CAPE-OPEN Update in PRO/II v9.2

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Invensys Operations Management

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Lyon, France
19th & 20th Sep 2012
Agenda

- New features added in PRO/II v9.2
- Part 1. Support for CAPE-OPEN Thermo v1.1 specification
- Part 2. Support for CAPE-OPEN Petroleum Fractions specification
New features added in PRO/II v9.2

- Support for CAPE-OPEN Thermo v1.1 specification
  - Implemented to overcome the limitations with CAPE-OPEN Thermo v1.0 specification
  - The support for CAPE-OPEN Thermo specification v1.0 should continue to work as before.

- Support for CAPE-OPEN Petroleum Fractions specification
  - Demonstrated Petroleum Fractions Prototyping, as part of SIG, in the 4th CAPE-OPEN European Conference, Heidelberg. Developed on top of Petroleum Fractions Prototyping.
  - PRO/II is the first to implement the socket for Petroleum Fractions specification II.
CAPE-OPEN Update in PRO/II v9.2 - Part 1

Support for CAPE-OPEN Thermo v1.1 specification
Support for CAPE-OPEN Thermo v1.1 Specification

PRO/II Material Object supports Thermo v1.1 & v1.0 Interfaces

Thermo v1.1

ICapeThermoMaterial
ICapeThermoCompounds
ICapeThermoEquilibriumRoutine
ICapeThermoPhases
ICapeThermoPropertyRoutine
ICapeThermoUniversalConstant

Thermo v1.0

ICapeThermoMaterialObject
Support for CAPE-OPEN Thermo v1.1 Specification
Support for CAPE-OPEN Thermo v1.1 Specification

![Diagram of SIMSCI - Thermodynamic Data with selection of property calculation systems and COCOC3C6C1 Property Package Properties window open.]

Push the button to view CAPE OPEN property packages.
Support for CAPE-OPEN Thermo v1.1 Specification

Keyword Changes:

*Examples for CAPE-OPEN Thermo v1.1*

THERMODYNAMIC DATA
METHOD SYSTEM=CO, PID=COCO_TEA.PropertyPackManager.1, &
PNAME="C1_C2", SET=CO01

METHOD SYSTEM=CO, PID=MFCO11PPManager.MFCO11PPM.1, &
PNAME="C3C5", SET=CO02

*Examples for CAPE-OPEN Thermo v1.0*

METHOD SYSTEM=CO, PID=COCO_TEA.THERMOPACK.1, &
PNAME="C1_C2", SET=CO01

METHOD SYSTEM=CO, PID=MFCOThermoSys.MFCOSys.1,
PNAME="C3C5", & SET=CO02
Support for CAPE-OPEN Thermo v1.1 Specification

Future work:

Support for VLLE and VLSE in PRO/II - CAPE-OPEN
Support for CAPE-OPEN Thermo v1.1 Specification

Live demonstration
COCO Mixer with COCO CAPE-OPEN Thermo v1.1
COCO Mixer with COCO CAPE-OPEN Thermo v1.1
**COCO Mixer with COCO CAPE-OPEN Thermo v1.1**

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**UNIT 1, 'CO1'**

**CAPE-OPEN Description**

<table>
<thead>
<tr>
<th>Name</th>
<th>Mixer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Mixer - unit operation to adiabatically mix 2 or more inlet streams</td>
</tr>
<tr>
<td>progid</td>
<td>COCO_COUS.MIXER.1</td>
</tr>
<tr>
<td>version</td>
<td>2.2.0.0</td>
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<tr>
<td>CAPE-OPEN version</td>
<td>1.1</td>
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<tr>
<td>Vendor URL</td>
<td><a href="http://www.cocosimulator.org/">http://www.cocosimulator.org/</a></td>
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</table>

**CAPE-OPEN Active Report**

**unit is solved**

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**SIMULATION SCIENCES INC.**

**PROJECT**

**PRO/II VERSION 9.2 ELEC U8.3.6**

**PROBLEM**

**OUTPUT**

**STREAM MOLAR COMPONENT RATES**

**09/06/12**

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**STREAM ID**

<table>
<thead>
<tr>
<th>NAME</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
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<tr>
<td>PHASE</td>
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<td>MIXED</td>
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<tr>
<td>THERMO ID</td>
<td>CO01</td>
<td>CO01</td>
<td>CO01</td>
</tr>
</tbody>
</table>

**FLUID RATES, LB-MOL/HR**

| 1 METHANE | 50.0000 | 100.0000 | 50.0000 |
| 2 ETHANE  | 50.0000 | 100.0000 | 50.0000 |

**TOTAL RATE, LB-MOL/HR**

| 100.0000 | 200.0000 | 100.0000 |

**TEMPERATURE, F**

| -177.7421 | -167.2493 | -149.6861 |

**PRESSURE, PSIA**

| 20.0000 | 20.0000 | 30.0000 |

**ENTHALPY, HH BTU/HR**

| -0.5651 | -1.0949 | -0.4690 |

**MOLECULAR WEIGHT**

| 23.0562 | 23.0562 | 23.0562 |

**MOLE FRACT VAPOR**

| 0.5000 | 0.5609 | 0.6000 |

**MOLE FRACT LIQUID**

| 0.5000 | 0.4391 | 0.4000 |
## Conclusions

The following combinations are possible in PRO/II with CAPE-OPEN

<table>
<thead>
<tr>
<th>Unit Operation</th>
<th>Thermo method</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPE-OPEN Unit</td>
<td>CAPE-OPEN Thermo v1.1</td>
</tr>
<tr>
<td></td>
<td>CAPE-OPEN Thermo v1.0</td>
</tr>
<tr>
<td></td>
<td>PRO/II native thermo</td>
</tr>
<tr>
<td>PRO/II native Unit</td>
<td>CAPE-OPEN Thermo v1.1</td>
</tr>
<tr>
<td></td>
<td>CAPE-OPEN Thermo v1.0</td>
</tr>
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</table>
Thank you...

Q&A?