UNIT SIG report

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CAPE-OPEN 2016 Annual Meeting

Linde Engineering, Pullach, Germany

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Outline

- Report Period: Sep 2015 till Oct 2016
- Key responsibilities
- Members
- Update on Petroleum Fractions specification
- Objectives for 2016/2017

Responsibilities

- Maintain and publish the standard
- Respond to issues raised by developers and users
- Prioritize registered issues and give recommendations on solutions
- Promote and support the use of the CAPE-OPEN interface for Unit Operations

Unit SIG Members

- Members:
  - Krishna Murthy Penukonda (Schneider Electric)
  - Michel Pons (CO-LaN)
  - Richard Baur (Shell Global Solutions)
  - Jasper van Baten (AmsterCHEM)
  - Michael Hlavinka (Bryan Research & Engineering)

- Join? Contact Krishna Murthy Penukonda

- Monthly phone meetings
  - Follow them on website

Update on Petroleum Fractions specification

- Scope and Requirements sections are updated.
- Clarifications on the functionality with examples.
- State diagrams and Sequence diagrams are added.

Petroleum Fractions: scope

- The specification is developed for communication between Ref-Unit and PME.
- The communication between Property Package and PME is not considered in the scope of this specification.
- Curve properties are not considered in the scope of this specification.

Petroleum Fractions: clarifications

- **Clarification:**
  - **Issue:**
    - **How to deal with multiple feeds containing different pseudo compound slates for a given Unit Operation?**

Petroleum Fractions: clarifications

- **Options:**
  - **(A) Process Modelling Environment responsibility:**
    - **Cons: Nil**
    - **Pros:**
      - **PME already knows which pseudos are the same and which are not**
      - **Scenario works for non-petroleum unit operations**

        (Compound sets consistent on all Ports)
  - **B) Unit Operation responsibility:**
    - **Cons:**
      - **The Unit Operation must detect different pseudos**
      - **PME must provide means to do so**

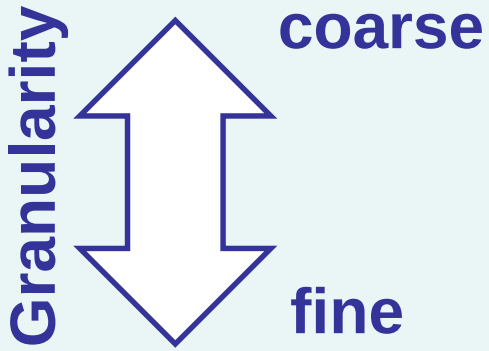
        (for example require different names for different pseudos)
    - **Pros:**
      - **Scenario allows for different stream types connected to a unit (e.g. heat exchangers)**

Petroleum Fractions: clarifications

- **Chosen solution**
  - **PME has responsibility for making uniform compound slates on all Ports of a Unit Operation**
  - **This responsibility for equal feed compounds only pertains to petro streams.**

Petroleum Fractions: clarifications

- **Clarification on granularity:**
  - **Refinery properties may be specified in different levels of granularity.**
    - Bulk property
    - Curve property
    - Compound property



  - **A Ref-UNIT should set a property in the finest granularity that it can predict, preferably the values for each pseudo-compound.**
    (contd…)

Petroleum Fractions: clarifications

- **Clarification on granularity:**
  - **The PME may store the property in any chosen granularity provided it must be able to return the property in the granularity it was specified.**
    - **Example 1: if the Unit Operation specifies a bulk value of a property, requesting the bulk value of the same property should always return the specified value.**
    - **Example 2: if the Unit Operation specifies the compound values of a property, the Material Object must be able to return consistent compound values.**

