Commodities and Energy Products

Proposal for incorporation into FpML Version 4.0

16th September 2002

Status of this Document:

This document is a draft proposal to incorporate commodities and energy products into FpML Version 4.0 and is intended to be a starting point for an energy working group.

The primary focus of this document is on energy commodities with the intention that these products may potentially be extended in the future to other commodities such as metals and agricultural products.

Specific details of some of the products herein are still being defined (e.g., tiered and formula pricing, and cash- and physical-settlement). Some element, entity and scheme definitions are still stubbed.

TABLE OF CONTENTS

1 INTRODUCTION

This proposal leverages the existing FpML specification as a basis to establish a standard XML format for exchanging trade data between energy companies. This proposal extends the FpML Version 3.0 Working Draft specification to incorporate both physical and financial commodity derivatives. Existing FpML components are reused where possible.

Assumptions are:

- The FpML specification is flexible enough to accommodate and adapt to the peculiarities of new derivative products within asset classes.
- The specification's base framework for its existing asset classes is equally applicable for commodities and energy products.
- Physically-settled (vs. cash-settled) f/x and equity trades in the current specification provides a acceptable precedent for physically-settled commodity trades.

This proposal also assumes FpML's adoption of FpML Version 3.0's proposed implementation of "strategies" necessary to construct composite trades such as option collars. FpML Version 3.0, being only a working draft at this time, is subject to revision or obsolescence.

Disclaimer from FpML Financial products Markup Language, Working Draft 17 April 2002, Version: 3.0:

This is the FpML Version 3.0 Working Draft for review by the public and by FpML members and working groups. It is a draft document and may be updated, replaced or obsoleted by other documents at any time. It is inappropriate to use FpML Working Drafts as reference material or to cite them as other than "work in progress". There will be a subsequent release of this working draft to include Equity Derivative Products. This is work in progress and does not imply endorsement by the FpML.

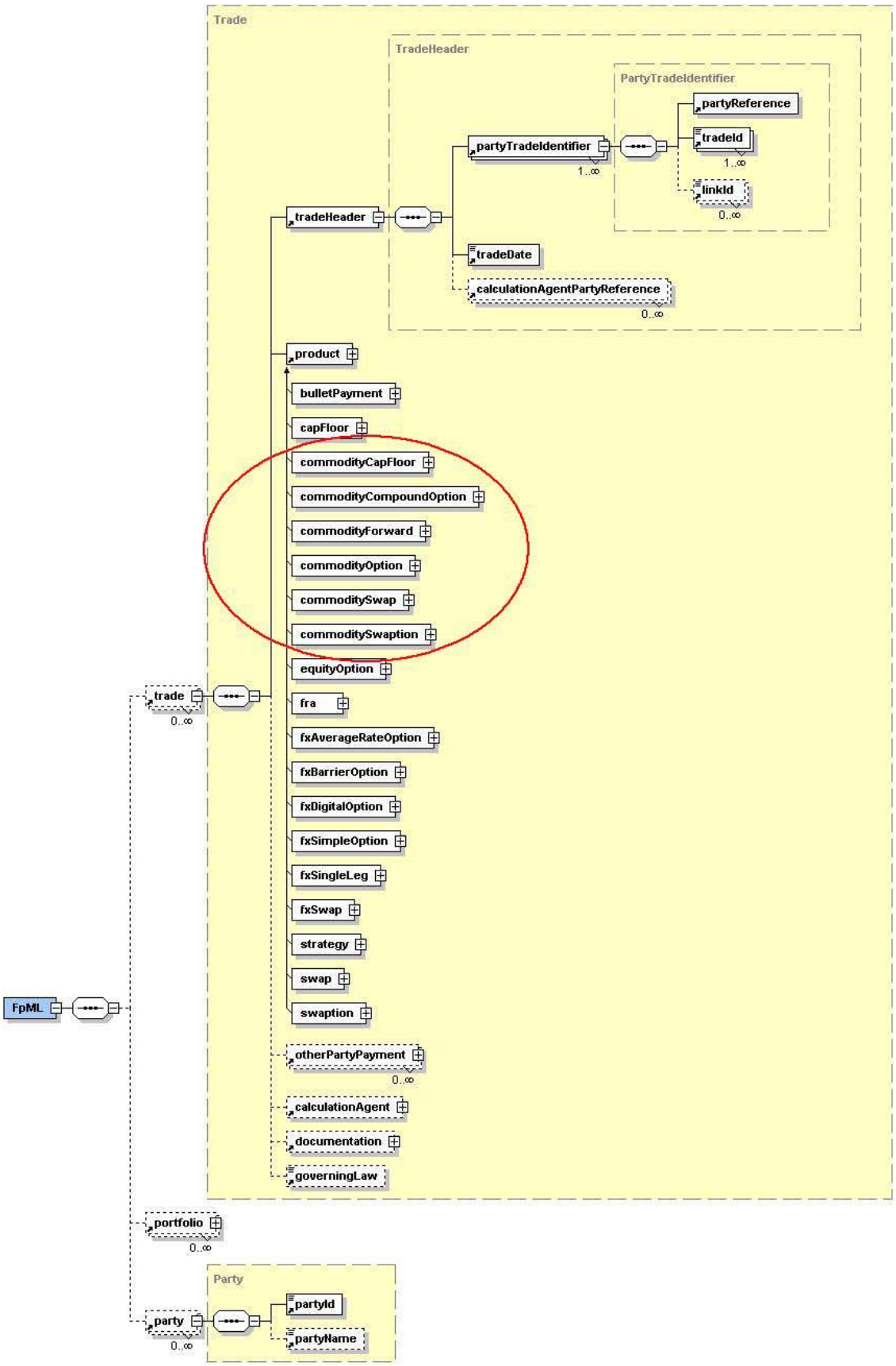
FpML Version 3.0 Working Draft is available online at: http://www.fpml.org/spec/2002/wd-fpml-3-0-2002-04-17/index.asp

2 COMMODITY PRODUCTS

The following products are herein defined for commodities and energy:

- commodityForward
- commoditySwap
- commodityOption
- commodityCapFloor
- commoditySwaption
- commodityCompoundOption

The commodityForward is the foundational product for the other commodity products.


Trade
TradeHeader
PartyTradeIdentifier
partyReference
tradeId
1..∞
partyTradeIdentifier
1..∞
linkId
0..∞
tradeHeader
tradeDate
calculationAgentPartyReference
0..∞
product
bulletPayment
capFloor
commodityCapFloor
commodityCompoundOption
commodityForward
commodityOption
commoditySwap
commoditySwaption
equityOption
fra
fxAverageRateOption
fxBarrierOption
fxDigitalOption
fxSimpleOption
fxSingleLeg
fxSwap
strategy
swap
swaption
trade
0..∞
FpML
otherPartyPayment
0..∞
calculationAgent
documentation
governingLaw
portfolio
0..∞
Party
partyId
partyName
party
0..∞

3 ENTITY DEFINITIONS

The following entities are added to the specification within a new XSD called either fpml-commodities-3-0.xsd or fpml-ce-3-0.xsd.

