Successful Operation of the First AlkyClean® Solid Acid Alkylation Unit

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Process Safety Conference
May 17, Dordrecht, The Netherlands
This presentation contains forward-looking statements regarding CB&I and represents our expectations and beliefs concerning future events. These forward-looking statements are intended to be covered by the safe harbor for forward-looking statements provided by the Private Securities Litigation Reform Act of 1995. Forward-looking statements involve known and unknown risks and uncertainties. When considering any statements that are predictive in nature, depend upon or refer to future events or conditions, or use or contain words, terms, phrases, or expressions such as “achieve”, “forecast”, “plan”, “propose”, “strategy”, “envision”, “hope”, “will”, “continue”, “potential”, “expect”, “believe”, “anticipate”, “project”, “estimate”, “predict”, “intend”, “should”, “could”, “may”, “might”, or similar forward-looking statements, we refer you to the cautionary statements concerning risk factors and “Forward-Looking Statements” described under “Risk Factors” in Item 1A of our Annual Report filed on Form 10-K filed with the SEC for the year ended December 31, 2015, and any updates to those risk factors or “Forward-Looking Statements” included in our subsequent Quarterly Reports on Form 10-Q filed with the SEC, which cautionary statements are incorporated herein by reference.
Q4 2015 Adjusted Operating Income* $279.3 million

Fabrication Services
- Fabrication & erection
- Process & modularization
- Pipe fitting and distribution
- Engineered products
- Specialty equipment

Technology
- Licensed technology
- Proprietary catalysts
- Technical services

Engineering & Construction
- Engineering
- Procurement
- Construction
- Commissioning

Capital Services
- Program management
- Maintenance services
- Remediation and restoration
- Emergency response
- Environmental consulting

*Total operating group income from operations excluding nuclear disposition charges. See Reconciliation of Non-GAAP Supplemental Information
Technology Overview

Capabilities

- Petrochemical, gas processing and refining technologies
- Specialty catalysts
- Consulting and technical services

Differentiation

- Most complete portfolio of olefins technologies
- World leader in heavy oil upgrading technologies
- Breadth of technologies provides complete solutions
What is Driving the Demand for Octane?

- Global Fuel Demand Increasing, Including Gasoline
- High Octane Components Being Removed from Gasoline Pool
- Tighter Government Mandates
- Higher Performance Engines Requirements
- Overall Octane Deficit

<table>
<thead>
<tr>
<th></th>
<th>China V</th>
<th>US Tier 3</th>
<th>California CaRFG3</th>
<th>Euro 5</th>
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<tbody>
<tr>
<td>Benzene, %</td>
<td>1</td>
<td>0.62</td>
<td>0.7</td>
<td>1</td>
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<tr>
<td>RVP, kPa Winter/Summer</td>
<td>85/65</td>
<td>7.0 psi ~48 kPa</td>
<td>7.0 psi ~48 kPa</td>
<td>60</td>
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</table>
Traditional Commercialized Alkylation Options

- **HF Alkylation**
  - High quality alkylate, low acid consumption, good feedstock flexibility
  - Extremely hazardous; not preferred anymore
  - Some refiners are considering shutting down existing units due to risk profile
  - Public pressure is growing due to safety and environmental risks

- **Sulfuric Acid (SA) Alkylation**
  - The alkylation technology of choice for refiners at this time
  - Currently the best choice in balancing the safety/operability issues with benefits of high quality alkylate (particularly at low temperatures)
  - CDAlky® has become the technology of choice for sulfuric acid alkylation
- Acid/HC contacting done with eductor or recirculation
- Reaction temperatures near ambient (38°C)
- HF regeneration by fractionation
- Numerous fractionation product schemes
- Product and by-product clean-up required
Incident at Gumi, S-Korea
• September 27, 2012
• Unloading of HF to Storage Tank
• 5 people died
• 18 people injured
• > 3000 people evacuated
• Difficult to approach
• Difficult to decontaminate
• Agricultural damage
• Vehicle damage
• Livestock affected
• Avoiding HF Release
• Minimizing HF Handling:
  – Transportation
  – Storage/Inventory
  – Regeneration
• Minimizing Waste Disposal
• Minimizing Impact of Other Refinery Units Incidents:
  – Potential major impact
  – Torrance refinery

➢ Costly & Continuous Mitigation Required
HF Alkylation: Operational Issues

• **Inherent Drawbacks of HF Alkylation:**
  – Expensive materials used to avoid/minimize corrosion
  – Corrosion, Plugging likely in isoStripper due to HF breakthrough
  – Breakthrough of HF with products/by-products
  – Post-treatment of products required

• **Maintenance & Turnaround:**
  – Frequent turn-around needed
  – Time on stream reduced significantly
  – Safety Risks

• **Production:**
  – Yield Loss due to the production of Acid Soluble Oil (ASO)

• **Operability:**
  – Operation more difficult compared to other refining units
Emerging Commercialized Alkylation Options

