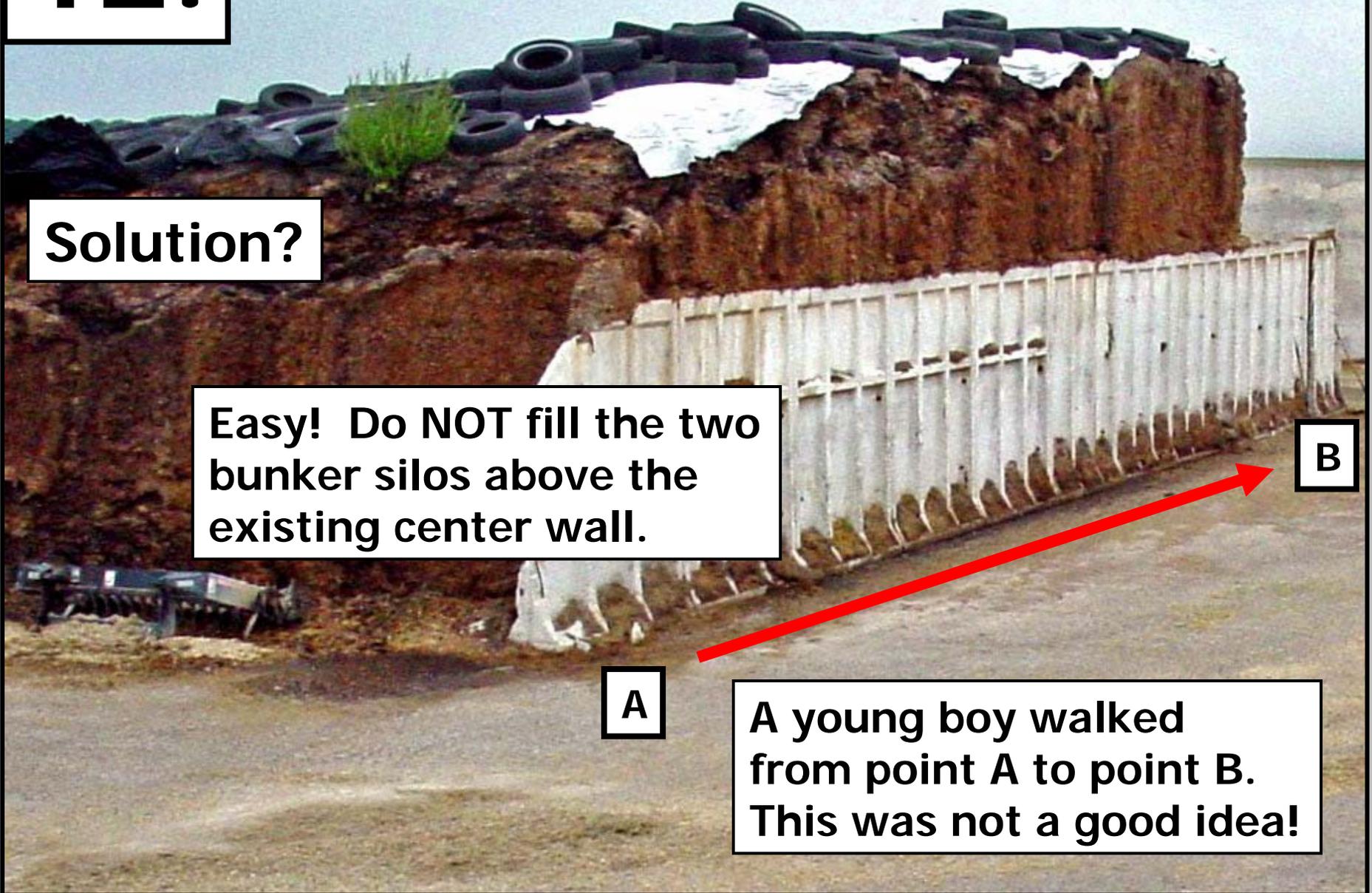
Solution?

Easy! Do NOT fill the two bunker silos above the existing center wall.

A

A young boy walked from point A to point B. This was not a good idea!

B



13.

HM Corn



Feedlot in KS

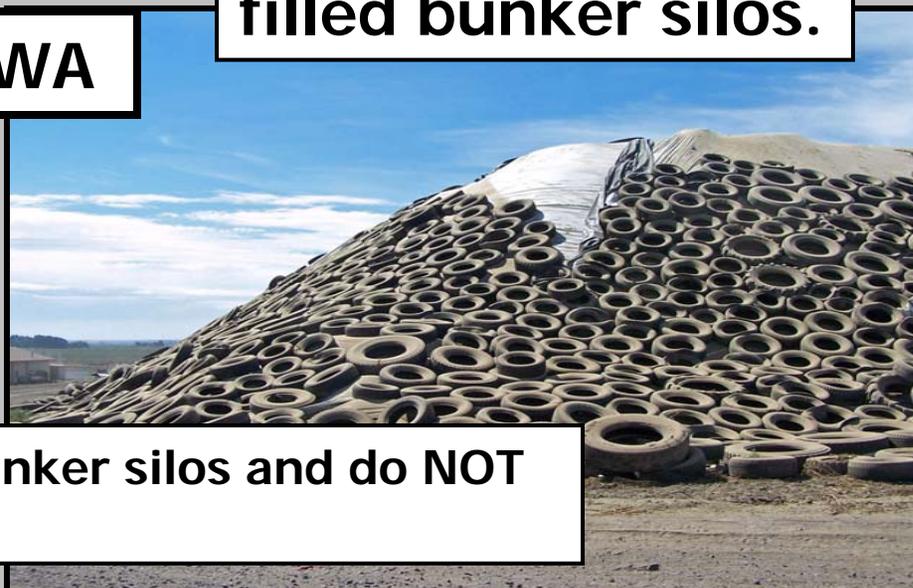


Dangerous, over-filled bunker silos.