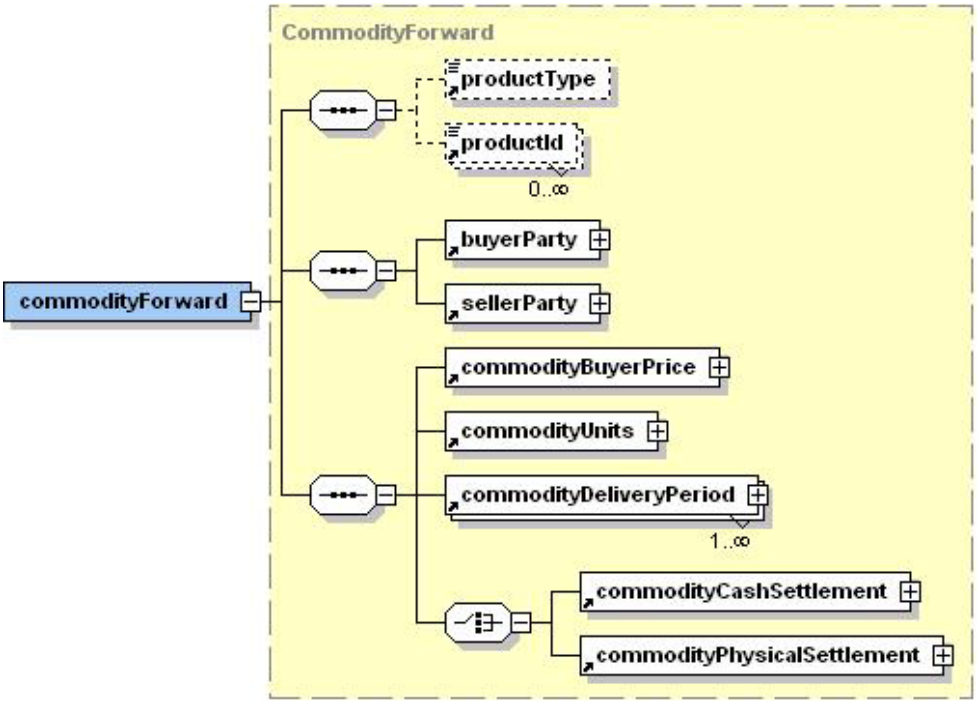
The energy working group will evaluate the following entities to determine 1) whether existing entities can be reused instead of creating new ones, and 2) which new entities might be applicable to other products in which case they could be placed in the shared components XSD.

FpML_CommodityForward

Description:

An entity for defining a commodity forward product.

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

(FpML_PartyDetails is reused from equity derivative components; it is not a "shared" component)

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

(FpML_PartyDetails is reused from equity derivative components; it is not a "shared" component)

commodityBuyerPrice (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityFormulaPrice)

- (copy *element definition* from section 4).

commodityUnits (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityUnits)

- (copy *element definition* from section 4).

commodityDeliveryPeriod (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityDeliveryPeriod)

- (copy *element definition* from section 4).

Either

commodityCashSettlement (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityCashSettlement)

- (copy *element definition* from section 4).

Or

commodityPhysicalSettlement (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityPhysicalSettlement)

- (copy *element definition* from section 4).

Used by:

commodityForward

XSD Fragment:

```
<xsd:complexType name="CommodityForward">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityBuyerPrice"/>
        <xsd:element ref="commodityUnits"/>
        <xsd:element ref="commodityDeliveryPeriod" maxOccurs="unbounded"/>
        <xsd:choice>
          <xsd:element ref="commodityCashSettlement"/>
          <xsd:element ref="commodityPhysicalSettlement"/>
        </xsd:choice>
      </xsd:sequence>
    </xsd:extension>
```

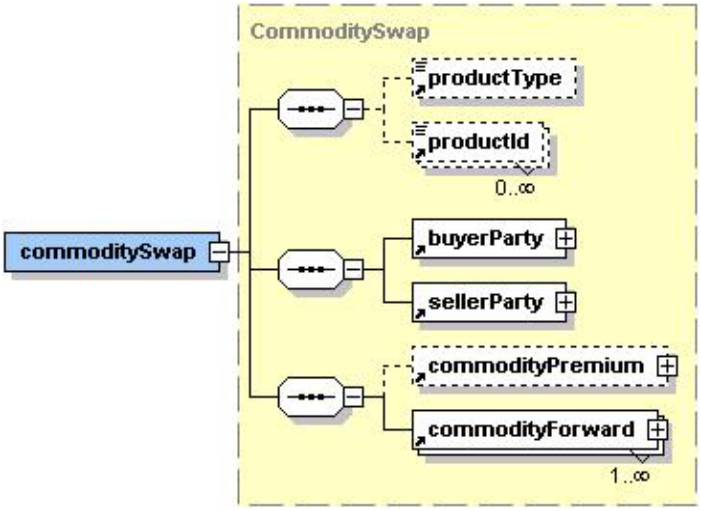
```
   </xsd:complexContent>
</xsd:complexType>
```

FpML_CommoditySwap

Description:

An entity for defining a commodity swap product as a stream of forwards.

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

commodityPremium (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityBuyerPrice)

- (copy *element definition* from section 4).

commodityForward (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityForward)

- (copy *element definition* from section 4).

Used by:

commoditySwap

XSD Fragment:

```
<xsd:complexType name="CommoditySwap">
   <xsd:complexContent>
      <xsd:extension base="CommodityProduct">
         <xsd:sequence>
            <xsd:element ref="commodityPremium" minOccurs="0"/>
            <xsd:element ref="commodityForward" maxOccurs="unbounded"/>
         </xsd:sequence>
      </xsd:extension>
   </xsd:complexContent>
</xsd:complexType>
```

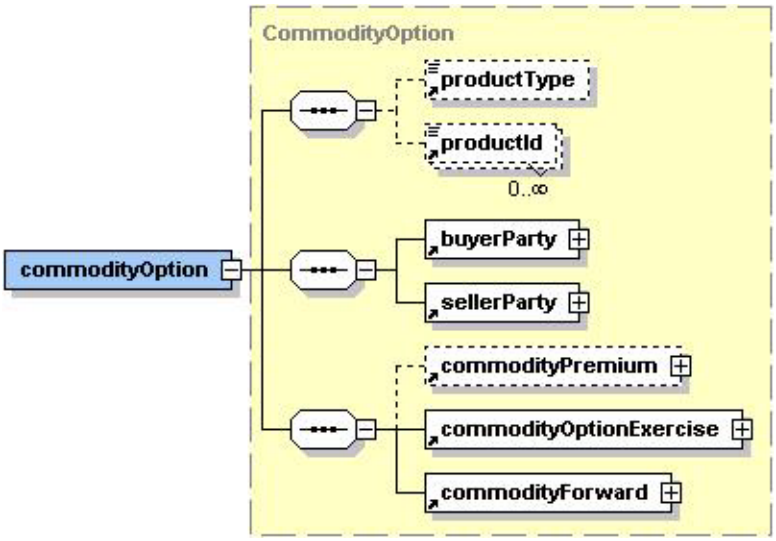
FpML_CommodityOption

Description:

An entity for defining an option on a commodity forward product.

