

CAPE-OPEN Update in PRO/II v9.2

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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.

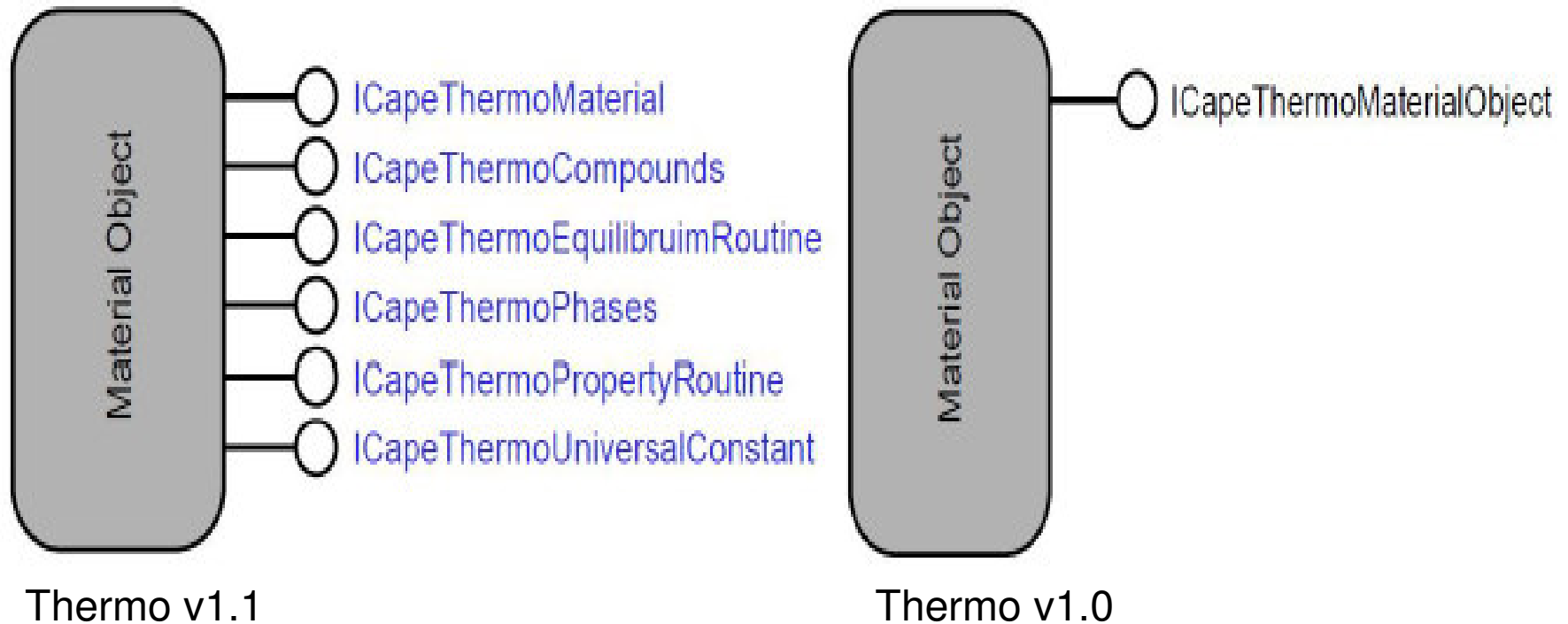
 - ❑ PRO/II is the first to implement the socket for Petroleum Fractions specification II.