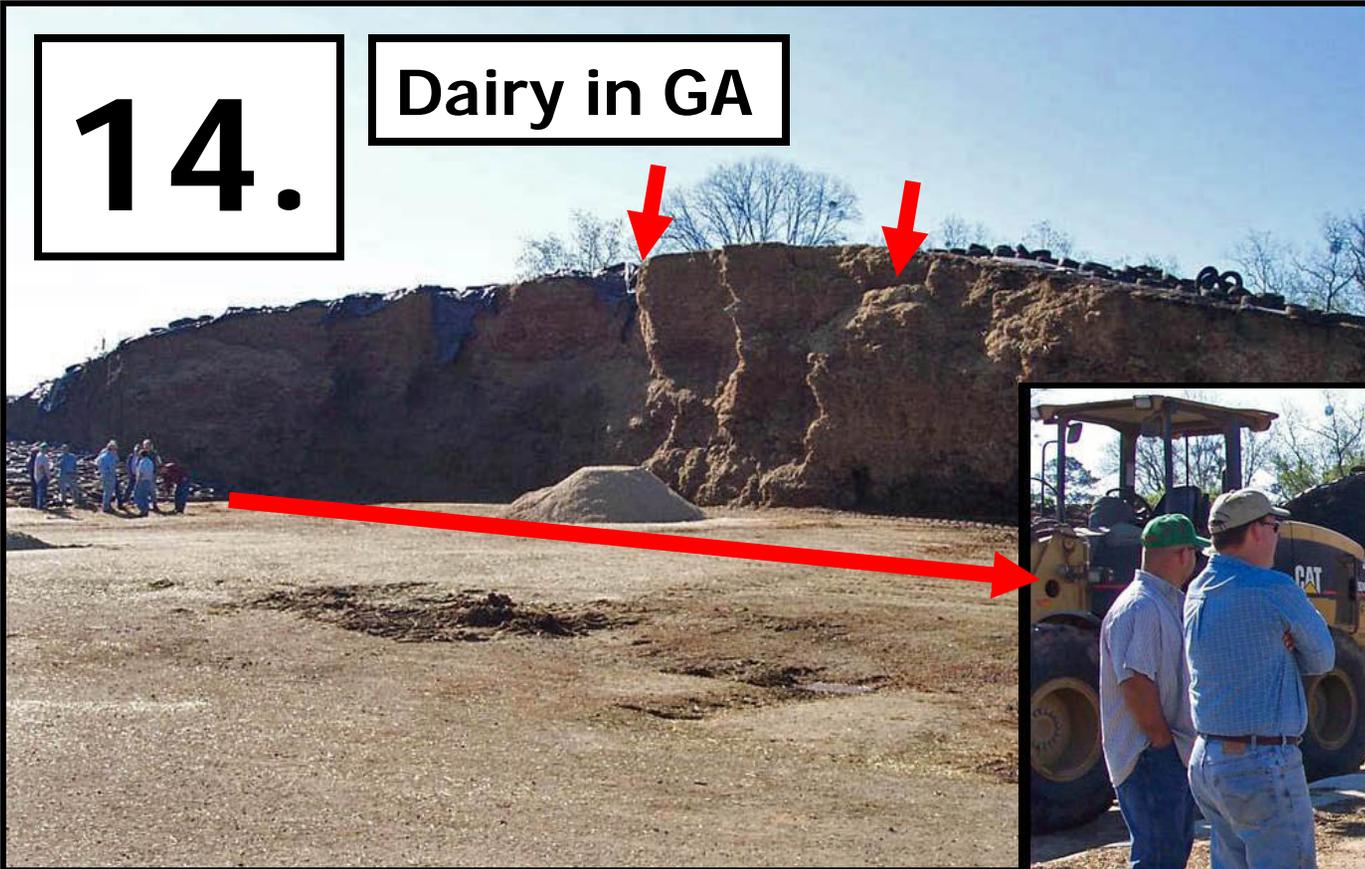
Feedlot in WA

Solution? Add more bunker silos and do NOT over-fill them!



14.

Dairy in GA



“How do your feeders decide which corn silage to load first?”

14.

Dairy in GA

The many problems in this bunker silo do NOT have easy, simple SOLUTIONS!



“How do your feeders decide which corn silage to load first?”

“Keith, I’ll be brutally honest, we just chase the avalanches & loose piles every morning.”

15.

Dairy in ID



This bunker of alfalfa underwent a disastrous clostridial fermentation!

Scales 1-800-235-7019
UNLIMITED INC. HANFORD, ID

15.

1. Do NOT chop alfalfa WET!

2. INOCULATE at the forage harvester!

Solution?

3. Add another PACK tractor!



16.

Feedlot in TX

February 2006

Thousands of tons of whole-plant corn lost as surface spoilage.

Solution? Easy. Seal the bunker silos ... **CORRECTLY!**



17.

