

## INNOVATION, TECHNOLOGY AND EFFICIENCY IMPROVEMENT PROJECTS

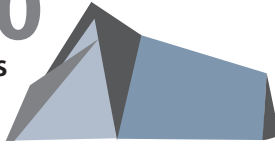
**\$400+**  
million  
INVESTMENT

**7** PROJECTS  
Completed in  
**2019**

### WORKFORCE COMPARISON

**MINNESOTA VIKINGS**  
U.S. Bank Stadium project

**900**  
workers  
on site  
during  
construction



**FLINT HILLS**  
improvement projects

**1000**  
contractors on site  
NEARLY EVERY DAY



**2,500**  
workers  
on site in  
November

**RESULTS**

LOWER  
EMISSIONS

INCREASED  
EFFICIENCY

CLEANER  
PRODUCTS

IMPROVED  
ABILITY  
to meet  
consumer  
demand

### AMMONIUM THIOSULFATE (ATS) TECHNOLOGY

World's largest application of Ammonium  
Thiosulfate (ATS) technology

Converts air pollution  
from motor fuels (sulfur) into  
**FERTILIZER**  
that benefits farmers and the environment



Produces ultra-low sulfur gasoline,  
which **LOWERS** vehicle  
emissions



PUTS **DOWNWARD** PRESSURE  
on fertilizer prices for local farmers




**ATS**

Annual **ATS** production expected  
to be **100,000** SHORT  
TONS


### COMBINED HEAT & POWER (CHP) PROJECT

Among Minnesota's most efficient sources of  
electric energy generation

Produces  
**50**  
megawatts  
of **ELECTRICITY**  
using natural gas  
and steam



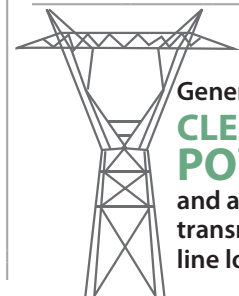
**POWERS**  
nearly **40%**  
of the refinery



**SIGNIFICANTLY  
INCREASES**  
refinery's  
**efficiency**



Generates  
**CLEANER  
POWER**  
and avoids  
transmission  
line loss




**SAVES ABOUT**  
**400,000** gallons of water  
use per day  
compared to traditional systems




## MODERNIZED COOLING TOWERS

Allows the refinery to more efficiently control its ability to rapidly heat and cool refining products

**REDUCES**  
water use by  
**↓ 15**  
**million**  
GALLONS  
ANNUALLY

 **10%**  
**REDUCTION**  
**in ENERGY**  
consumption

## NEW GAS OIL FRACTIONATOR



**Built in**  
**CAMBRIDGE**  
Minnesota

**Weights**   
**670,000 lbs.**

**TRANSPORTED**  
**60 miles**




**TO PINE BEND REFINERY**

**Improves**   
**REFINING EFFICIENCY**  
to meet consumer product  
**DEMANDS**

## NEW HEATING ELEMENTS

**TWO NEW HEATERS**  
*state-of-the-art*

**PROVIDE 80%**   
**REDUCTION**  
in NOx emissions over former 1950s heaters

**TOTAL**  
**NOx EMISSIONS**  
REDUCTION of more than

**13%** 

**CONVERTS**  
asphalt-like material  
to  
**GASOLINE &**  
**DIESEL FUEL**



## WESCOTT PROPANE STORAGE TERMINAL



**EFFICIENT**  
**PROPANE**  
inventory management  
*especially in winter – when demand is highest*

## INVER GROVE HEIGHTS STORAGE TANKS

**UPGRADED**  
**storage**  
**TANKS**



**EFFICIENT**  
**PRODUCT**  
inventory management  
*even during maintenance periods – to meet consumer demand during reduced operations*