Flour Milling Process
Strategically Located 6 Mills

- **OAKLAND, CA** 14,000 cwt (875t)
- **FRESNO, CA** 9,500 cwt (595t)
- **LOS ANGELES, CA** 14,500 cwt (875t)
- **WINCHESTER, VA** 26,500 cwt (1,640 t)
- **SAGINAW, TX** 14,000 cwt (875 t)

Corporate
Minneapolis, MN
Hard Red Winter Wheat:

- Planted in the fall in areas where the winters are mild and dry.

- Growth begins in the Fall, dormant in the Winter. Plant matures in the spring and is harvested in the early summer.
United States: Winter Wheat

Yellow numbers indicate the percent each state contributed to the total national production. States not numbered contributed less than 1% to the national total.

- Major areas combined account for 75% of the total national production.
- Major and minor areas combined account for 99% of the total national production.
- Major and minor areas and state production percentages are based upon averaged NASS county-level and state production data from 2000-2004.

Note: The agricultural data used to create the map and crop calendar were obtained from the National Agricultural Statistics Service at: http://www.usda.gov/nass.

World Agricultural Outlook Board
Joint Agricultural Weather Facility
Flour Milling Process
Grain Receiving

- by Railcar = 3,400 bushels (90 ton)/car
- by Truck = 900 bushels (25 ton)/truck
- Grain Storage = 1.1 million bushels (27,700 ton)
Recycler aspirator removes particles lighter in density
Wheat Cleaning Process

- Grain separator uses two screens. One larger screen to remove larger than wheat pieces and one smaller screen to remove smaller pieces.
Wheat Cleaning Process

- Scourer rubs wheat on wheat to remove dirt from the outside of the wheat kernel
Tempering Process

- Water is added to the surface of the wheat in a mixing conveyor.
- Wet wheat is held in bins for 12 & 16 hours.
Grain Cleaning & Tempering

Post Tempering Process

- Wheat passes through a magnet
- Intensive scourer breaks up weak & cleans wheat kernels
- Recycle aspirator removes remaining light particles
Milling is continuous automated process to grind wheat and to **extract white endosperm from the wheat kernels.**

- **A mill**
  - 9,000 cwt/day (562 t/day)
  - White Flour – Hard/Spring

- **B mill**
  - 4,500 cwt/day (280 t/day)
  - White Flour Hard & Soft

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**Endosperm**
- About 85% percent of the kernel weight and the source of white flour. The endosperm contains the greatest share of protein, carbohydrates and iron, as well as the major B-vitamins, such as riboflavin, niacin, and thiamine. It is also a source of soluble fiber.

**Bran**
- About 14 1/2% percent of the kernel weight. Bran is included in whole wheat flour and can also be bought separately. The bran contains a small amount of protein, large quantities of the three major B-vitamins, trace minerals, and dietary fiber — primarily insoluble.

**Germ**
- About 2 1/2% percent of the kernel weight. The germ is the embryonic or sprouting section of the seed, often separated from flour in milling because the fat content (10 percent) limits flour's shelf-life. The germ contains minimal quantities of high quality protein and a greater share of B-complex vitamins and trace minerals. Wheat germ can be purchased separately and is part of whole wheat flour.
Milling

- Roller Mills: corrugated rolls break wheat into course particles. Smooth rolls reduce endosperm to flour
Milling

- Pneumatics: Air used to transfer mill stock
- Sifter: ground wheat is sifted through successive screens of increasing fineness
- Flour passes through a sifter & is collected in a screw conveyor
Milling

◆ Purifier: air currents and sieves separate bran from granular endosperm
Finished Product

Product Storage

◆ Flour is blown into one of 26 storage bins
Ingredient Addition

- Ingredients are added on loadout
Finished Product

Product blending and transferring

- Flour is pulled from the storage bins and transferred to the truck loading tanks
Product blending and transferring

- Flour passes through rebolt sifters. Tailings are collected & inspected for each load

- Flour then passes through an infestation destroyer, which utilizes impact as a means for controlling infestation

- Flour then passes through a rare-earth magnet
Product blending and transferring

- Flour passes through a metal detector