[Note: the strike price is the buyer price on the underlying forward.]

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

commodityPremium (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityBuyerPrice)

- (copy *element definition* from section 4).

commodityOptionExercise (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityOptionExercise)

- (copy *element definition* from section 4).

commodityForward (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityForward)

- (copy *element definition* from section 4).

Used by:

commodityOption

XSD Fragment:

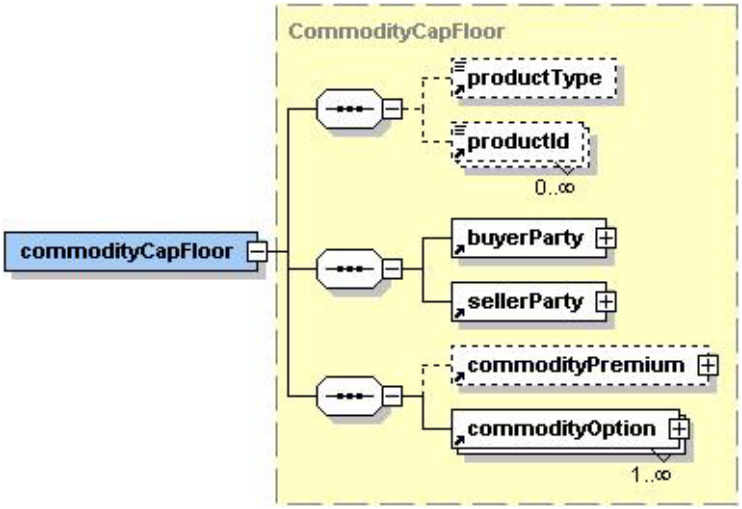
```
<xsd:complexType name="CommodityOption">
   <xsd:complexContent>
      <xsd:extension base="CommodityProduct">
         <xsd:sequence>
            <xsd:element ref="commodityPremium" minOccurs="0"/>
            <xsd:element ref="commodityOptionExercise"/>
            <xsd:element ref="commodityForward"/>
         </xsd:sequence>
      </xsd:extension>
   </xsd:complexContent>
</xsd:complexType>
```

FpML_CommodityCapFloor

Description:

An entity for defining a commodity cap/floor product as a stream of options.

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

commodityPremium (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityBuyerPrice)

- (copy *element definition* from section 4).

commodityOption (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityOption)

- (copy *element definition* from section 4).

Used by:

commodityCapFloor

XSD Fragment:

```
<xsd:complexType name="CommodityCapFloor">
   <xsd:complexContent>
      <xsd:extension base="CommodityProduct">
         <xsd:sequence>
            <xsd:element ref="commodityPremium" minOccurs="0"/>
            <xsd:element ref="commodityOption" maxOccurs="unbounded"/>
         </xsd:sequence>
      </xsd:extension>
   </xsd:complexContent>
</xsd:complexType>
```

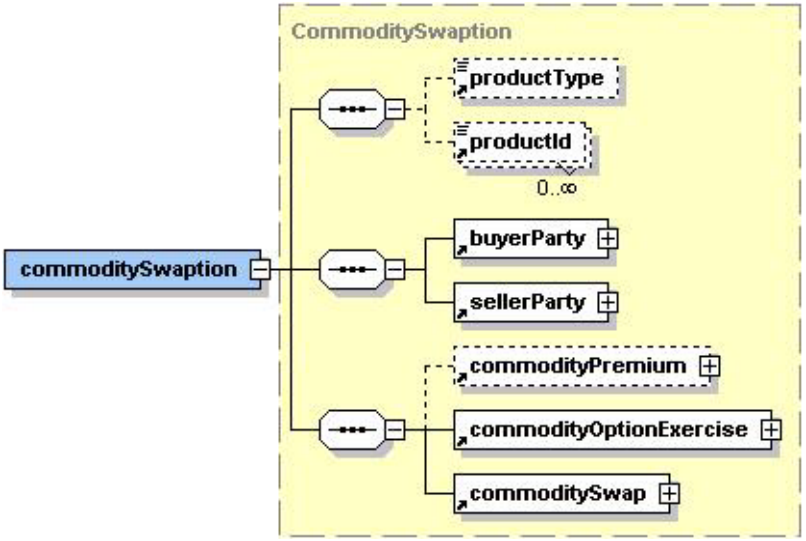
FpML_CommoditySwaption

Description:

An entity for defining an option on a commodity swap product.

[Note: the strike price is the premium on the underlying swap.]

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

commodityPremium (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityBuyerPrice)

- (copy *element definition* from section 4).

commodityOptionExercise (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityOptionExercise)

- (copy *element definition* from section 4).

commoditySwap (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommoditySwap)

- (copy *element definition* from section 4).

Used by:

commoditySwaption

XSD Fragment:

```
<xsd:complexType name="CommoditySwaption">
   <xsd:complexContent>
      <xsd:extension base="CommodityProduct">
         <xsd:sequence>
            <xsd:element ref="commodityPremium" minOccurs="0"/>
            <xsd:element ref="commodityOptionExercise"/>
            <xsd:element ref="commoditySwap"/>
         </xsd:sequence>
      </xsd:extension>
   </xsd:complexContent>
</xsd:complexType>
```

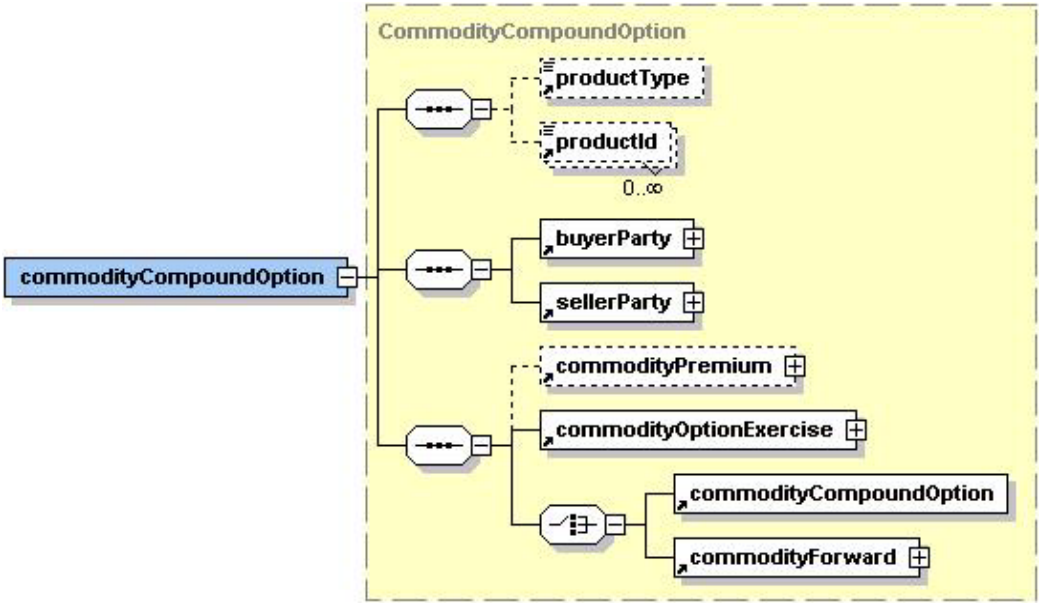
FpML_CommodityCompoundOption

Description:

An entity for defining nested commodity option products.

