

North Dakota Mill

New G-mill commissioned in Grand Forks to meet customer growth and product needs.



Facing east, North Dakota Mill's new 129-foot-tall, seven-story, 11,500-cwt.-per-day G-mill in Grand Forks, ND sits on a 47-acre complex. Aerial cover photo by Vern Whitten Photography, Fargo, ND. Unless indicated otherwise, ground-level photos by Karl Ohm.

The North Dakota Mill and Elevator Association, Grand Forks, and the North Dakota Industrial Commission (NDIC), Bismarck, on Sept. 26, 2016 celebrated the official grand opening of a new

11,500-cwt.-per-day G-mill along with 200 invited guests consisting largely of state and local officials, dignitaries, vendors, customers, and producers. Several key members of the North Dakota Wheat Commission were also present.



With the new \$38.7 million G-Mill addition, North Dakota Mill now is considered the largest milling operation in North America at 49,500 cwts. per day and produces largely spring wheat flour products of various grades, including whole wheat ►



Dignitaries, members of the North Dakota Industrial Commission, and Vance Taylor, president/general manager, North Dakota mill, Grand Forks, took part in the ribbon-cutting ceremony during the new G-mill's grand opening on Sept. 26, 2016.



North Dakota Mill

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G-mill commissioned: Sept. 26, 2016
G-mill milling capacity: 11,500 cwts. daily
Facility-wide capacity: 49,500 cwts. daily
Grain storage capacity: 4 million bushels
Flour storage capacity: 120,000 cwts.
Products: Spring wheat flours, whole wheat flours, identity-preserved white spring wheat, and durum
Number of employees (G-mill): 3
Employees companywide: 147

Key personnel:

- Vance Taylor, president/general mgr.
- Chris Lemoine, production/operations mgr.
- Ed Barchenger, controller/finance mgr.
- Steve Sannes, sales mgr.
- Mike Jones, transportation/logistics mgr.
- Jeff Bertsch, grain procurement mgr.
- Bob Sombke, quality assurance/technical services mgr.

Supplier List

Aspirators..... CETEC/OCRIM
Automation.....Fusion Electric LLC
BlowersAerzen USA.
Bran finishersCETEC/OCRIM
Color sorters CETEC/OCRIM
Conveyors (elevator).....Schlagel Inc.
Conveyors (mill)..... CETEC/OCRIM
Design/builder..... Vigen Construction
Dust collection..... CETEC/OCRIM.
Electrical bid package ...Kice Industries Inc.
Electrical controls Fusion Electric LLC
EngineeringVAA, LLC
Equipment installer.....Vigen Construction
Flow controllers CETEC/OCRIM
HVAC.....CETEC Inc.
Magnets.....OCRIM
Manlift..... Humphrey Manlift Co.
Metal detectors.....Fortress Technology
Pneumatic system..... CETEC/OCRIM
ScalesBühler Inc.
Screeners..... CETEC/OCRIM
Scourers CETEC/OCRIM
Sifters.....Great Western Mfg. Co.
Spouting.....CETEC/OCRIM
Tempering equipment CETEC/OCRIM

flour, durum flour and semolina, and some organic spring wheat and durum products. The mill also produces identity-preserved hard white spring wheat products.

“The expansion was necessary to meet the requirements of our existing customers and to add value to more North Dakota spring wheat and durum,” said Vance Taylor, president and general manager, North Dakota Mill, in his welcoming remarks during the grand opening.

“This new mill was designed with sanitation and durability very much in mind by using a lot of stainless steel in areas involving product contact.

“It’s a beautiful mill that incorporates the latest in milling and automation technology that we’re all very proud of. With the added production of the new G-mill, total daily production capacity for the entire operation now stands at about 49,500 cwt. making this operation the largest, single wheat flour mill site in North America.”

Before the ribbon-cutting ceremony in the afternoon, Taylor expressed special thanks for the unwavering support of the NDIC (a three-member commission), which included Gov. Jack Dalrymple, Attorney General Wayne Stenehjem, and



North Dakota Mill President and General Manager Vance Taylor emceed and led off with comments during the grand opening and ribbon-cutting ceremony of the new G-mill in Grand Forks on Sept. 26, 2016. He underscored how much of the new G-mill’s success was tied to a total team effort.

Agriculture Commissioner Doug Goehring. The NDIC has oversight authority over the North Dakota Mill.

Taylor also thanked NDIC Executive Director and Secretary Karlene Fine for her guidance and support in the project, as well as the support from the state’s legislature.

Grand Opening Comments

During the grand opening, several officials underscored the significance and

impact of the new G-mill.