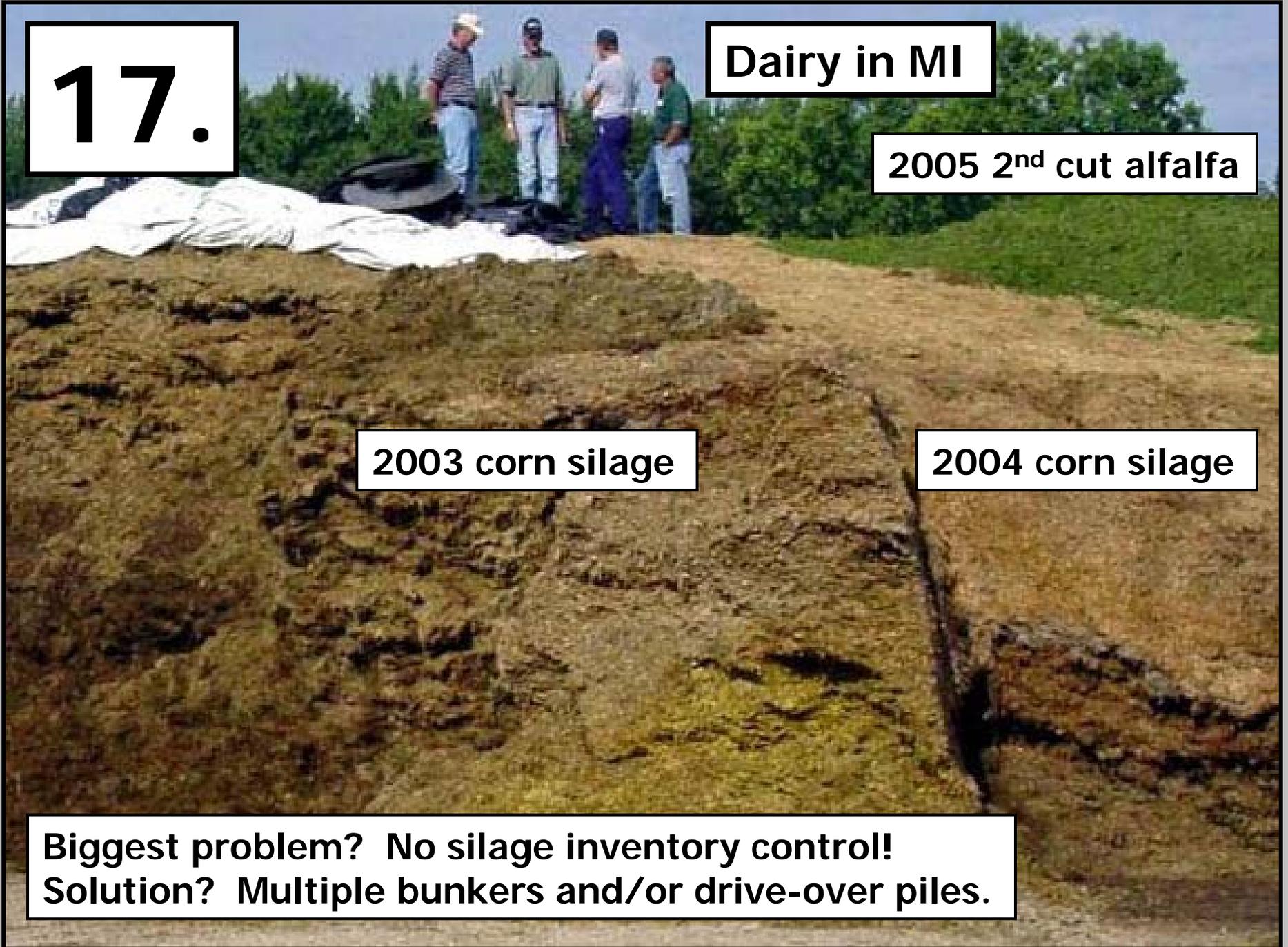
Dairy in MI

2005 2nd cut alfalfa

2003 corn silage

2004 corn silage

**Biggest problem? No silage inventory control!
Solution? Multiple bunkers and/or drive-over piles.**



18.

KS

There are two forage sorghum hybrids with drastically different nutritional values in this beef operation's over-filled, low DM density, poorly sealed bunker silo!



Solution?

- 1. Select hybrids with similar NV.**
- 2. Add an extra pack tractor.**
- 3. Do not fill above the red line.**
- 4. Use better sealing techniques.**

19.

Dairy in NM

Wheat silage

We asked the owner what he expected for a 'shrink loss'. His reply, "the same as last year, which was 8.93%". Our estimate for this pile was 25 to 30% shrink!!

20.

Dairy in CA



Low DM, low density, dangerous pile of corn silage with a very high acetic acid content and a huge amount of surface spoilage!

Solution?

- 1. Fill the existing drive-over pile correctly.**
- 2. Put all the tons/acres that would have been above the red lines in a second well managed drive-over pile!**