CAPE-OPEN Update in PRO/II v9.2 - Part 1

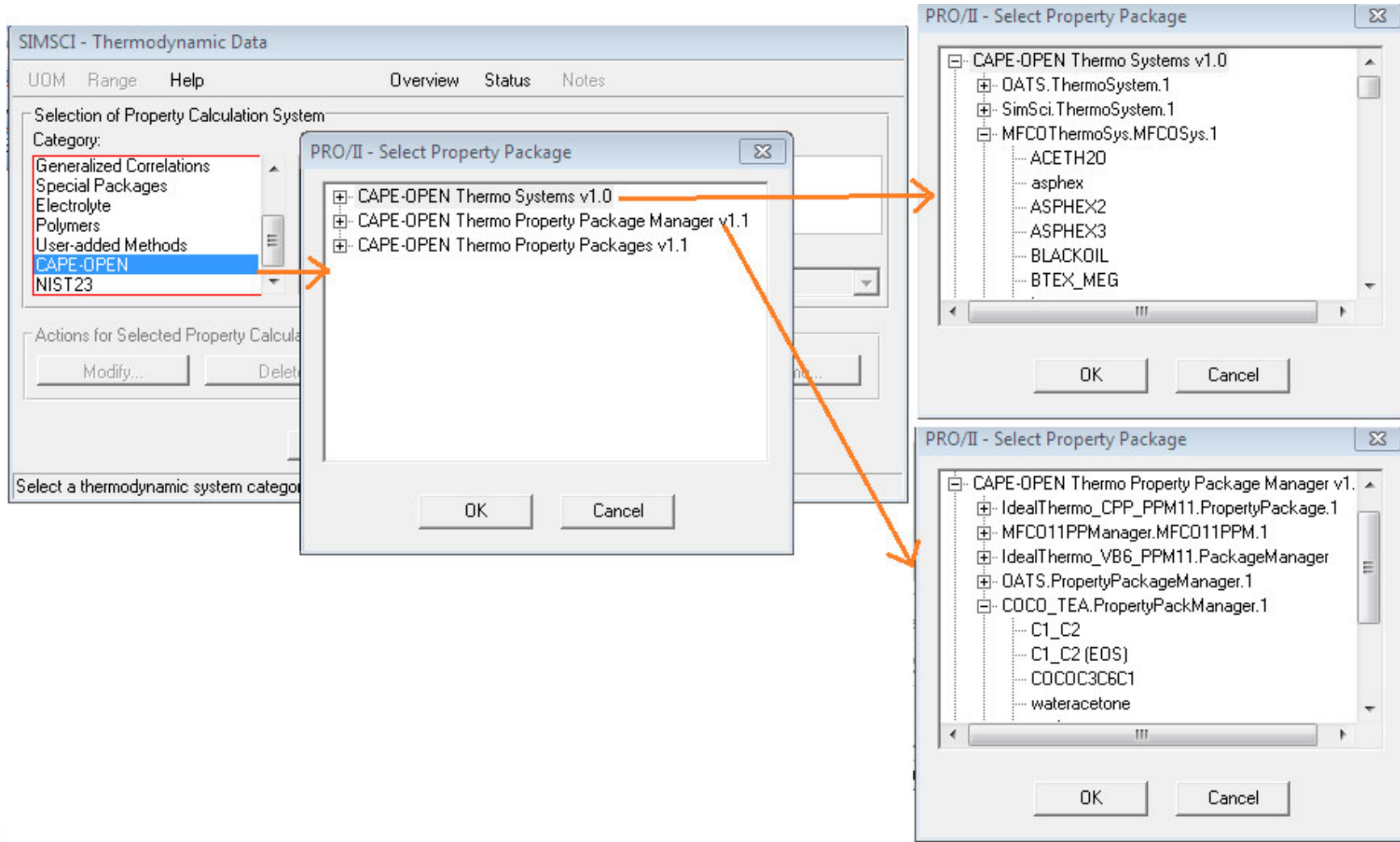
Support for CAPE-OPEN Thermo v1.1 specification