Among those were: Gov. Dalrymple, who already had announced in August 2015 that he wouldn’t seek re-election in 2016; Neal Fisher, administrator, North Dakota Wheat Commission, Mandan; and Alberto Antolini, CEO, OCRIM S.p.A., Cremona, Italy.

“This is a great day and something that we all need to be proud of,” said Gov. Dalrymple. “Over the years, we had many decisions to make on whether or not to expand the state mill, but every time we looked at the performance of the mill itself as a business and looked at the sound direction of Vance Taylor and his management team, it was pretty conclusive to invest in expanding the mill, which was a really big one, to meet the growing demand and to help add value to North Dakota wheat.”

In his opening remarks, Fisher said: “For wheat producers in North Dakota, this is a tremendous and monumental day, and we’re blessed to have a diversified agriculture in this state.

“Wheat accounts for about one-third of the tillable acres in the state, and with back-to-back record yields, we’re producing as much wheat today as we ever have on less ground with better technology, better management, and more markets these days. More than 50% of the wheat grown here enters the domestic markets in the United States; the other slightly less than half goes to about 100 foreign markets.

“This mill with its recent expansion will be larger than the demand of 97 of those 100 customer-countries that we have worked so hard in developing markets in, some of which are very large and represent 50 to 70 million ►



More than two weeks prior to the Sept. 26, 2016 grand opening of North Dakota Mill’s new G-mill in Grand Forks, Vigen Construction, East Grand Forks, MN, was putting on the finishing touches to the outside walls. This new facility encompasses approximately 75,000 square feet. Aerial photo by Vigen Construction.



Above: The mill is equipped with 27 OCRIM rollstands (five double-high and 22 single-high). Right: The fifth or sifter floor includes six Great Western plansifters, five eight-section and one six-section for rebolt, with aluminum lift-out trays.



bushels per year.

“The mill represents a 35-million-bushel-per-year account now. That’s a very dramatic increase and a dramatic example of what can be done by something that is so important for this industry here in North Dakota.

“This accomplishment also is complemented by a state-wide partnership that involves not only the North Dakota Wheat Commission but also the North Dakota Mill, the Northern Crops Institute, North Dakota State University, and U.S. Wheat Associates.”

In his remarks, Alberto Antolini, CEO of OCRIM, said: “This is one of the most advanced mills that OCRIM has built in the United States and worldwide. It is an honor for OCRIM to have a customer like North Dakota Mill that is the largest facility in the United States.”

After several dignitaries provided remarks and the ribbon-cutting ceremony, attendees broke up into groups to tour the new G-mill facility. That was followed by a special evening reception and dinner at the Ramada Inn in Grand Forks.

State-owned Mill

Despite its record capacity, the North Dakota Mill and Elevator Association, which now employs 147 people, is unique in that it is the only state-owned mill in the United States. It was created in 1922 to give the state’s farmers a better price for their wheat and add value by avoiding freight costs associated with shipping it to Minneapolis, MN.

The mill sources hard red spring (HRS) wheat and durum primarily from the state’s growers, but additional supplies do come from adjacent states such as Montana and Minnesota when needed.

North Dakota Mill can store 4 million bushels on site and has a finished product storage capacity of approximately 120,000 cwt., which includes the new flour storage at the G-mill.

According to the mill’s website, the North Dakota Mill receives no funds or financial assistance from the state to subsidize the milling operations.

All operating revenues are derived through sales. In fiscal year 2016, for example, the mill reported \$9.3 million in profits spawned by record shipment volumes that helped offset tough wheat market conditions.

Five percent of its profits are transferred to the state’s Agricultural Products Utilization Commission, and 50% of the remaining profits go to the state general fund.

The balance is invested back into the mill to help fund things like capital projects. However, the NDIC still has oversight over the mill’s budgetary matters and

During the grand opening, attendees had the chance to tour the new G-mill. Shown here are a complement of OCRIM rotary valve ST airlocks.

outlays for capital projects, as was the case with the new G-mill project.

The G-mill addition was first approved by the NDIC in 2014 and marked the eighth time that North Dakota Mill either had made renovations or added new milling facilities to the complex over a 20-year period.

“In planning the new G-mill, we made accommodations on the north end for further expansion in the future if needed,” said Taylor. “The present expansion also included a cleaning and tempering building addition. A high-speed truck and rail grain unloading project is also underway.”

The Team Assembled

Prior to the groundbreaking of the project in fall 2015, North Dakota Mill assembled an expert team to handle all key phases of the projects:

- Taylor and Chris Lemoine, production operations manager at the facility, helped determine the mill’s layout and flow and worked together to interface with all the key contractors.



- OCRIM, Cremona, Italy, provided milling and cleaning equipment, processing design, and engineering plans.