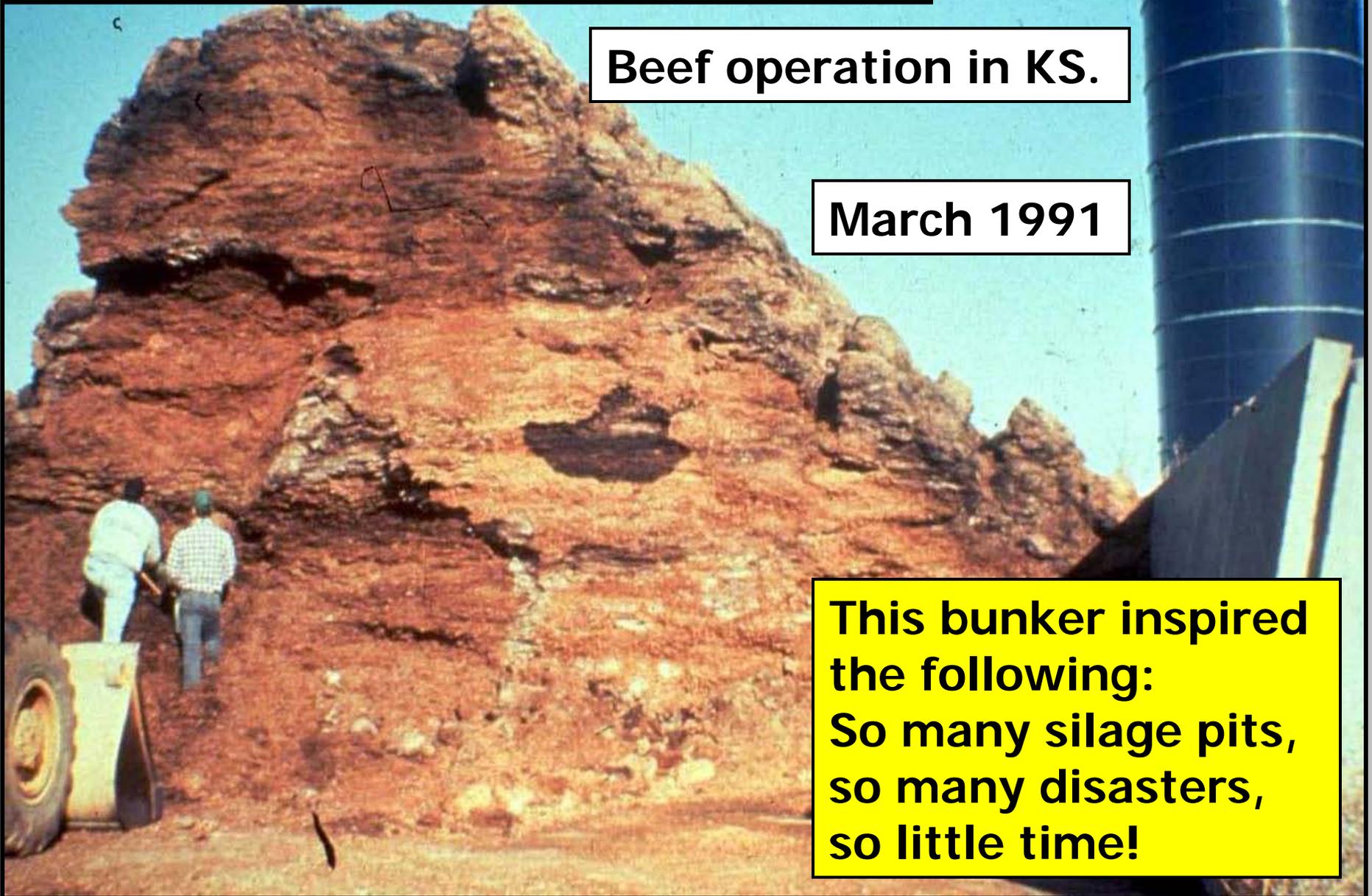


Our 1st most Favorite!!

Beef operation in KS.

March 1991

This bunker inspired
the following:
So many silage pits,
so many disasters,
so little time!



Our 2nd most Favorite!!



Beef operation in KS.

November 2000



Our 2nd most Favorite!!



Beef operation in KS.

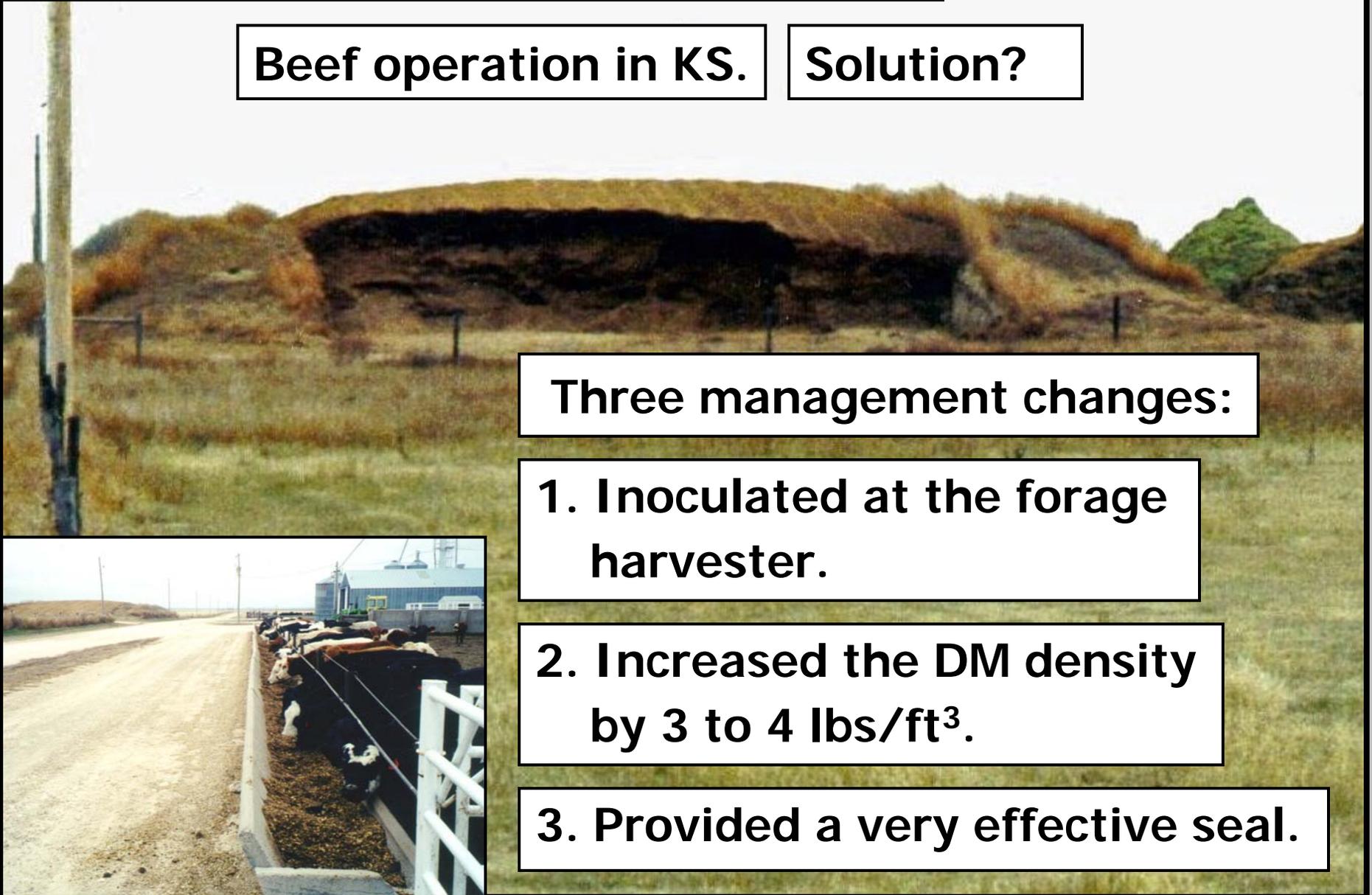
Solution?

