

BUREAU OF RECLAMATION CANAL LINING DEMONSTRATION PROJECT

The Bureau of Reclamation constructed 34 canal-lining test sections in 11 irrigation districts in four States to assess durability and effectiveness (seepage reduction) over severe subgrades. Geosynthetic clay liner (GCL) was installed in two sections at the Ochoco Irrigation District in Oregon in April 1999. One section used Bentomat DN and Bentomat CL covered with 1' of soil per manufacturer's recommendations to provide confining pressure and protect the GCL. However, the seepage requirements for irrigation canals are much less stringent than other applications, such as landfills and wastewater treatment lagoons. Therefore, Reclamation decided to construct a second experimental section with the GCL exposed to evaluate the cost savings of eliminating the cover material.

Covered GCL

After three years in service, Reclamation determined that the covered GCL condition was **excellent**. Preconstruction ponding testing performed by Reclamation showed an average seepage rate of 0.91 ft/day. The post construction ponding test result for the Bentomat DN and CL combined section was 0.11 ft/dy. Estimated long-term effectiveness was 90%. Preliminary results of this study suggest that covered GCL have very favorable benefit-cost ratios of approximately 6. Total cost, including assumed overhead and profit of 17%, for the covered GCL was \$0.82-0.87/ft².

As shown in the attached letter, in February 2006, the Ochoco Irrigation District reported that the GCL continues to function well.

Exposed GCL

The exposed GCL was observed to have some cracking and shrinking from UV exposure. Although the overall performance was deemed very good, the District covered the GCL per manufacturer's recommendations to prevent further degradation.

References:

Swihart, J. & Haynes, J., R-02-03, *Canal-Lining Demonstration Project Year 10 Final Report*, U.S. Dept. of Interior Bureau of Reclamation, November 2002, www.usbr.gov/pn/programs/wat/pdf/finalcanal/front.pdf

Swihart, J. & Haynes, J., R-99-06, *Canal-Lining Demonstration Project Year 7 Durability Report*, U.S. Dept. of Interior Bureau of Reclamation, September 1999, www.usbr.gov/pn/programs/wat/publications/canallining.pdf



Installation of Bentomat at Ochocco Irrigation District in Oregon in April 1999.

**OCHOCO IRRIGATION DISTRICT
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PRINEVILLE, OREGON 97754
(541) 447-6449**

February 21, 2006

Kaul Corporation
2525 S Wadsworth Blvd. #300
Lakewood, CO 80227

C/o Joe Kaul

RE: Bentomat Geosynthetic Clay Liner (GCL)

Dear Joe,

In 1999 Ochoco Irrigation District (OID) along with the Bureau of Reclamation (BOR) installed a Bentomat Geosynthetic Liner (GCL) along a portion of a leaking canal. This canal seepage was a problem as it was subbing into a homeowner's basement. The GCL was installed, and covered with approximately 6 to 10 inches of soil. To date this liner is functioning well and no seepage has been detected in the basement.

If you have any further questions feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell L. Rhoden".

Russell L. Rhoden, Manager