[Note: the strike price is the premium on the underlying option.]

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Product)

- The base entity which all FpML products extend.

buyerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party buying the forward.

sellerParty (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_PartyDetails)

- The party selling the forward.

commodityPremium (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityBuyerPrice)

- (copy *element definition* from section 4).

commodityOptionExercise (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityOptionExercise)

- (copy *element definition* from section 4).

Either

commodityCompoundOption (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityCompoundOption)

- (copy *element definition* from section 4).

Or

commodityForward (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityForward)

- (copy *element definition* from section 4).

Used by:

commodityCompoundOption

XSD Fragment:

```
<xsd:complexType name="CommodityCompoundOption">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOptionExercise"/>
        <xsd:choice>
          <xsd:element ref="commodityCompoundOption"/>
          <xsd:element ref="commodityForward"/>
        </xsd:choice>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

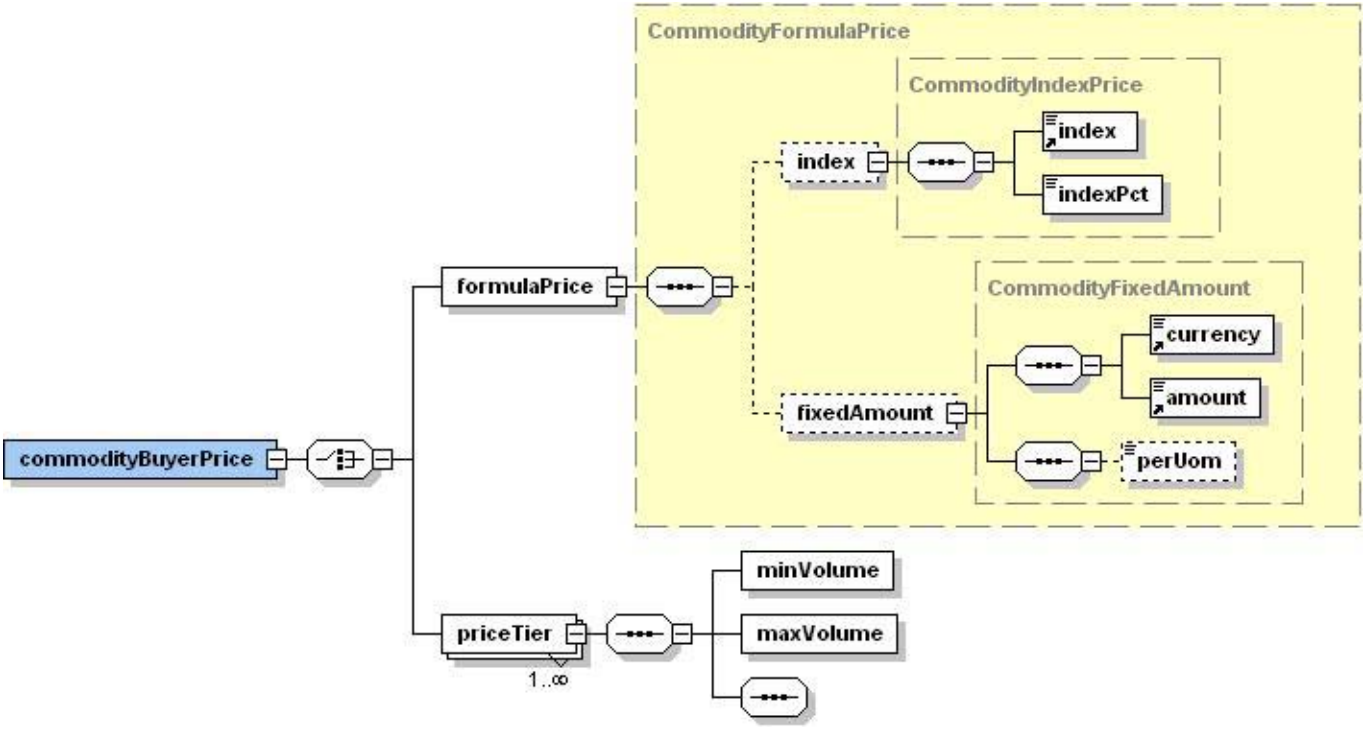
FpML_CommodityFormulaPrice

Description:

An entity for…. The fixed amount doubles as the full price of a fixed-price trade and the offset of an index plus offset trade.

[Need to include tiered gas pricing, complex crude pricing and averaging dates. Should NX1, NX3, NXAVG and NXPROMPT be expressed as averages of NYMEX-NG? Roll days and … for NXPROMPT+1 and NXPROMPT-1.]

Figure:



Contents:

index (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityIndexPrice)

- (copy *element definition* from section 4).

fixedAmount (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_CommodityFixedAmount)

- (copy *element definition* from section 4).

Used by:

commodityForward

XSD Fragment:

FpML_CommodityIndexPrice

Description:

An entity for….

Figure:

(see FpML_CommodityFormulaPrice above)

Contents:

index (exactly one occurrence; of type *string*, an enumerated domain value defined by *indexScheme*)

- A published index price.

indexPct (exactly one occurrence; of type *decimal*)

- A percentage of the published index price expressed as decimal amount (i.e., 1.0=100%; 0.5=50%).

Used by:

commodityFormulaPrice
commodityCashSettlement

XSD Fragment:

FpML_CommodityFixedAmount

Description:

An entity for…. (This entity extends FpML_Money.)

Figure:

(see FpML_ CommodityFormulaPrice above)

Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_Money)

- An entity for defining a currency amount.

perUom (zero or one occurrence; of type *string*, an enumerated domain value defined by *uomScheme*)

- Defines the fixed amount as a per unit price relative to the volumetric quantity.

Used by:

commodityFormulaPrice

XSD Fragment:

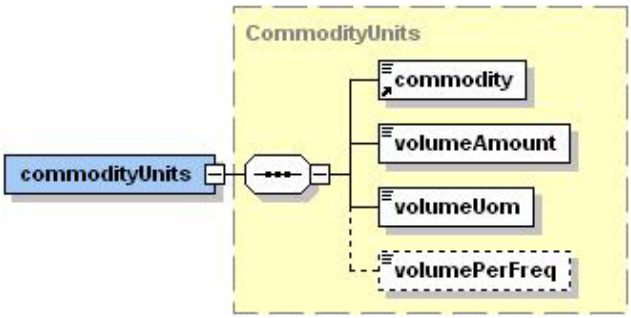
FpML_CommodityUnits

Description:

An entity for….

Note: Whether the commodity is a financial or physical trade is defined by cash settlement or physical settlement.

Figure:



Contents:

commodity (exactly one occurrence; of type *string*, an enumerated domain value defined by *commodityScheme*)

- The commodity being traded.

volumeAmount (exactly one occurrence; of type *decimal*)

- The volumetric quantity of the specified commodity.

volumeUom (exactly one occurrence; of type *string*, an enumerated domain value defined by *uomScheme*)

- The unit of measure in which the quantity is denominated.

volumePerFreq (zero or one occurrence; of type *string*, an enumerated domain value defined by *frequencyScheme*)

- Defines the volumetric quantity as relative to the delivery period.

Used by:

commodityUnits

XSD Fragment:

Natural Gas Example:

<commodityUnits>
<commodity>NG</ commodity>
<volumeAmount>10,000</ volumeAmount>
<volumeUom>MMBtu</ volumeUom>
<volumePerFreq>M</ volumePerFreq>