• Ionic Liquid (IL) Alkylation
  – Ionic Liquid alkylation was commercialized in a 100 KTA unit in China (2013)
  – Potentially removes some of the safety and hazard issues:
    • This needs to be confirmed particularly in co-catalyst preparation
  – Capital intensive: $130 MMUSD for 100 KTA (complex IL/HC separation)
  – High utility consumption: 50% more than sulfuric acid alkylation
  – Chlorides in the alkylate product: Post-treatment unavoidable
  – Reported alkylate quality value falls short of a technology breakthrough

• Solid Acid Catalyst Alkylation
  – Inherently safer than liquid acid technologies, particularly HF
  – Optimized for low to average alkylate capacities
  – CB&I and Albemarle successfully commercialized the first solid acid alkylation technology in China in 2015 using AlkyClean® technology (capacity 2,700 BPD)
  – AlkyClean technology is the first and only commercialized solid acid alkylation technology in the world
• Challenges with HF Alkylation Units:
  – Safety issues
  – Environmental issues
  – Operational issues

• Revamps & Grassroots Solution offered by CB&I and Albemarle:
  An environmentally friendly and competitive Solid Acid Catalyst technology to replace HF alkylation technology: AlkyClean
• **CB&I and Albemarle Catalysts:**
  - Cooperation since 1996
  - Bench scale pilot unit in Amsterdam

• **First Licensee: Shandong Wonfull, Zibo, China**
  - 100 KTA alkylate capacity
  - CB&I executed process design package in 2013
  - Start-up: August 2015

• **AlkyClean Awards**
  - 2016 Presidential Green Chemistry Award from the U.S. EPA
• Commercially proven with over 1 year of successful operation
• Inherently Safer and Environmentally Friendly
  – No liquid acid used in the process
  – No corrosion
  – No safety risks through exposure
• Significant Operational Risks Reduction
  – Eliminate HF safety risks
• Very Easy to Maintain and Operate
  – Simple & robust operation: Fixed beds
  – No corrosion
• High Product Quality
  – Higher octane alkylate
  – No ASO
• **Only** Solid Acid Alkylation Process **Commercially Proven**

• Catalyst Supplier Albemarle:
  – Leader in catalyst manufacturing
  – Leader in catalyst development

• **Optimized Catalyst Regeneration System:**
  – Longer catalyst cycle/life

• **Tolerant to Feed Contaminants by Design**
  – Process design
  – Catalyst
**AlkyClean References: Shandong Wonfull, Zibo, China**

- Alkylate Production: 100 KTA – 2,700 BPD
- Started up 2015
Oxygenates, sulfur, nitriles, and basic nitrogen components are removed to reach the AlkyStar catalyst impurities specification.

A Selective Hydrogenation Unit is included to reduce the concentration of Butadiene in the feedstock.

Imported MTBE Raffinate

Hydrogen

Make-up i-Butane

Olefin Feed

Feed Pretreatment

Reaction Section (3 Parallel Reactors)

Catalyst Regeneration

Product Fractionation Section

Hydrogen Rich Fuel Gas

i-Butane

n-Butane Product

Alkylate Product

100 kTa alkylate

100 kTa alkylate
### Shandong Wonfull: AlkyClean Product Quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>RON</td>
<td>95-97</td>
</tr>
<tr>
<td>Sulfur</td>
<td>&lt; 1 ppm</td>
</tr>
<tr>
<td>RVP</td>
<td>&lt; 50 kPa</td>
</tr>
<tr>
<td>ASTM D-86 FBP</td>
<td>&lt; 208°C</td>
</tr>
</tbody>
</table>

#### Graph

- **X-axis:** Date, mm/yy
- **Y-axis:** RON
- **Data Points:**
  - 08/15
  - 09/15
  - 10/15
  - 11/15
  - 12/15
  - 01/16
  - 01/16
  - 02/16
HF Alkylation Revamp to AlkyClean: Incentives

- Safety: Peace of Mind
- Product quality: Higher
  - No ASO = Higher Yield
  - Higher RON, due to insensitivity for Butene-1
  - Impact of products on downstream units None
- Continuous cost of HF mitigation: Eliminated
- Maintenance Cost: Eliminated
  - No replacement of expensive materials
  - No corrosion issues
  - Less frequent shutdowns & turn around
- Operating costs: Similar
  - Catalyst instead of HF acid processing
• CB&I and Albemarle Successfully Developed & Commercialized The World First Solid Catalyst Alkylation Process: AlkyClean

• AlkyClean Technology is Proven & Demonstrated:
  – High Alkylate Product Quality
  – Economically Viable

• AlkyClean Units Can easily Revamp HF Alkylation Units

• AlkyClean Process Utilizes a Commercialized Solid Acid Catalyst, and Therefore:
  – Is an Inherently Safer Alkylation Technology
  – Releases Refiners of HF Safety, Environmental and Operational issues
  – Provides Refiners with Peace of Mind