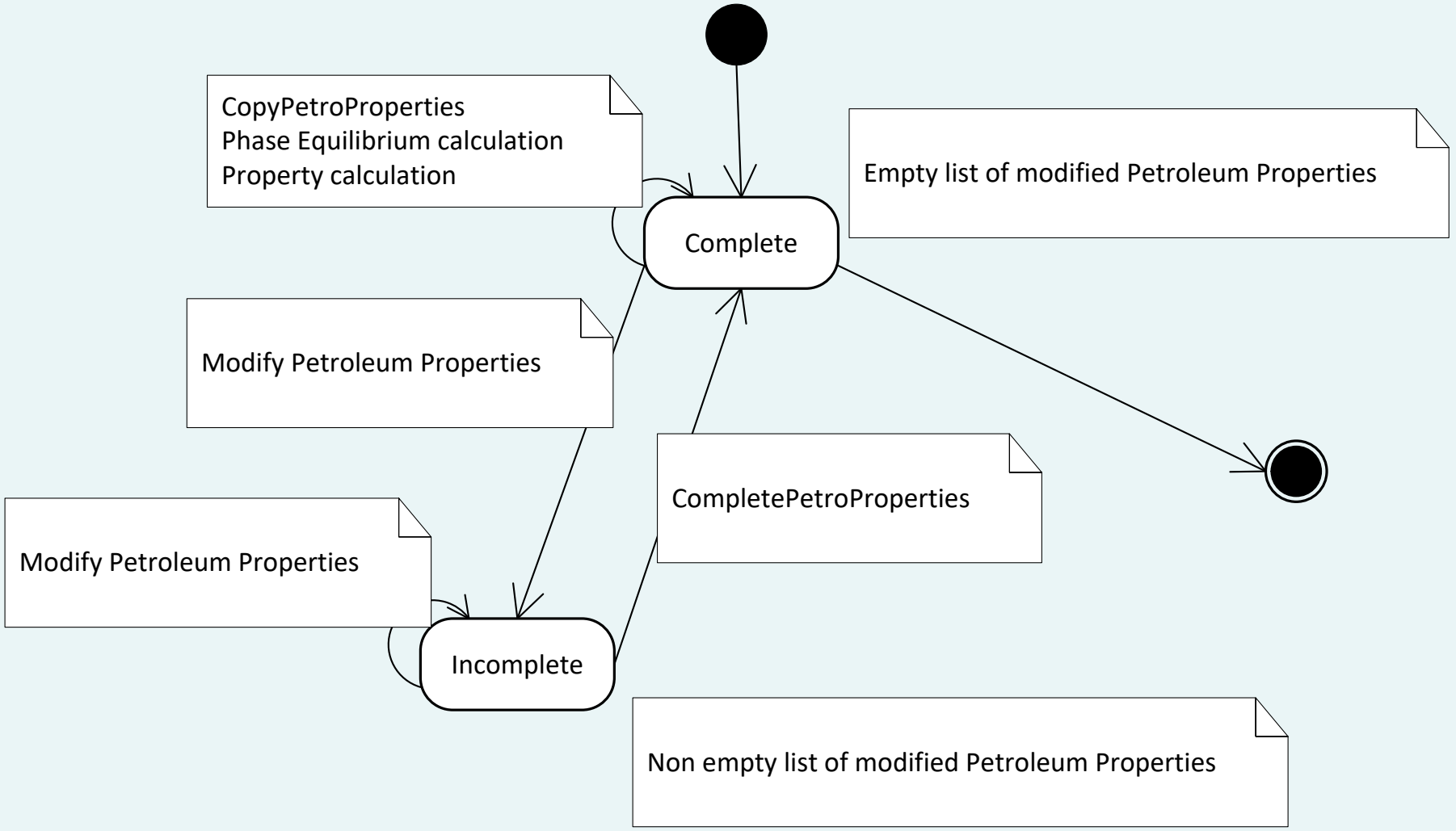
(contd…)

Petroleum Fractions: clarifications

- **Clarification on granularity:**
  - **A Ref-UNIT may not set conflicting granularities of any given property.**
    - Example: a Ref-UNIT that predicts sulphur content should predict compound sulphur content if it can, or bulk sulphur content if it can, but not both.
  - **A Ref-UNIT may request bulk or compound representations of a property at the feed.**
  - **A Ref-UNIT may specify a bulk or a compound representation of a property at the outlet.**