Three management changes:

1. Inoculated at the forage harvester.

2. Increased the DM density by 3 to 4 lbs/ft³.

3. Provided a very effective seal.



Our 3rd most Favorite!!

Dairy in ID

August 2000



About 25 to 30 tons of corn silage 'avalanched' less than 2 minutes after this photo was taken!

Our 3rd most Favorite!!

Dairy in ID

August 2000



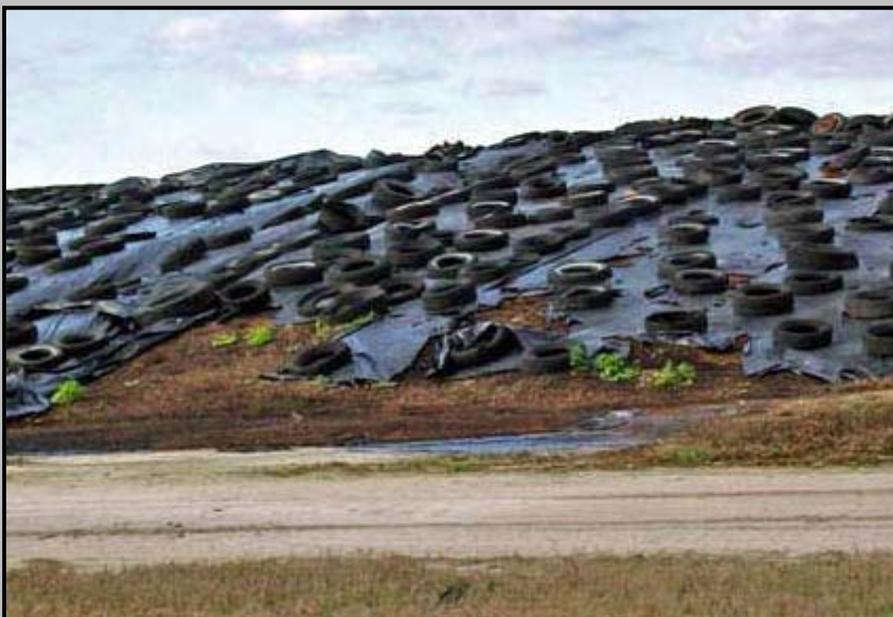
Solution?

Do NOT over-fill the two bunker silos and use proper face management techniques!

Excessive surface-spoiled silage in bunkers and piles is a HUGE problem!



Not all silos are sealed, and not all seals are effective!



Famous Quotes ...

“My neighbors said, ‘Richard, you’re crazy for covering that silage pit’, but I told them I could pay doctors and lawyers to seal my pit and make money.”

**Richard Porter, Farmer and Cattle Feeder
in Reading, Kansas.**

Ruppel. 1993. Management of Bunker Silos: Opinions and Reality.

Farm managers ranked 6 practices: chopping,
additives,
filling,
packing,
sealing, and
feedout.

- ✓ All managers rated **SEALING** as the *first* or *second* most important practice.
- ✓ Managers who rated **SEALING** *the most important practice* also placed *twice as many tires per square foot* compared to the other farm managers.

Practical Steps to Minimize Surface Spoilage

Achieve a high packing density (minimum of 12 lbs of DM/ft³) within the top 3 feet of the silage surface.

Back, front, and sides should not exceed a 3 to 1 slope.

All surfaces should be smooth, so water drains off ... not in!

Seal immediately after filling is complete.



Practical Steps to Minimize Surface Spoilage

Two sheets of plastic are preferred over a single sheet.

A sheet of Silostop under a sheet of plastic is preferred over two sheets of plastic.

Overlap the sheets by at least 4 to 6 feet.

Sheets should reach at least 4 to 6 ft off the forage surface around the entire perimeter of drive-over piles.



Practical Steps to Minimize Surface Spoilage

Put uniform weight on the sheets over the entire surface and double the weight on the overlaps.

Mow areas surrounding a bunker or pile and put up temporary fencing.

Regular inspection and repair are important.