```
</commodityUnits>
```

Power Example:

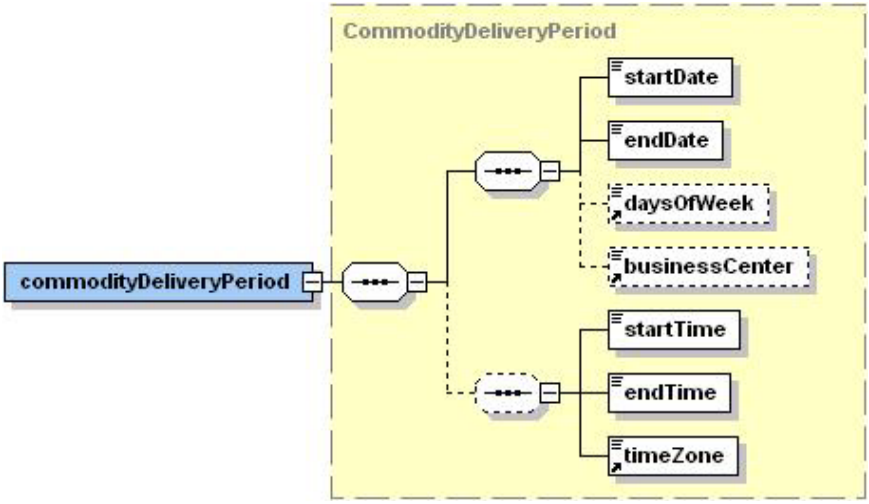
```
<commodityUnits>
        <commodity>Power</ commodity>
        <volumeAmount>50</ volumeAmount>
        <volumeUom>MWh</ volumeUom>
        <volumePerFreq>H</ volumePerFreq>
</commodityUnits>
```

FpML_CommodityDeliveryPeriod

Description:

An entity for….

Figure:



Contents:

startDate (exactly one occurrence; of type *date*)

- The start date of the delivery period.

(Should startDate be of type FpML_AdjustableDate or of type FpML_AdjustableOrRelativeDate?)

endDate (exactly one occurrence; of type *date*)

- The end date of the delivery period.

(Should endDate be of type FpML_AdjustableDate or of type FpML_AdjustableOrRelativeDate?)

daysOfWeek (zero or one occurrence; of type *string*, an enumerated domain value defined by *daysOfWeekScheme*)

- A mask restricting delivery to specific days of week between the startDate and endDate.

businessCenter (zero or one occurrence; of type *string*, an enumerated domain value defined by *businessCenterScheme*)

- ~~A code identifying a financial business center location. A list of business centers may be ordered in the document alphabetically based on business center code. An FpML document containing an unordered business center list is still regarded as a conformant document.~~
- A code identifying the days between the startDate and endDate which are holidays.

startTime (zero or one occurrence; of type *string*)

- The start time of delivery on each delivery day in the delivery period.

endTime (zero or one occurrence; of type *string*)

- The end date of delivery on each delivery day the delivery period.

timeZone (zero or one occurrence; of type *string*, an enumerated domain value defined by *timeZoneScheme*)

- Qualifies the startTime and endTime of the deliveryPeriod.

(Other FpML asset classes, e.g., FpML_BusinessCenterTime, use FpML_BusinessCenter to indicate time zone, i.e., 'GBLO' to designate "London time".)

Used by:

commodityDeliveryPeriod

XSD Fragment:

Natural Gas Example:

```
<commodityDeliveryPeriod>
        <startDate>2002-09-01</startDate>
        <endDate>2002-09-30</endDate>
</commodityDeliveryPeriod>
```

Definitions of On-Peak, Off-Peak and ATC for U.S. Power:

	PPT	MPT	CPT	EPT
On-Peak	HE0700-HE2200 -MTWTFS-	HE0800-HE2300 -MTWTFS-	HE0700-HE2200 -MTWTF--	HE0800-HE2300 -MTWTF--
Off-Peak	HE0100-HE0600 -MTWTFS- HE2300-HE2400 -MTWTFS- HE0100-HE2400 S------H	HE0100-HE0700 -MTWTFS- HE2400-HE2400 -MTWTFS- HE0100-HE2400 S------H	HE0100-HE0600 -MTWTF— HE2300-HE2400 -MTWTF— HE0100-HE2400 S-----SH	HE0100-HE0700 -MTWTF— HE2400-HE2400 -MTWTF— HE0100-HE2400 S-----SH
ATC (Around-the-Clock)	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH

Power Off-Peak PPT Example:

```
<commodityDeliveryPeriod>
        <startDate>2002-09-01</startDate>
        <endDate>2002-09-30</endDate>
        <daysOfWeek>-MTWTFS-</daysOfWeek>
        <businessCenter>NERC</businessCenter >
        <startTime>HE0100</startTime>
        <endTime>HE0600</endTime>
        <timeZone>PPT</timeZone>
</commodityDeliveryPeriod>
<commodityDeliveryPeriod>
        <startDate>2002-09-01</startDate>
```

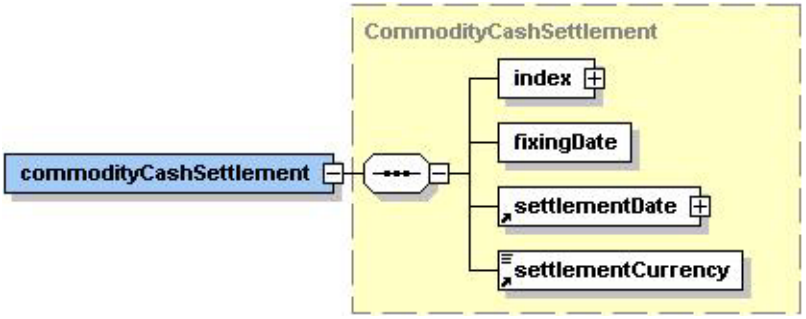
```
        <endDate>2002-09-30</endDate>
        <daysOfWeek>-MTWTFS-</daysOfWeek>
        <businessCenter >NERC</businessCenter >
        <startTime>HE2300</startTime>
        <endTime>HE2400</endTime>
        <timeZone>PPT</timeZone>
</commodityDeliveryPeriod>
<commodityDeliveryPeriod>
        <startDate>2002-09-01</startDate>
        <endDate>2002-09-30</endDate>
        <daysOfWeek>S------H</daysOfWeek>
        <businessCenter >NERC</businessCenter >
        <startTime>HE0100</startTime>
        <endTime>HE2400</endTime>
        <timeZone>PPT</timeZone>
</commodityDeliveryPeriod>
```

FpML_CommodityCashSettlement

Description:

An entity for….

Figure:



Contents:

[This entity is still being defined.]

Used by:

`commodityCashSettlement`

XSD Fragment:

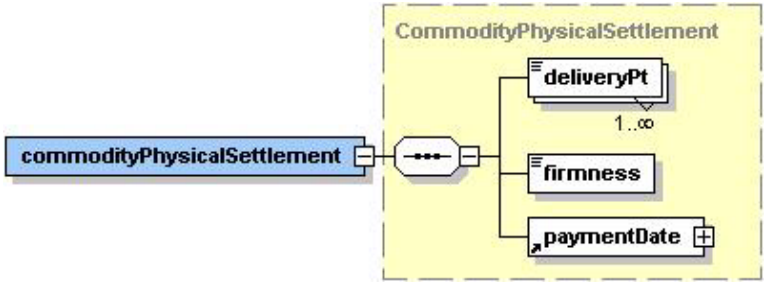
FpML_CommodityPhysicalSettlement

Description:

An entity for….

[Note: all physical logistics and specifications for a physical commodities trade would be defined here.]

Figure:



Contents:

[This entity is still being defined.]

Used by:

`commodityPhysicalSettlement`

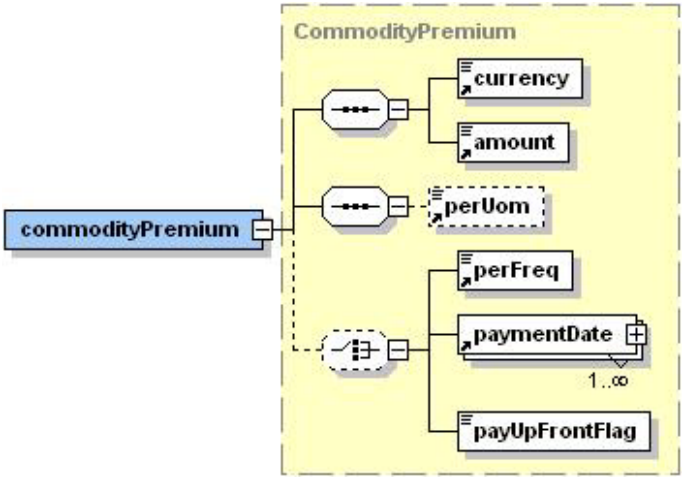
XSD Fragment:

FpML_CommodityPremium

Description:

An entity for….

Figure:



Contents:

inherited element(s) (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML_CommodityFixedAmount)

- An entity for defining a currency amount per uom.

Either

perFreq (zero or one occurrence; of type *string*, an enumerated domain value defined by *frequencyScheme*)

- Defines....

Or

paymentDate (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_AdjustableDate)

- The payment date(s). This date is subject to adjustment in accordance with any applicable business day convention.

Or

payUpFrontFlag (exactly one occurrence; of type *boolean*)

- Defines....

Used by:

commodityPremium

XSD Fragment:

Non-recurring Premium Example:

```
<commodityPremium>
        <amount>0.02</amount>
        <currency>USD</currency>
        <perUom>MMBtu</perUom>
</commodityPremium>
```

Annual Premium Example:

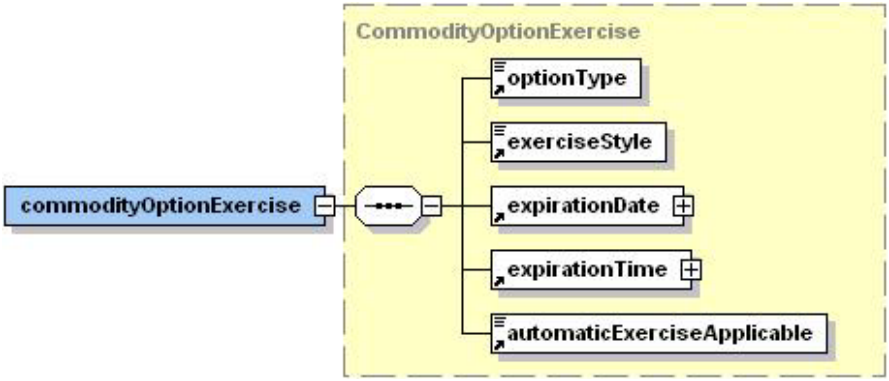
```
<commodityPremium>
        <amount>1000</amount>
        <currency>USD</currency>
        <perFreq>Y</perFreq>
</commodityPremium>
```

FpML_CommodityOptionExercise

Description:

An entity for….

Figure:



Contents:

optionType (exactly one occurrence; of type *string*, an enumerated domain value defined by *optionTypeScheme*)

- The type of option transaction.

(optionType is reused from equity derivative components; it is not a "shared" component)

exerciseStyle (exactly one occurrence; of type *string*, an enumerated domain value defined by *exerciseStyleScheme*)

- The manner in which the option can be exercised.

(exerciseStyle is reused from f/x derivative components; it is not a "shared" component)

expirationDate (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_AdjustableOrRelativeDate)

- The last day within an exercise period for an American style option. For a European style option it is the only day within the exercise period.

expirationTime (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML_BusinessCenterTime)

- The latest time for expiration on expirationDate.

(businessCenter in expirationTime is not an adequate substitution for timeZone; need FpML_BusinessCenterTime modified for choice of businessCenter OR timeZone.)

automaticExerciseApplicable (exactly one occurrence; of type *boolean*)

- If true then each option not previously exercised will be deemed to be exercised at the expiration time on the expiration date without service of notice unless the buyer notifies the seller that it no longer wishes this to occur.

(automaticExerciseApplicable is reused from equity derivative components; it is not a "shared" component)

Used by:

commodityOptionExercise

XSD Fragment:

Adjustable Expiration Date Example:

```
<commodityOptionExercise>
        <optionType>Call</optionType>
        <exerciseStyle>American</exerciseStyle>
        <expirationDate>
                <adjustableDate>
                        <unadjustedDate>2002-09-28</unadjustedDate>
                        <dateAdjustments>
                                <businessDayConvention>NONE|FOLLOWING|PRECEDING
                                        </businessDayConvention>
                                <businessCenters>
                                        <businessCenter>GBLO|USCH|USLA|USNY</businessCenter>
                                </businessCenters>
                        </dateAdjustments>
                </adjustableDate>
        </expirationDate>
        <expirationTime>
                <hourMinuteTime>11:00:00</hourMinuteTime>
                <businessCenter> GBLO|USCH|USLA|USNY</businessCenter>
        </expirationTime>
        <automaticExerciseApplicable>False</automaticExerciseApplicable>
</commodityOptionExercise>
```

Relative Expiration Date Example:

```
<commodityOptionExercise>
        <optionType>Put</optionType>
        <exerciseStyle>European</exerciseStyle>
        <expirationDate>
                <relativeDate>
                        <periodMultiplier>1</periodMultiplier>
                        <period>D|W|M</period>
                        <dayType>Business|Calendar</dayType>
                        <businessDayConvention>NONE|FOLLOWING|PRECEDING
                                </businessDayConvention>
                        <businessCenters>
                                <businessCenter>GBLO|USCH|USLA|USNY</businessCenter>
                        </businessCenters>
                        <dateRelativeTo>CalculationPeriodEndDate|…</dateRelativeTo>
```

```
                </relativeDate>
        </expirationDate>
        <expirationTime>
                <hourMinuteTime>11:00:00</hourMinuteTime>
                <businessCenter> GBLO|USCH|USLA|USNY</businessCenter>
        </expirationTime>
        <automaticExerciseApplicable>False</automaticExerciseApplicable>
</commodityOptionExercise>
```

4 ELEMENT DEFINITIONS

The following elements are added to the specification.

Element/Description	Used By
commodityForward ; entity type: FpML_CommodityForward A commodity forward product definition.	FpML_ProductSelection FpML_CommoditySwap FpML_CommodityOption FpML_CommodityCompoundOption
commoditySwap ; entity type: FpML_CommoditySwap A product definition for a stream of commodity forwards.	FpML_ProductSelection FpML_CommoditySwaption
commodityOption ; entity type: FpML_CommodityOption A product definition for an option on a commodity forward.	FpML_ProductSelection FpML_CommodityCapFloor FpML_CommodityCompoundOption
commodityCapFloor ; entity type: FpML_CommodityCapFloor A product definition for a stream of commodity options.	FpML_ProductSelection
commoditySwaption ; entity type: FpML_CommoditySwaption A product definition for an option on a commodity swap.	FpML_ProductSelection
commodityCompoundOption ; entity type: FpML_CommodityCompoundOption A product definition for nested commodity options.	FpML_ProductSelection FpML_CommodityCompoundOption

commodityBuyerPrice ; entity type: FpML_CommodityFormulaPrice (insert element definition).	FpML_CommodityForward
commodityIndexPrice ; entity type: FpML_CommodityIndexPrice (insert element definition).	FpML_CommodityFormulaPrice FpML_CommodityCashSettlement
commodityFixedAmount ; entity type: FpML_CommodityFixedAmount (insert element definition).	FpML_CommodityFormulaPrice
commodityUnits ; entity type: FpML_CommodityUnits (insert element definition).	FpML_CommodityForward
commodityDeliveryPeriod ; entity type: FpML_CommodityDeliveryPeriod (insert element definition).	FpML_CommodityForward
commodityCashSettlement ; entity type: FpML_CommodityCashSettlement (insert element definition).	FpML_CommodityForward
commodityPhysicalSettlement ; entity type: FpML_CommodityPhysicalSettlement (insert element definition).	FpML_CommodityForward
commodityPremium ; entity type: FpML_CommodityPremium (insert element definition).	FpML_CommoditySwap FpML_CommodityOption FpML_CommodityCapFloor FpML_CommoditySwaption FpML_CommodityCompoundOption

commodityOptionExercise ; entity type: FpML_CommodityOptionExercise (insert element definition).	FpML_CommodityOption FpML_CommoditySwaption FpML_CommodityCompoundOption

5 SCHEME DEFINITIONS

The following coding schemes are added to the specification, with corresponding default scheme attributes added to the FpML root component:

- commodityScheme
- daysOfWeekScheme
- deliveryPointScheme
- firmnessScheme
- frequencyScheme
- indexScheme
- timeZoneScheme
- uomScheme

The following existing coding schemes are amended for additional values:

- businessCenterScheme
- exerciseStyleScheme
- periodScheme

businessCenterScheme (amended)

Definition:

A financial business center location.

URI:

http://www.fpml.org/spec/2000/business-center-1-0

Description:

In general, the codes are based on the ISO country code and the English name of the location.

Additional location codes can be built according to the following rules. The first two characters represent the ISO country code, the next two characters represent a) if the location name is one word, the first two letters of the location b) if the location name consists of at least two words, the first letter of the first word followed by the first letter of the second word .

There are exceptions to this rule. For example, the TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) business center for Euro settlement has a code of EUTA.

This coding scheme is currently consistent with the S.W.I.F.T. Financial Centre scheme used in the MT340/MT360/MT361 message definitions, although FpML controls the Business Center Scheme and it should not be assumed that both schemes will remain synchronized.

Coding Scheme

CODE	SOURCE	DESCRIPTION
ARBA	FpML	Buenos Aires
ATVI	FpML	Vienna
AUME	FpML	Melbourne
AUSY	FpML	Sydney
BEBR	FpML	Brussels
BRSP	FpML	Sao Paulo
CAMO	FpML	Montreal
CATO	FpML	Toronto
CHGE	FpML	Geneva
CHZU	FpML	Zurich
CLSA	FpML	Santiago
CNBE	FpML	Beijing
CZPR	FpML	Prague
DEFR	FpML	Frankfurt
DKCO	FpML	Copenhagen
EETA	FpML	Tallinn
ESMA	FpML	Madrid
EUTA	FpML	TARGET (euro 'Business Center')
FIHE	FpML	Helsinki
FRPA	FpML	Paris
GBLO	FpML	London
GRAT	FpML	Athens
HKHK	FpML	Hong Kong
IDJA	FpML	Jakarta
ILTA	FpML	Tel Aviv
ITMI	FpML	Milan
ITRO	FpML	Rome
JPTO	FpML	Tokyo
KRSE	FpML	Seoul
LBBE	FpML	Beirut
LULU	FpML	Luxembourg
MXMC	FpML	Mexico City
MYKL	FpML	Kuala Lumpur
NLAM	FpML	Amsterdam
NOOS	FpML	Oslo
NZAU	FpML	Auckland
NZWE	FpML	Wellington
PAPC	FpML	Panama City
PHMA	FpML	Manila
PLWA	FpML	Warsaw
RUMO	FpML	Moscow
SARI	FpML	Riyadh
SEST	FpML	Stockholm
SGSI	FpML	Warsaw
SKBR	FpML	Bratislava
THBA	FpML	Bangkok
TRAN	FpML	Ankara

TWTA	FpML	Taipei
USCH	FpML	Chicago
USLA	FpML	Los Angeles
USNY	FpML	New York
ZAJO	FpML	Johannesburg
NERC (added)	FpML	North American Electric Reliability Council Holidays http://www.nerc.com/~oc/offpeaks.html
(others to be added)		

commodityScheme

Definition:

A commodity being traded.

URI:

http://www.fpml.org/spec/2002/commodity-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/commodity-scheme-1-0)

Coding Scheme

CODE	SOURCE	DESCRIPTION

Natural Gas

NG		Natural Gas

Power

Power		Power

Crude and Products

CL	NYMEX	WTI Crude (CL is Periodic Table symbol for chlorine)
SC	NYMEX	Brent Crude (SC is Periodic Table symbol for scandium)
HO	NYMEX	Heating Oil (HO is Periodic Table symbol for holmium)
HU	NYMEX	Unleaded Gasoline
PN	NYMEX	Propane

Metals

AL (COMEX: AL)	Periodic Table	Aluminum

CU (COMEX: HG)	Periodic Table	Copper
AU (COMEX: GC)	Periodic Table	Gold
HG	Periodic Table	Mercury
PD (NYMEX: PA)	Periodic Table	Palladium
PT (NYMEX: PL)	Periodic Table	Platinum
PA	Periodic Table	Protactinium
SI	Periodic Table	Silicon
AG (COMEX: SI)	Periodic Table	Silver

(others)		

daysOfWeekScheme

Definition:

A mask specifying the specific days of week on which a commodity will be delivered.

URI:

http://www.fpml.org/spec/2002/days-of-week-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/days-of-week-scheme-1-0)

Description:

Requires a corresponding business center or holiday calendar specification to define which days are business days and holidays.

Coding Scheme

CODE	SOURCE	DESCRIPTION
SMTWTFSH		Weekends, weekdays and holidays
-MTWTF--		Weekdays only
-MTWTF-H		Weekdays and holidays
S-----SH		Weekends and holidays
(etc.)		

deliveryPointScheme

Definition:

URI:

http://www.fpml.org/spec/2002/delivery-point-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/deliver-point-scheme-1-0)

Description:

Coding Scheme

CODE	SOURCE	DESCRIPTION
(TBD)		

exerciseStyleScheme (amended)

Definition:

The specification of how an ~~FX OTC~~ option will be exercised.

URI:

http://www.fpml.org/spec/2002/exercise-style-scheme-3-0

Coding Scheme

CODE	SOURCE	DESCRIPTION
American	FpML	Option can be exercised on any date up to the expiry date.
European	FpML	Option can only be exercised on the expiry date.
Asian (added)	FpML	

firmnessScheme

Definition:

URI:

http://www.fpml.org/spec/2002/firmness-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/firmness-scheme-1-0)

Description:

Coding Scheme

CODE	SOURCE	DESCRIPTION
F		Firm
I		Interruptible
(others)		

frequencyScheme

Definition:

Same as periodScheme.

[Need to reconsider whether introducing a synonym for period is necessary rather than just using period. See the relative expiration date example within the FpML_CommodityOptionExercise entity definition in section 3 for an example of period.]

URI:

http://www.fpml.org/spec/2000/period-1-0

Root Element Example:

<FpML ... frequencySchemeDefault = "http://www.fpml.org/spec/2000/period-1-0" ...>

indexScheme

Definition:

URI:

http://www.fpml.org/spec/2002/index-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/index-scheme-1-0)

Description:

Coding Scheme

CODE	SOURCE	DESCRIPTION
IF.ANR.LA.H		Inside F.E.R.C.'s Gas Market Report / Prices of Spot Gas Delivered to Pipelines / ANR Pipeline Co. / Louisiana / Range (High)
MD.16HR.COB.WA		Megawatt Daily's MarketReport / Trades for Standard 16-Hour Daily Products / COB / Weighted Average Index
(others)		

periodScheme (amended)

Definition:

The specification of a time period.

URI:

http://www.fpml.org/spec/2000/period-1-0

Coding Scheme

CODE	SOURCE	DESCRIPTION
D	n/a	Day
M	n/a	Month
T	n/a	Term
W	n/a	Week
Y	n/a	Year
H (added)	n/a	Hour

timeZoneScheme

Definition:

A time zone.

URI:

http://www.fpml.org/spec/2002/time-zone-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/time-zone-scheme-1-0)

(Is there an existing ISO definition for time zones, which also includes "prevailing" time?)

Coding Scheme

CODE	SOURCE	DESCRIPTION
GMT		Greenwich Mean Time
UTC		Coordinated Universal Time
CDT		Central Daylight Saving Time
CPT		Central Prevailing Time
CST		Central Standard Time
EDT		Eastern Daylight Saving Time
EPT		Eastern Prevailing Time
EST		Eastern Standard Time
MDT		Mountain Daylight Saving Time
MPT		Mountain Prevailing Time
MST		Mountain Standard Time
PDT		Pacific Daylight Saving Time
PPT		Pacific Prevailing Time
PST		Pacific Standard Time
(others)		

uomScheme

Definition:

A unit of measure.

URI:

http://www.fpml.org/spec/2002/uom-scheme-4-0
(or, http://markets.Reuters.com/rtfs/int/spec/2002/uom-scheme-1-0)

Coding Scheme

CODE	SOURCE	DESCRIPTION
MMBtu		Million British thermal units
MWh		Megawatt hours
(others)		

6 XSD CHANGES

The following changes to support commodities and energy are based on the FpML Version 3.0 Working Draft XSD.

6.1 Changes to fpml-main-3-0.xsd

1. A new commodities XSD has been included into fpml-main-3-0.xsd:

