TO: David A. Stawick
Secretary of the Commission, Commodity Futures Trading Commission
FR: Michael Atkin, Managing Director, EDM Council
RE: **Algorithmic Study**
DA: December 22, 2010

The EDM Council is pleased to offer comments on the SEC/CFTC inquiry concerning the feasibility of requiring the derivatives industry to adopt standardized computer-readable algorithmic descriptions to describe complex and standardized financial derivatives. Our response is organized into three sections:

(1) Our view of the current and future role of semantics in establishing precise terms, definitions and relationships associated with financial contracts;

(2) Overview of the EDM Council's Semantics Repository and the state of semantic precision for OTC derivatives; and

(3) Our views on the specific questions posed in Release No. 34-63423; File No. 4-620. I will note that the EDM Council is not in position to comment on the specific practices of its members in either calculating net exposure or for the state of semantics implementation within individual firms.

The EDM Council is a 501(c)(6) non-profit trade association established in 2005 by financial institutions and financial industry vendors to address the challenges associated with management of reference data across firms and throughout the industry. A roster of current members is appended to this response.

Role of Semantics

Precise reference data is the lifeblood of the financial industry. It defines the contractual structure of the financial instrument and specifies the requirements and obligations of the participants. It sets out the dates, rates and terms associated with debenture, redemption, netting, maturity, priority and exercise. It clarifies capital structure, cash flows and payment parameters. It defines restrictions and eligibility requirements. It provides linkages to multiple underlying instruments as well as to essential triggers (market events) and among contractual participants.

The term semantics refers to the ultimate meaning of a simple data point. The meanings of terms in contracts are ultimately grounded in the legal statements and commitments agreed to by participants as part of the structure of financial instruments.

A semantic approach can clarify broader modeling challenges. For example, the performance of a portfolio within an institution requires semantic descriptions of facts about holdings and positions as well as facts about the wider marketplace that correspond to conditions stipulated in contracts (i.e. the conditions under which an option may be exercised). Positions also have a dimension of counterparty risk if the commitment entered into is not fulfilled. Such risk can be modeled mathematically and is also a candidate for formal semantic definition.

Looking at the issue more broadly, systemic risk would require modeling of counterparties and their exposures. Facts about counterparties are facts about

contracts and are therefore also included in a semantic model of these contracts. Additional facts about the positions and exposures of those parties at any given point in time may also be modeled semantically to provide the formal terms needed to analyze systemic risk.

Without belaboring the point, reference data is the core factor of input into every business process within financial institutions. It must be complete, accurate and consistent in order for firms to have trust and confidence that it is fit for purpose for all models and applications. And it must be comparable so that regulators can rely on it to provide oversight over complexity and guard against overly risky business practices.

To summarize, complete, accurate and consistent data is relevant at three distinct levels: facts about contracts, facts about positions and holdings within a financial institution, and facts about the wider system. Tagging each of these kinds of terms semantically with reference to contract, party, market events and the mathematics of cash flow would ensure accuracy and consistency across different data sources and different reporting mechanisms.

Why Data Gaps Exist

Complete, consistent and comparable reference data is not always the case in the financial industry. Data gaps exist because we have an inefficient and fragmented chain of information supply. To put things into perspective, all of the data that defines the contractual relationships of financial instruments is factual. It originates in some form of legal document and was contractually defined at the point of issuance by lawyers without the consistent use of standard terms and definitions. It is then independently acquired by multiple vendors who transform it to fit their source systems and rename it using internal definitions and nomenclature. Independent business units of financial institutions then source it from multiple vendors, transform it to match their internal environments and store it in unconnected databases and spreadsheets using multiple formats and inconsistent definitions.

This process of fragmentation and silo management repeats itself across the industry and sometimes results in content (particularly for complex instruments) that is non-comparable and not precise enough to promote trust and confidence that it is fit-for-purpose for data intensive applications. All this translates into a semantics problem of common terms that have different meanings, common meanings using different terms and vague definitions that don't capture critical nuances.

Every data practitioner within financial institutions understands this to be out of place for an industry that operates in real time, on a global basis, with high volume transactions, for a whole range of complex instruments and with an increasing need for process automation. That's why the interest in data definitions and semantic precision is making such rapid inroads within financial institutions – and why the industry has banded together to create a Semantics Repository which provides a formal representation of facts about, definitions of, and relationships associated with, all financial instruments.

CFTC and SEC interest in using standard terminology to describe complex derivatives is well timed and could become a catalyst for unwinding the "Tower of Babel" that currently prevents financial systems from talking to one another without the need for manual reconciliation and transformation processes. From the perspective of the EDM Council, the adoption of consistent semantics is the

most important infrastructure objective within the financial industry – and one that is essential for ushering in the newly emerging 'Age of Transparency'.