- CETEC Cereals Technologies, Inc., Elkridge, MD (410-796-0890), helped facilitate equipment selection and purchases from OCRIM, in addition to supplying the wheat heater and air makeup equipment and performing design engineering and product flow design on the project.

- VAA LLC, Plymouth, MN (763-559-9100), provided general arrangement, structural engineering, industrial architecture, and bid document preparation services.

- Vigen Construction, East Grand Forks, MN (218-773-1159), provided all the slipform mill and cleaning house building work and equipment installation.

“North Dakota Mill’s working relationship with OCRIM goes back to 1980, when the K-mill was initially constructed,” said Taylor. “Ever since then, OCRIM has been involved with several new mill additions and renovations. We’ve also had a great long-term working relationship with VAA and Vigen Construction over the years.”

The G-mill also was designed in the Autodesk® Plant Design Suite, a robust 3-D software program.

All the equipment was laid out in 3-D, which enabled OCRIM and CETEC to generate precise bills of material (BOM) directly from the design software.

VAA also helped design the building using Rivit® software for Building Information Modeling (BIM). Afterwards, the equipment and building drawings were combined to generate a full and comprehensive 3-D plant design. The final drawings in 3-D then were shared with the key contractors.

Description of Milling Facility

The new mill is a seven-story slipform concrete building 129 feet tall measuring approximately 280 feet by 45 feet and is annexed at the south end to a 10-story cleaning house 190 feet tall measuring about 25 feet by 72 feet. The entire structure encompasses approximately 75,000 square feet.

Light-emitting diode (LED) lighting also was used throughout the mill to save energy and is expected to offer a quick payback of less than five years. Further energy is being saved with variable frequency drives (VFDs), but they are being used on a limited basis.



Wherever possible, to help enhance the facility’s sanitation, stainless steel spouting is used predominantly throughout North Dakota Mill’s new G-mill.

Other construction features:

- The overall design integrated the new G-mill building with the existing seven milling units, terminal elevator, and packing warehouse.

- Special care was given to the architectural design of the building to create a similar appearance to the existing facility.

- The mill is insulated to eliminate the possibility of condensation in the interior areas.

- Careful attention was given to the structure of the two aerial bridges connecting the milling and cleaning house buildings to the flour storage building and elevator terminal (see aerial photo on page 4).

- Pressure-relief panel openings, pre-cast structural beams, weld plates, and reinforcement steel had to be inserted at the correct elevations and spacing during the slipform construction.

- There were 102 openings and 94 structural precast beams placed integrally, as construction proceeded.

- Approximately 6,500 cubic yards of concrete were used in the structure. Nine different classes of concrete mix designs were incorporated into the total project.

Wheat Cleaning and Tempering

The mill’s fully-automated cleaning house, which has a 1,200-bph capacity, and the tempering area are equipped

with the following basic equipment:

Incoming spring wheat enters as one stream and is heated by a CETEC HTX-35 Grain Heater, before being split into two streams and then run through OCRIM MSC15 magnetic separators.

From there, the wheat is sent to two OCRIM SPR-15L rotary motion separators, which is followed by further cleaning using OCRIM vertical aspirators located on the eighth floor of the cleaning house.

In the lower floors, optical color sorting, scouring, and more aspiration occur before the wheat is transferred to an OCRIM intensive mixer rated at 32.5 tph and equipped with an inlet flow sensor that provides uniform moisture distribution.

From there, the wheat enters three tempering bins, each capable of holding 240 tons. After about a 24-hour tempering time, the wheat goes through more scouring and aspiration and then passes into another set of magnetic separators, each equipped with a hinged door for easy cleaning, before going to the first break bin with a 2.5 ton capacity.

Milling Equipment

On the second floor, the G-mill is equipped with 27 OCRIM rollstands, five RMX-1250 double-highs and a mix of RMX-125 and RMX-100 single-highs to make up the balance.

On the first floor sits approximately 12 OCRIM DCP-500 centrifugal pin-type impactors along with 10 OCRIM DR-30 and DR-45 rotary detachers.

The fifth or sifter floor includes six Great Western plansifters, five eight-section and one six-section for rebolt, with aluminum lift-out trays. Before being transferred to other areas, the flour is passed through a magnetic separator. This is complemented by three OCRIM vibro-finishers, while the fourth or purifier floor has nine OCRIM SDX stainless steel purifiers. This is complemented by nine OCRIM FPKN-512 polygonal bran finishers.

On the seventh floor, the mill has an air makeup system that promotes uniform mixing of outside and indoor air and then delivers it to each floor in the mill.

The G-mill also includes nine all-stainless steel finished-flour tanks on load cells, each capable of holding 230,000 pounds of product.

Karl Ohm, editor