12 ft x 40 x 120 ft bunker of corn silage



259 tons

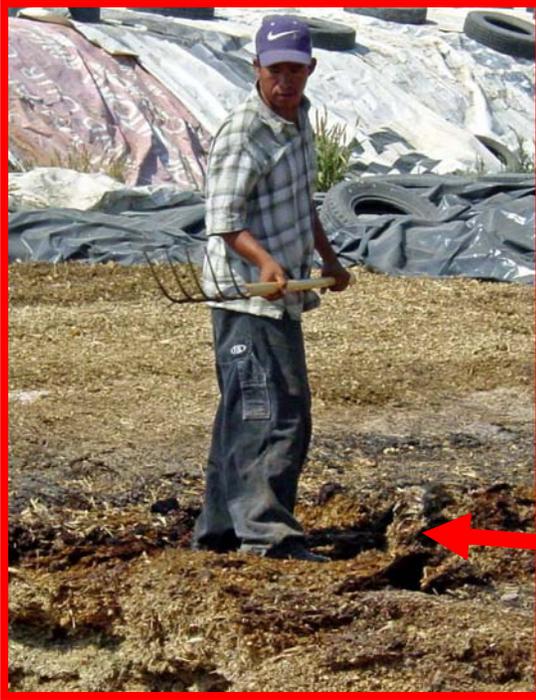
1,094 tons

Corn silage: Value in the top 3 ft
= \$9,720

Net saved with std. plastic = \$1,710

Net saved with **Silostop** = \$2,512





**Surface-
spoilage ...**

**Feed it?
or
Pitch it?**



Surface-spoiled Corn Silage Research at Kansas State

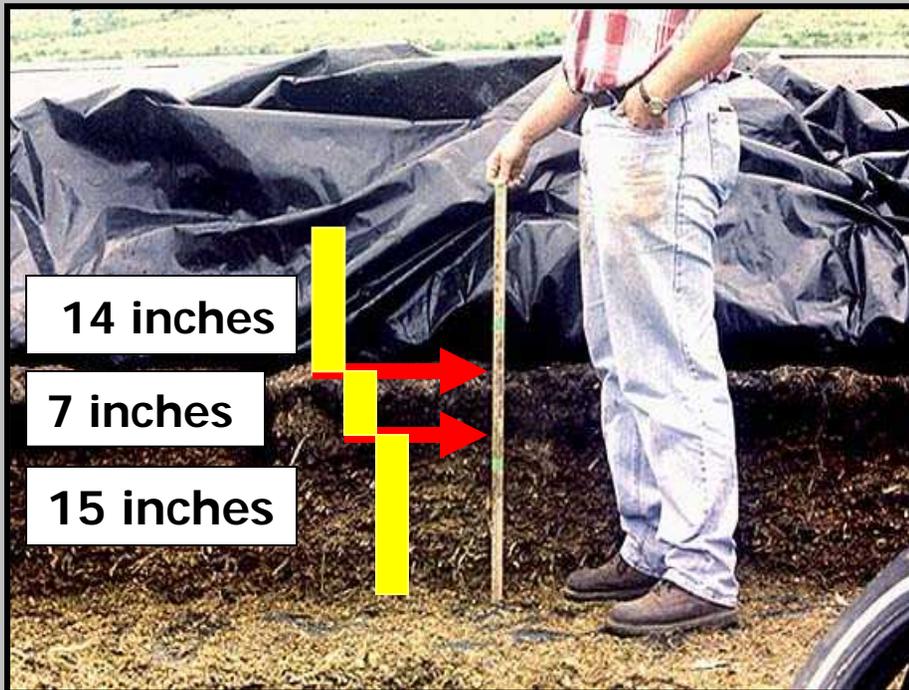
'Slime' in the ration,
% on a DM basis:

0, 5.4, 10.7, and 16.0

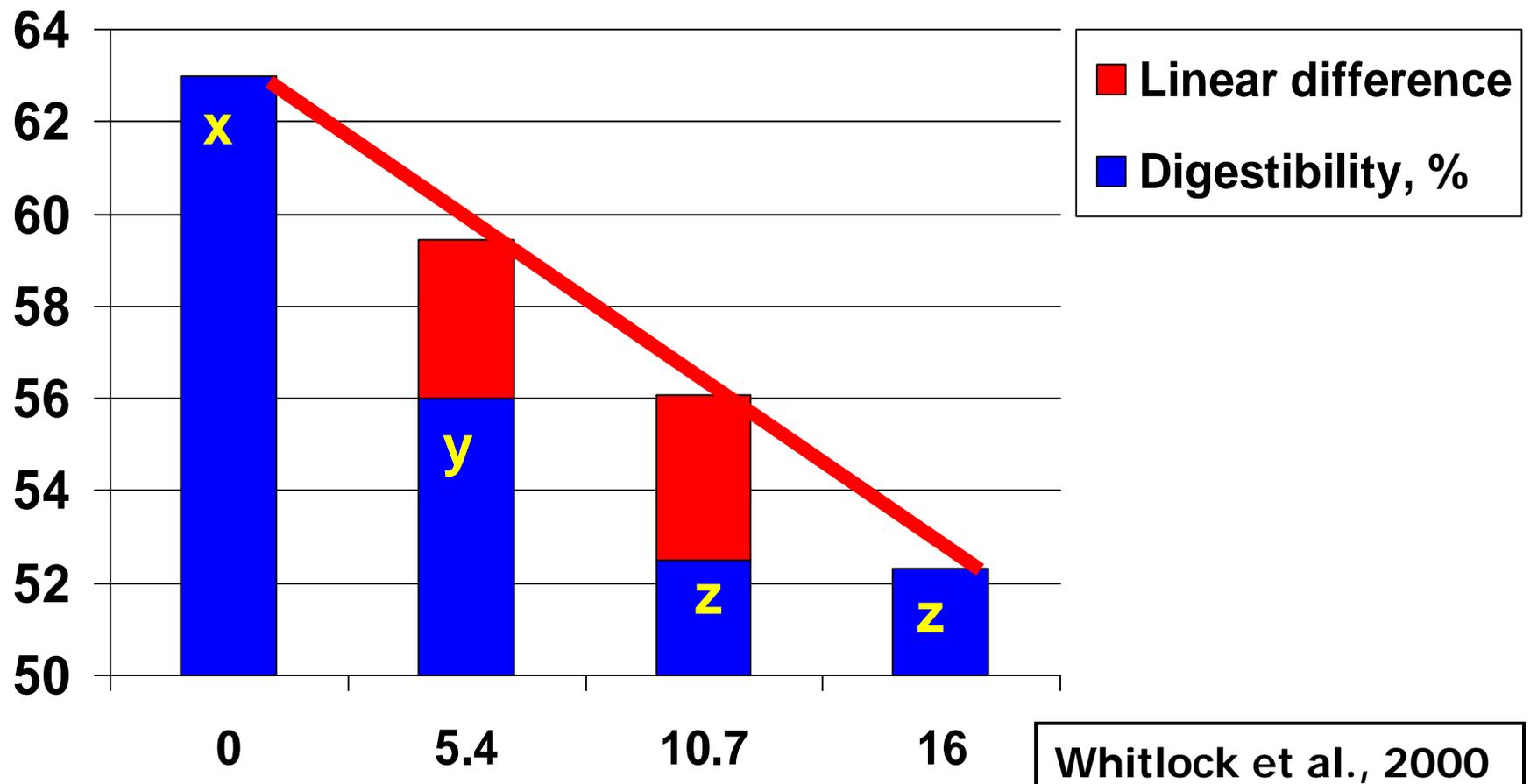
Whitlock et al., 2000

Key results:

- ✓ Depressed **DM intake**.
- ✓ Destroyed the **forage mat** in the rumen.
- ✓ Reduced **fiber digestibility** dramatically.



NDF Digestibility



How much does feeding surface-spoiled corn silage cost dairy producers?

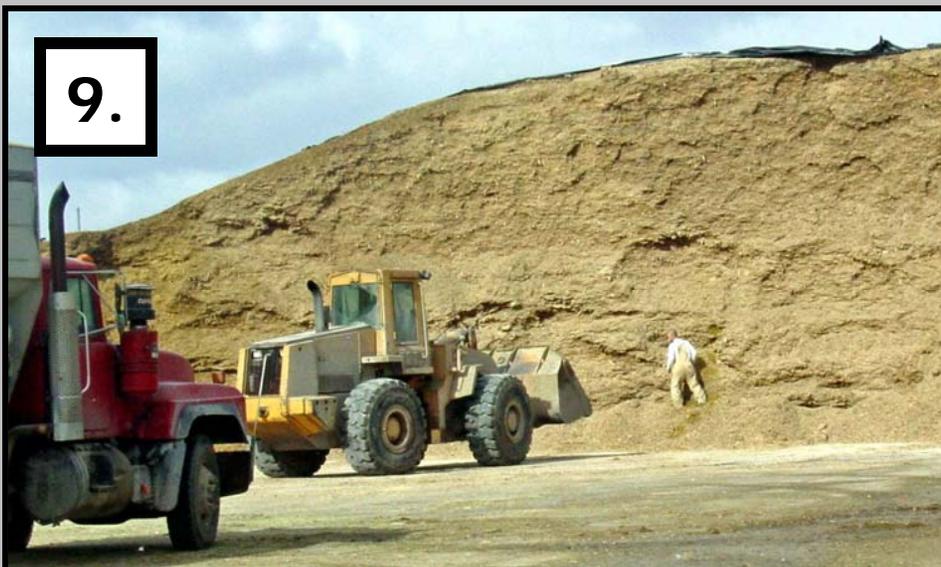
- ✓ 0.7 to 3.0 lbs less milk /cow/day.^{1,2}
- ✓ Equals **\$40** to **\$140** less milk /cow/year.

¹ Assumes that 1 percentage unit of NDF digestibility equals 0.55 lbs of milk /cow/day.

² Assumes that 1% surface-spoilage in the ration decreases NDF digestibility by 1.3 percentage units.



There are far too many "over-filled" bunker silos and drive-over piles that are NOT SAFE!!



At 3:45 pm on December 3, 1999, 6 tons of haylage in a bunker silo collapsed on Nick Schriener of Athens, Wisconsin. Schriener was rescued in a matter of minutes, but he suffered a C6 spinal cord injury. Nick is a quadriplegic for life.

Successful Farming, September 2000

Important Quotes ...

“Even though I was standing 20 ft from the face, 12 tons of silage collapsed on me. I didn’t hear or see anything”.

“I had been in (silage) pits hundreds of times, and you just become kind of complacent because nothing ever happens ... it just took that one time”.

**Mac Rickels; Nutritionist in Comanche, TX.
Dairy Herd Management, October 2000.**

**Important Quotes ... “We have nothing to lose by practicing safety; but we have everything to lose by not practicing it.”
Dennis Murphy, Extension Safety Specialist, Penn State U.**

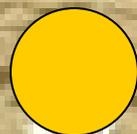
Major Hazards:

- ✓ **Fall from height.**
- ✓ **Run-over by machinery.**
- ✓ **Tractor roll-over.**
- ✓ **Entangled in machinery.**
- ✓ **Crushed by an avalanche.**
- ✓ **Complacency.**

Keith Bolsen Ph.D.
& Associates



**"Start taking *Silage Safety Seriously*
... Today", Ruthie Bolsen.**



Keith Bolsen Ph.D.
& Associates



**“Start taking *Silage Safety Seriously*
... Today”, Ruthie Bolsen.**

Note: Ruthie’s son, Kreg Morris, died on 9-30-01 in an auto accident that did NOT have to happen. Kreg was a 32-year attorney with a 3-year old son at the time of his accident.

The Most Important GOAL in Managing Bunker Silos and Drive-over Piles:

Send All Employees Home
to their Families

SAFE ... EVERYDAY!!

Avoiding problems with bunker silos and drive-over piles begins with TEAM WORK!!

Nutritionists/agronomists, when was the last time you had a meeting with your dairy client's team and his/her crop growers and silage contractor?

Dairy producers, when was the last time you had a meeting with your silage/forage team and your crop growers and silage contractor?