Support for CAPE-OPEN Thermo v1.1 Specification

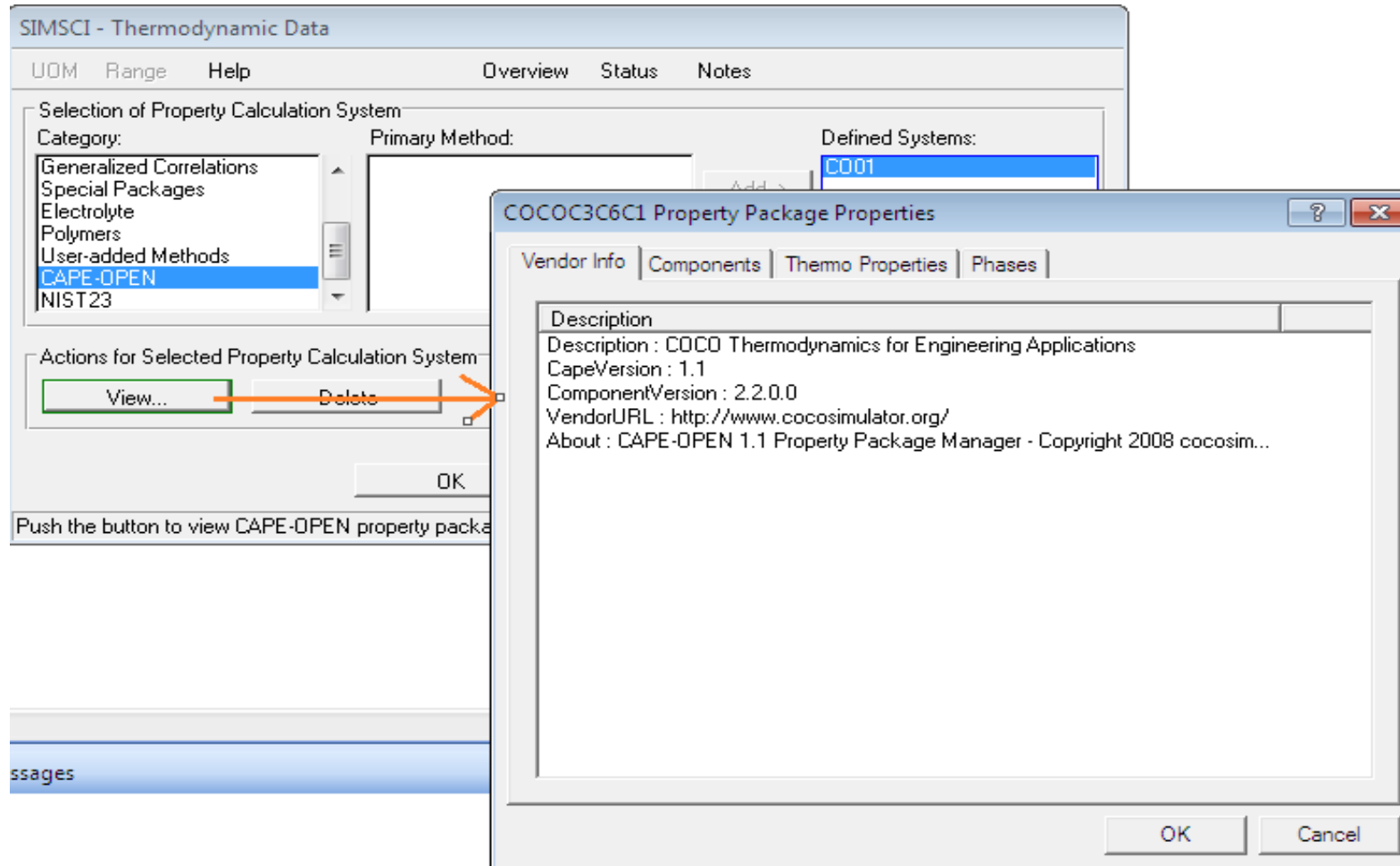
PRO/II Material Object supports Thermo v1.1 & v1.0 Interfaces



Support for CAPE-OPEN Thermo v1.1 Specification



Support for CAPE-OPEN Thermo v1.1 Specification



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

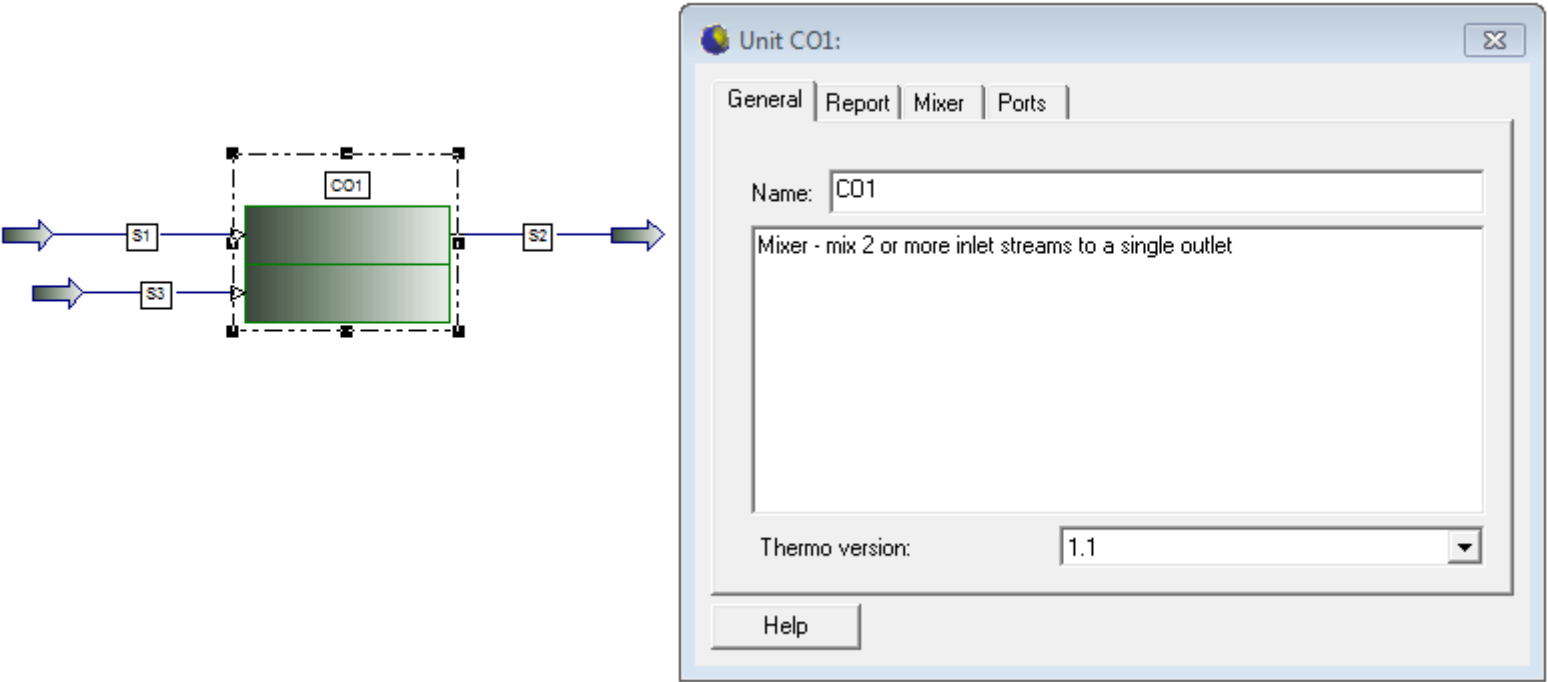
Future work:

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

The image shows a sequence of four screenshots from the SIMSCI - Thermodynamic Data software, illustrating the configuration of a property package. Orange arrows indicate the flow of information from the selection dialog to the property package details.

Top Screenshot: Selection of Property Calculation Systems

- Category: Most Commonly Used
- Primary Method: (Empty)
- Defined Systems: COO1
- Default System: COO1
- Buttons: View..., Delete, Duplicate, Rename...

Middle-Left Screenshot: CL_C2 Property Package Properties - Description

- Vendor Info | Components | Thermo Properties | Phases
- Description: COCO Thermodynamic for Engineering Applications
- CAPE Version: 1.1
- Component Version: 2.20.0
- Vendor URL: http://www.cocosimulatio.org/
- About: CAPE-OPEN 1.1 Property Package Manager - Copyright 2008 cocosimulatio...

Middle-Right Screenshot: CL_C2 Property Package Properties - Components

Component Name	PRO.M Component	Formula	CASNumber
Methane	METHANE	CH4	74-82-8
Ethane	ETHANE	C2H6	74-84-0

Bottom-Left Screenshot: CL_C2 Property Package Properties - Properties Supported

- Properties Supported:
- activityCoefficient
- activityCoefficient.Dmoles
- activityCoefficient.DmoFracion
- activityCoefficient.Dpressure
- activityCoefficient.Dtemperature
- bubblePoint.Temperature
- density
- density.Dmoles
- density.DmoFracion
- density.Dpressure
- density.Dtemperature
- devPoint.Temperature
- enthalpy
- enthalpy.Dmoles
- enthalpy.DmoFracion
- enthalpy.Dpressure
- enthalpy.Dtemperature
- entropy

Bottom-Right Screenshot: CL_C2 Property Package Properties - Phases

- Phases:
- overall
- Vapor
- Liquid

COCO Mixer with COCO CAPE-OPEN Thermo v1.1

UNIT 1, 'C01'

CAPE-OPEN Description

```

Name           Mixer
Description    Mixer - unit operation to adiabatically mix 2 or more inle
progid         COCO_COUS.MIXER.1
version        2.2.0.0
CAPE-OPEN version 1.1
Vendor URL     http://www.cocosimulator.org/
    
```

CAPE-OPEN Active Report

unit is solved

```

SIMULATION SCIENCES INC.          R          PAGE P-5
PROJECT          PRO/II  VERSION 9.2 ELEC V8.3.6
PROBLEM          OUTPUT
                  STREAM MOLAR COMPONENT RATES          09/06/12
    
```

STREAM ID		S1	S2	S3
NAME				
PHASE		MIXED	MIXED	MIXED
THERMO ID		C001	C001	C001
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, MM BTU/HR				
		-0.5651	-1.0349	-0.4698
MOLECULAR WEIGHT				
		23.0562	23.0562	23.0562
MOLE FRAC VAPOR				
		0.5000	0.5609	0.6000
MOLE FRAC LIQUID				
		0.5000	0.4391	0.4000

Conclusions

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

Unit Operation	Thermo method
CAPE-OPEN Unit	CAPE-OPEN Thermo v1.1 CAPE-OPEN Thermo v1.0 PRO/II native thermo
PRO/II native Unit	CAPE-OPEN Thermo v1.1 CAPE-OPEN Thermo v1.0

Thank you...

Q&A?