

**From: Mark S. Lewis**  
**Subject: Executive Summary of DOE Research 2004**  
**To: Ag Burning Task Force**

The Washington State Department of Ecology Ag Burning Task Force has been funding research into straw utilization for papermaking fibers. During this time research has led to the discoveries of new and economical ways to pulp wheat straw. It has also led to the investigation of other cereal straws such as grass seed straw and seed alfalfa for various pulp and paper products.

There are five tasks on the current project:

- Wheat Straw as a TMP substitute in newsprint
- Pulping and Bleaching of seed alfalfa for white paper grades
- Pulping of grass seed, wheat and alfalfa for molded pulp products
- Liquor utilization as a fertilizer and soil amendment
- Feasibility of using straw economically and logistically

During 2004 an opportunity presented itself at a western Washington recycled mill. This mill uses 100 percent secondary fiber to produce a wide range of brown paperboard grades. Currently China is putting tremendous demand pressures on the North American Old Corrugated Containers (OCC) market. This trend is expected to continue into the future. This led to this mill wanting to look at wheat straw as a fiber source. In August of 2004 the first ever commercial paper was made using Eastern Washington wheat straw. Two tons of paper with 25% wheat straw pulp was made using pulp that was produced at the University of Washington Paper Science labs. An end use trial was also run at the company's research facility. Cores were made using this paper, and had higher strength than their normal production. In December of 2004 a second trial was run which was completely funded by the company. Two tons of wheat straw was pulped to make approximately 3000 pounds of pulp. This was blended with their normal blend at approximately 35% and 8 tons of paperboard, specifically partition board was made. The key property the company was looking at was bulk. The partition board was 15% bulkier than what they were running prior to the start of the trial.

Also in 2004 a trial was run at a molded pulp mill in Eastern Washington and thousands of berry baskets were produced using wheat straw as a fiber source. Baskets with 50% and 100% wheat straw substitution were made. Strength was equivalent or greater than their normal production. The highlight to the trial was that the drainage time dropped by more than 50%. This can lead to increased production at the facility.

Research into pulping and bleaching of seed alfalfa straw for a white paper grade was completed in 2004. In 2005 bleached seed alfalfa will be blended with bleached wood to produce white paper grades.

This paper is made from wheat straw and seed alfalfa straw pulp from Eastern Washington.