```
<xsd:include schemaLocation="fpml-commodities-3-0.xsd"/>
```

2. Attributes for new default schemes have been added to the root "FpML" element:

```
<xsd:element name="FpML">
   :
      <xsd:attribute name="commoditySchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="daysOfWeekSchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="deliveryPeriodSchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="firmnessSchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="frequencySchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="indexSchemeDefault" type="xsd:normalizedString"/>
      <xsd:attribute name="uomSchemeDefault" type="xsd:normalizedString"/>
   :
</xsd:element>
```

6.2 Excerpt from new fpml-commodities-3-0.xsd or fpml-ce-3-0.xsd

The following is excerpted from a larger file:

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.fpml.org/2002/FpML-3-0"
      xmlns:xsd="http://www.w3.org/2001/XMLSchema"
      xmlns="http://www.fpml.org/2002/FpML-3-0"
      elementFormDefault="qualified" attributeFormDefault="unqualified">
   <xsd:include schemaLocation="fpml-shared-3-0.xsd"/>
   <xsd:include schemaLocation="fpml-eqd-3-0.xsd"/>
   <xsd:include schemaLocation="fpml-fx-3-0.xsd"/>
   :
   <xsd:complexType name="CommodityForward">
      <xsd:complexContent>
       <xsd:extension base="CommodityProduct">
         <xsd:sequence>
            <xsd:element ref="commodityBuyerPrice"/>
            <xsd:element ref="commodityUnits"/>
            <xsd:element ref="commodityDeliveryPeriod"/>
            <xsd:choice>
               <xsd:element ref="commodityCashSettlement"/>
               <xsd:element ref="commodityPhysicalSettlement"/>
            </xsd:choice>
```

```
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
  :
  <xsd:element name="commodityForward" type="CommodityForward"
     substitutionGroup="product"/>
  :
</xsd:schema>
```