

Association of Environmental and Engineering Geologists

The Rocky Mountain Section Newsletter

OCTOBER 2009

MEETING DATE

**THURSDAY
OCTOBER 8th,
2009**

TIME

5:30 p.m. Social Hour
6:30 p.m. Dinner
7:30 p.m. Presentation

LOCATION

**Berthoud Hall,
Colorado School of
Mines
1516 Illinois St.
Golden, Co 80401
Room 241
See Map Below**

COST

**\$25 Members
\$27 Non-members
Students free then
\$10**

RESERVATIONS

meetings@aeqrms.org
or
WWW.AEGRMS.ORG

**BY NOON,
TUESDAY
OCTOBER 6TH**

Getting Beet Up

Robin Dornfest
CTL|Thompson

It's been said that sweet is good and sweeter is better, but it's what's left over on the other side of Sugartop Mountain that can create a problem.

First, a little history. A slowed Colorado economy in the 1890s brought one of the largest agricultural upturns in Colorado's history. This sweet growth in the farming economy came from the expansion of sugar beet production, which left behind something less desired – beet waste.

Sugar beets thrive in high clay content and coarse sandy soils, making Colorado an ideal place to grow and farm them. In 1899 a familiar local name, Carl Boettcher, co-funded the creation of the Colorado Sugar Manufacturing Co., a beet sugar processing plant in Grand Junction, and in 1901 he co-founded the Great Western Sugar Co., with its familiar GW logo, which soon became the largest producer of beet sugar in the country.

By the early part of the 20th century, Colorado became the leading producer of beet sugar in the nation, with the Western Sugar Beet Co. being the largest of the sugar beet producers. The farms and production plants spanned the Colorado Front Range, reaching through the South Platte River valley – Eaton, Greeley, Windsor, Fort Collins, Denver, Sterling, Fort Morgan, Brush, Brighton, Fort Lupton, Ovid and Johnstown. Currently, The Western Sugar Cooperative grows sugar beets in Greeley, Sterling, Longmont, Fort Morgan and Rocky Ford, and manufactures sugar in Fort Morgan.

What does beet waste look like? If you ever wondered about the white piles frequently spotted along the Front Range, now you know – they're sugar beet waste. Flushed from the sugar beet processing plants, the byproducts were distributed over vast open areas. Beet spoil materials were commonly found covering large expanses of ground, or having leached into the soils, in areas up to 4 miles away from the processing plant. The waste piles can be seen above ground in mounds. They can also cover large areas with up to 15 ft. of materials and are not easily noticeable. These materials pack an undetected punch for those unaware of their chemical and engineering characteristics and until recently, little was known about these harmful traits.

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Words from the Chair

Greetings Rocky Mountain Section,

October is upon us once again. Soon it will be time to don orange safety vests and venture into the field with more than just a rock hammer. As I write this I am hoping our Section has good attendance at the annual meeting. By the time you read this, I hope those of you who did attend enjoyed the meeting. At the annual meeting I will also be attending the Board of Director's meeting. In the November newsletter I will summarize items that may be of interest to our Section and its members. I look forward to serving as the Rocky Mountain Section chair this year.



Adam Prochaska

A Letter to AEG-RMS Members

It's that time of year again. Time again to pay our dues to AEG.

I just dropped my dues into the mail.

Since I have been very blessed in 2009 in both my professional and personal lives (especially when compared to 2008, LOL!), I elected to make a contribution to the Foundation. A substantial contribution.

Now, I think that all of us have things to be thankful for, one of which is our chosen profession. In that regard, giving back to our profession is the right thing to do.

Given that, I issue a challenge to the current Section officers, the former officers, and to all members of the Rocky Mountain Section to contribute something, anything to the Foundation when you pay your dues this year. Any amount helps.

Wouldn't it be something if every member of the Section contributed something to the Foundation?

Thanks.

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What does this mean for construction today? Modern sugar beet production plants have environmentally friendly ways of disposing of the waste, but problems exist because of old disposal methods that left acres of materials behind in the 1950s and '60s. The waste can have a negative effect on construction, especially in northeastern Colorado where sugar beet processing plants were abundant.