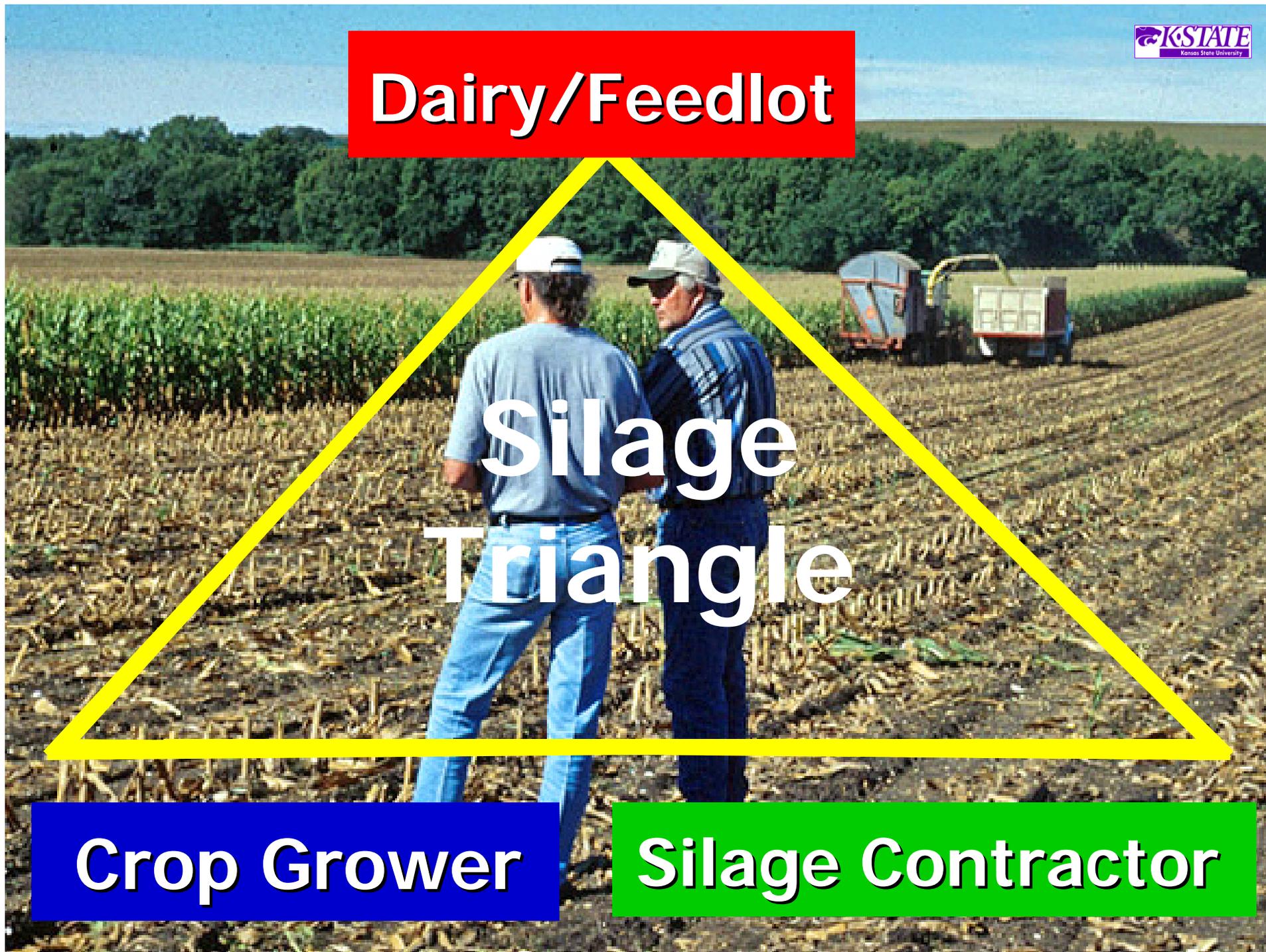


Dairy/Feedlot

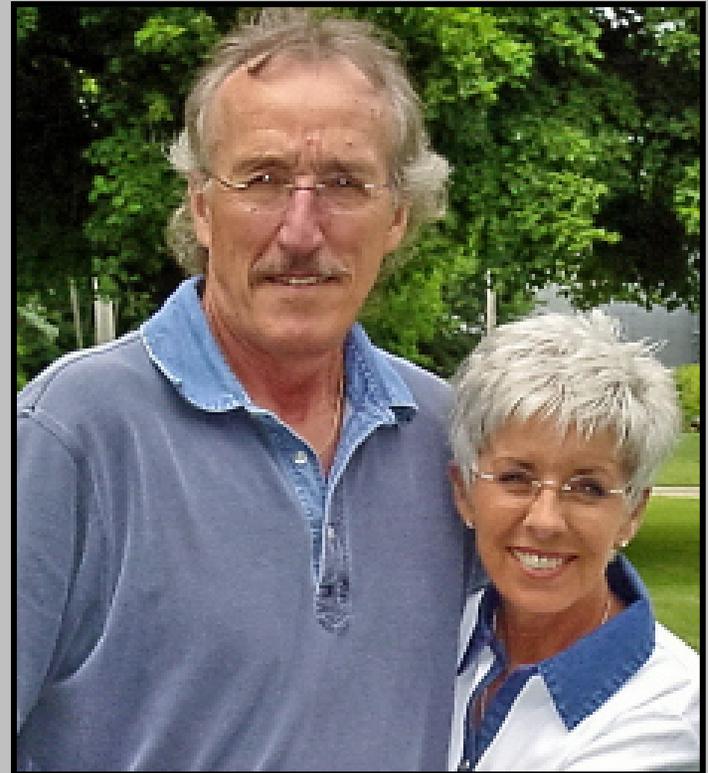
**Silage
Triangle**

Crop Grower

Silage Contractor



**THANK
YOU!**



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