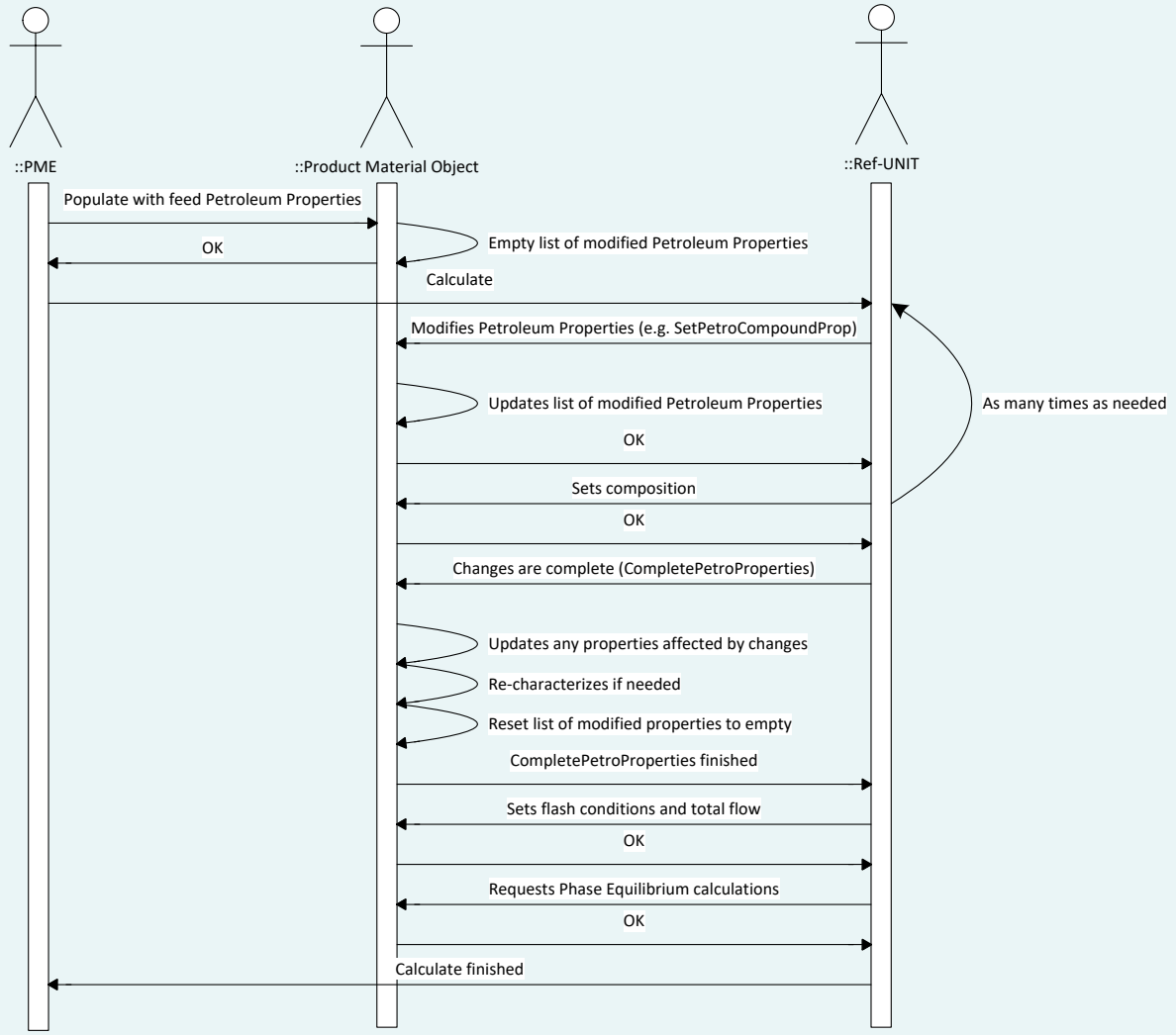
Petroleum Fractions: state diagram

States of Material Object



Petroleum Fractions: sequence diagram

- **Sequence Diagram: calculation of a Ref-UNIT**



Objectives for 2016/17

- Petro Fractions
  - Submit specification for Request For Comments
  - Publish Petroleum Fractions specification
  - Produce an IDL against the textual specification
- Continue to maintain Unit specification and E&C
- Prepare for COBIA
- Dynamic unit / Equation-oriented
  - on hold until business cases justify action