Structures constructed over beet waste are now experiencing failures. New developments in these desirable areas of available land may also have problems if the beet waste is not identified and mitigated during development. Mitigation of beet spoils through design, removal and replacement, or avoidance can be costly. Identification of beet spoil materials prior to construction can allow mitigation methods to be incorporated into the construction sequence and lessen unforeseen construction costs. While it's not considered a contaminant, beet waste can have the following effects on new construction or existing buildings:

- Piping, voids and sinkholes. Beet waste deposits can contain long pipes (caves) and form sinkholes, which impact the stability of soil. These features can cause movement of a foundation and differential settlement of a building, resulting in distress. These damages may lead to unlevel floor slabs and cause significant damage from foundation movement. Building movement and settlement can be particularly harmful to industrial companies, where unlevel floors and cracking can disrupt sensitive machinery set directly on the floor. Beet waste can also cause poor pavement performance, sinkholes in roadways, and the consolidation of pavement subgrade.
- Soluble sulfates. The beet waste is often high in soluble sulfates, which react negatively with concrete and chemically treated pavement subgrade, causing deterioration and other failures. The presence of beet waste in soil can lead to the formation of the expansive mineral ettringite. This mineral is formed by the combination of water, soil, soluble sulfates and calcium. Calcium is usually found in subgrade stabilizing products such as lime, fly ash and Portland cement. Formation of ettringite can cause severe damage to pavements and foundations.

What can be done? By conducting thorough geological and geotechnical investigations before site development, and researching historical site uses, engineers can identify the presence of beet waste and develop mitigation alternatives. This could mean modifying the construction materials used, adding stabilizers to the soil, creating a more suitable subgrade, or removal of the beet waste and replacement with fill. Possible repairs to existing buildings could include replacing the foundation or underpinning the building with a new foundation that extends well below the affected soil. Roadways constructed in areas of beet waste may need continued maintenance.

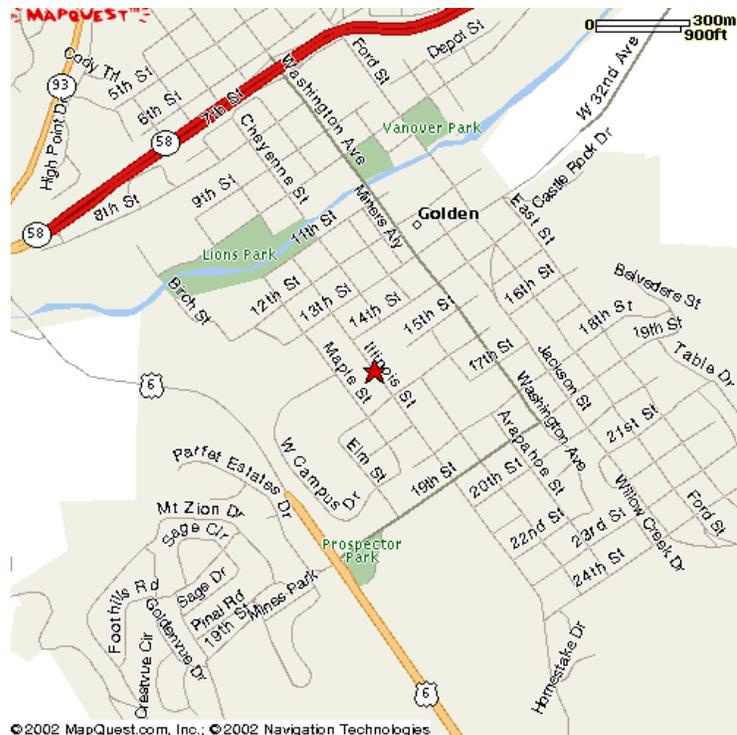
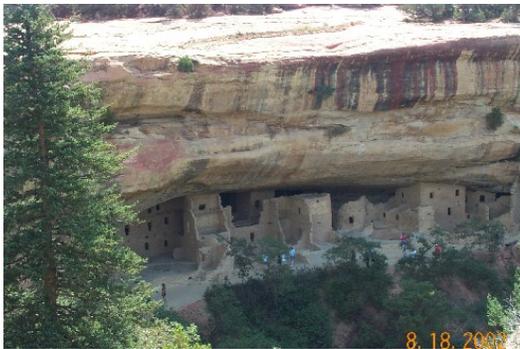
Identification of beet spoils prior to construction can result in significant savings during development and in the long term. Depending on the repairs needed, costs to amend existing construction can range from thousands to hundreds of thousands of dollars.

Colorado's rich history in beet sugar production brought growth to Colorado's economy. However, it is important to remember the development and construction hazards the boom left behind.

November 2009 Meeting Location and Time Change

The November meeting will be held at AEG headquarters on Colorado Blvd and Cherry Creek. The meeting time will be at 6:00 PM (instead of 5:45). More information and a map will be provided in next months' newsletter

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