Quad County Corn Processors
Quad County Corn Processors (QCCP)

- Area farmers desired to add value to their corn
- QCCP formed in August 2000 by 425 local investors
- Production commenced in 2002
- R&D facility opened in 2008
- Cellerate construction began in July 2013
- Cellerate production facility opened July 2014
- Produced first commercial cellulosic ethanol from corn kernel fiber
Niche market/Strategic Partner strategy

- QCCP was strategically not constructed near a rail spur
  - Lowest cost feedstock
  - Highest value DDGS
- As the ethanol market expanded, we needed to adapt
  - Niche market
  - R&D for national enzyme companies
  - Demonstration Facility
- Strategic Partnerships
  - Syngenta – Cellerate Process Technology development and marketing
Process Technology
Cellerate™ enhanced by Enogen®

Benefits of both technologies combined
- 6% increase in ethanol yield (cellulosic
- Up to 15% increase throughput
- Up to 20% reduction in energy
- Up to 1.6 lb of oil per bushel
- Higher protein, lower fiber DDGs
Cellerate™: launched by QCCP in July 2014

- Firm additional value from solids load
  QCCP produced first cellulosic gallons in Iowa July 2014
- Approved by EPA to generate D3 RIN’s October 2014
- Eco-Engineers QAP program approved by EPA, October 2014
- April 9, 2015: QCCP hits million-gallon cellulosic milestone
- Cook solids at 40% on July 20, 2015
  - Currently working to confirm energy reduction
  - Currently adding 12% to capacity
- Oil yield anticipated to reach 1.2 lb with installation of second disc stack centrifuge in October/November 2015
March 9, 2015

RE:  Approved Q-RIN Program for Quad County Corn Processors, Galva, IA

To Whom It May Concern:

Quad County Corn Processors is an active participant in the EcoEngineers Q-RIN audit program. EcoEngineers Q-RIN audit protocol is specifically designed to audit the unique processes surrounding Corn Kernel Fiber Cellulosic Ethanol production. This protocol has been accepted and approved by EPA.

If you have any questions, please contact Jim Ramm at 515-309-1279 or jramm@ecoengineers.us.

Sincerely,

EcoEngineers

James M. Ramm, PE

cc: Delayne D. Johnson, Chief Executive Officer, Quad County Corn Processors, 6059 159th St., Galva, IA 51020
**Cellerate™ enhanced by Enogen® Advantages**

- Maximize conventional starch ethanol process
- The fiber is pre-treated as part of the conventional starch processes
- Because of breakdown achieved in pre-treatment the whole stillage fiber treatment is very mild, the pH is low enough to prevent starch degradation

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Example of starch molecule structure

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http://en.wikipedia.org/wiki/Trehalose

Cellerate™ enhanced by Enogen® Advantages

- Reduced time, chemicals and energy required because of pre-treatment
- Separate cellulosic distillation does not limit conventional distillation
- Allows a plant to load significantly more solids
  - Significant increase in plant throughput and reduction in energy
  - Ability to capture nearly all residual starch in second fermentation process (in future also hemicellulose)
Ethanol yield has been steady for months at 2.96 gal/bushel un-denatured.

| **D3 RINS** | ~1.25 million D3 RINS were sold for $0.60 in 2014 and 2015  
|             | • Waiver credit value:  
|             |   • 2014: $0.49  
|             |   • 2015: $0.64  
|             | • The 2016 value for waiver credits is expected to be ~$1.25-1.50. |

| **Enogen Enhanced Throughput** | Successful in routing starch (around distillation) from starch fermentation to Cellerate prior to plant shutdown.  
|                               | • Currently lining out the plant and estimate throughput testing will be complete in the next 45-60 days  
|                               | • To increase our distiller corn oil to 1.2 lb. per bushel, a second disc stack centrifuge should be in place late October/November. |

| **Incremental Feed Value from DDG’s** | Digestibility study conducted by Danisco on poultry demonstrated $72 per ton value above DDG’s in a least cost ration.  
|                                       | • Expected premium market opportunities:  
|                                       |   • Other monogastric species  
|                                       |   • Dairy  
|                                       |   • Export markets  
|                                       | • More testing planned in Fall 2015 (after oil recovery steps complete).  
|                                       | • Initial test results in 2013 did not indicate increased beef performance |

| **Low Carbon CARB index value Hemi-Cellulose** | Application will be submitted once Enogen Enhanced throughput values are validated. Expect a CI index of 0-44 depending on how indirect land use and additional corn oil from Cellerate are considered. CI on Cellerate gallons only.  
|                                                | • Currently in discussions (NMA’s and/or MTA’s) with five to seven yeast companies to evaluate their C-5 yeast. FDA approvals are pending |
Cellerate Licensing opportunity

- We are offering Cellerate technology to all dry grind ethanol facilities
- Syngenta has exclusive license of Cellerate in USA and Canada
  - Syngenta handles marketing, contracts and legal
- QCCP staff provides tours to our full scale Cellerate facility
  - Value model spreadsheet
- Industry implications
  - 2 billion gallons of cellulosic ethanol without grinding any more corn
  - 1.5 Billion gallons of additional corn oil without grinding any more corn
Contact Information

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