EDM Council's Semantics Repository

The problems and challenges associated with internal alignment of terms, conditions and descriptions associated with the underlying structure of financial instruments propelled the members of the EDM Council to create an open source repository of financial instrument semantics.

The Semantics Repository is structured as a formal and factual representation of the terms and conditions associated with every financial instrument as well as structural representation of every business relationship with involved counterparties. It has been constructed based on collaboration with the financial participants, it is extensible to cover any new instrument type that can be created and includes a process for both business and technical validation.

The industry has completed the reference data semantics for all listed instruments as well as OTC derivatives and those constructs have been incorporated into the Repository. The semantics for dated terms/market data, terms related to legal entity structures, loans and enhanced asset-backed securities are in draft and will be completed in the first quarter of 2011. Following completion of this, the industry will move on to corporate events, securities issuance and the transactions lifecycle.

[Access to the Semantics Repository: http://www.hypercube.co.uk/edmcouncil]

State of Semantics Adoption

Standardizing metadata and data definitions is a high priority (but not complete) objective for financial institutions across the industry. Some firms, such as the European Central Bank, have formally adopted a semantic structure for their security master applications. Many others are in process of enhancing their metadata repositories with semantic approaches and are in position to adopt standardized descriptions for both internal applications and for regulatory reporting.

In conjunction with efforts to complete the content of the Repository, the EDM Council has been making inroads with the semantics technology community on enhancements for representing the financial instrument ontology and for incorporating business rules into the Repository. Organizations such as the Object Management Group and SWIFT are collaborating with the Council on the integration of various initiatives into an aligned semantic data model. All of this work is bringing the industry closer formally embracing standardized semantic approaches as part of their production environments. The efforts of the SEC and CFTC to facilitate seamless information exchange and promote interoperability that takes into account the meaning of the underlying information can be (and should be viewed as) a critical catalyst for broad industry-wide adoption.

Questions Raised in Response to Title VII, Section 719(b)

Question 7: *Reliance on a discrete set of ontologies to define and describe derivatives transactions and positions? If yes, what computer language do you use?*

The EDM Council created a formal ontology for the OTC derivatives segment of the Semantics Repository. The OTC derivatives ontology is based primarily on

the assumed meanings of terms in FpML and ISO's 20022 business model, with additional extensions and refinements as a result of business subject matter expert reviews.

The Council's Semantics Repository does not use a computer language, but rather a modeling language known as OWL (Web Ontology Language). The modeling language is implemented within a CASE tool using a published standard from the Object Management Group known as Ontology Definition Metamodel (ODM), with significant extensions and adaptations for business readability.

Question 8: *If you use one or more ontologies, are they proprietary or open to the public?*

The OTC ontology within the EDM Council's Semantics Repository is available to all under an open source "attribution" license.

Question 9: *How do you maintain and extend the ontologies that you use to define derivatives data to cover new financial derivative products? How frequently are new terms, concepts and definitions added?*

The first draft of the OTC derivative ontology will be evaluated by EDM Council members and updated on a quarterly release cycle. Additional OTC concepts will be added when gaps are uncovered by firms during implementation and deployment.

Our focus is on defining both the contractual components of the OTC derivative and the business relationships related to issuance. The initial draft has been framed in terms of a number of supporting primitive concepts such as transaction, commitment, contract, side, etc. We are using the ontology for transactions (REA Ontology, reference 1) as developed by Michigan State University. We have also introduced the concept of cash flow based on formal mathematical modeling from Bloomberg. The end result of this building blocks approach should be the capability to describe new products using a combination of existing common concepts and new forms of underlying instruments.

Question 10: *What is the scope and variety of derivatives and their positions covered by the ontologies that you use? What do they describe well and what are their limitations?*

The Semantics Repository covers all the classes of OTC derivatives covered in FpML including credit default swaps as well as more common types. Common contract and transaction structures are modeled for options, forwards, swaps and spot transactions. Further terms specific to different underlying types (i.e. rates, indices, debt, equity, baskets, commodities and credit) have been added.

Please note: The Repository does not include systemic facts such as those about holders. For example, the Repository defines all the facts about a CDS contract, but we would not include whether the contract is "naked" or "covered" since that relates to whether a given party has holdings in the reference asset. The Semantics Repository model can be extended to encompass systemic facts once we have completed the ontology of the contracts themselves.

Question 11: *How do you think any limitations to the ontologies you use to describe derivatives can be overcome?*

Limitations can be addressed by ensuring that all terms in the Repository are defined in terms of the simplest thing that they are (i.e. contract, transaction,

etc.) and used in conjunction with a set of archetypal concepts. This approach, if properly followed, reduces the risk of "brittleness" associated with logical data modeling practices.

Question 12: *Are these ontologies able to describe derivatives transactions in sufficient detail to enable you to calculate net exposures to complex derivatives?*

All of the facts and relationships about existing OTC derivatives (and their underlying components) are currently captured in the Repository. Parties related to transactions are also covered. To ensure that net exposure can be calculated we should consider extending the ontology to cover portfolio and holding facts (i.e. terms that describe who holds what and whom is a counterparty to what).

Question 13: *Are these ontologies able to describe derivatives transactions in sufficient detail to enable you to perform other analysis? What types of analysis can you conduct with this data, and what additional data must be captured to perform this analysis?*

They should be (in principle). The Repository covers analytical concepts of all financial instruments (including derivatives) but these components are used as descriptive attributes and are still at draft stage. It is conceivable that these concepts could be extended or reapplied to analysis of positions or portfolios. This would be an area to explore.

Question 21: *What other standards (i.e. FpML and FIX) related to derivatives transactions does your organization or community use, and for what purposes? Has your implementation of these standards had any effect on the way your business is conducted?*

FpML and FIX are both messaging standards. We anticipate that the semantic terms and relationships in the Semantics Repository will be mapped to FpML message terms from which they were originally derived. Derivative messages would be communicated via FpML, while the meanings of the terms in those messages would be formally captured in the ontology. The same concept would apply to FIX messages for securities transactions.

Question 23: *In general, to what extent are XML-based languages able to describe a derivatives contract for further analysis? To what extent is other technology needed to provide a full description?*

XML-based languages are structured to provide a complete description of the terms in a message. For OTC derivatives, this would be a complete description of the instrument. XML schemas can be functionally expressive, although not as expressive as ontology languages and not as well grounded in formal logic. FpML is aligned with legal concepts via a cross-reference to the ISDA standard contract terms – making it somewhat unique among XML languages.

Please note that while XML is valuable in expressing a number of constructs about the nature of a derivative transaction, additional knowledge of many derivatives types is needed. For example, examples in the FpML literature show how to model a number of specific derivative types by using different combinations of message terms; the standard itself does not capture knowledge about those contracts.

Other languages, such as OWL, would give a more complete and formal description of the terms in a XML message. Keeping the XML messaging and

ontologies aligned would relieve the messages from formal description of terms because they would be contained within the ontology.

Question 27: *Would there be a benefit to standardizing computer readable descriptions of financial derivatives? What about standardization for certain class/type of financial derivatives?*

We would advocate standardizing the underlying concepts associated with OTC derivatives as the desired route. Standardizing contract descriptions would not support the need to innovate in the creation of new product types.

Question 29: *What would be an ideal ontology for you in terms of design, implementation and maintenance of the data sets and applications needed for your business?*

We would support formal, OWL-based ontology, developed in extended ODM (reference 2) so that it could be maintained in a UML tool. This approach would give greater control over the level of detail that is presented to viewers and would allow for an enhanced degree of business review and validation. This ontology should be mapped to message terms for transactions. It should be grounded in archetypal concepts (simplest possible) and modeled in line with the REA standard for transaction ontology.

Question 30: *How would a standardized computer readable description of financial derivatives be developed and maintained? Are there current models that should be considered?*

There are two components of this question – the model of the content and the underlying modeling framework. Development of the semantic modeling framework is best orchestrated through the Object Management Group (OMG). They are facilitating industry development of modeling best practices. Development of the content model is best done through industry collaboration with long term maintenance being governed by ISO TC68.

Question 31: *What is the importance of ontologies for the representation of derivatives data now and in the future?*

Ontologies enable the precise description of OTC derivatives based on their underlying descriptive attributes. That will help with extraction, classification and aggregation for analysis. Semantic technology is best placed for formal ontology representation and is mature enough to deliver on the requirement.

References

1. McCarthy, W.E.: The REA Accounting Model: A Generalized Framework for Accounting Systems in a Shared Data Environment. The Accounting Review Vol. LVII, No. 3 (July 1982) pp. 554-78. See https://www.msu.edu/user/mccarth4/rea-ontology/

2. Ontology Definition Metamodel Object Management Group Ref ptc/207-09-09. See http://www.omg.org/spec/ODM/

Members of the EDM Council

The positions outlined in this paper represent the composite views of the EDM Council. They may or may not represent the individual views of the member companies.

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