JOINT STUDY ON THE FEASIBILITY OF MANDATING ALGORITHMIC DESCRIPTIONS FOR DERIVATIVES

A STUDY BY THE STAFF OF THE SECURITIES AND EXCHANGE COMMISSION AND THE COMMODITY FUTURES TRADING COMMISSION AS REQUIRED BY SECTION 719(b) OF THE DODD-FRANK WALL STREET REFORM AND CONSUMER PROTECTION ACT

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EXECUTIVE SUMMARY

On July 21, 2010, President Obama signed into law the Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank Act"). Title VII of the Dodd-Frank Act provides the Commodity Futures Trading Commission ("CFTC") and the Securities and Exchange Commission ("SEC") with the authority to regulate over-the-counter ("OTC") derivatives in light of the recent financial crisis, which demonstrated the need for enhanced regulation of the OTC derivatives market. The Dodd-Frank Act provides that the CFTC will regulate "swaps" and the SEC will regulate "security-based swaps."

Section 719(b) of the Dodd-Frank Act requires the SEC and the CFTC (collectively the "Commissions") jointly to study (the "Study") the "the feasibility of requiring the derivatives industry to adopt standardized computer-readable algorithmic descriptions which may be used to describe complex and standardized financial derivatives," and the extent to which such algorithmic descriptions, together with standardized legal definitions, "may serve as the binding legal definition of derivative contracts."[1] The statute also requires us to examine the "logistics of possible implementations of standardized algorithmic descriptions for derivatives contracts." Thus, the Study presents two key questions. First, is computer technology capable of representing derivatives with sufficient precision and detail to facilitate collection, reporting, and analysis of risk exposures, including calculation of net exposures, as well as to function as part or all of a binding legal contract? Second, if the technological capability exists, in consideration of the logistics of possible implementation, should these standardized, computer-readable descriptions be required for all derivatives?

The Study fits within the broader context of the Commissions' work toward bringing greater transparency to the derivatives markets by requiring market participants to collect, report, and manage their risk exposures. In essence, the Study explores whether the collection, reporting, and management of risk exposures can be aided by the computer-readable descriptions - a common dictionary with standardized, electronic "spelling" for each aspect of a derivative.

To answer these questions, a cross-agency staff task force (the "staff") was established.[2] The Commissions also solicited comments and data and published a Notice of Request for Comment in the Federal Register. The staff conducted an extensive outreach effort, meeting with market participants, industry groups, data vendors, and academics, and communicated with international regulators, notably the members of the International Organization of Securities Commissions' ("IOSCO") Task Force on OTC Derivatives Regulation. The staff also participated in collaborative discussions facilitated by the U.S. Treasury Department's Office of Financial Research and other financial regulators.

In addition, the staff have considered the types of data that will become available to regulators and market participants in the future as a result of the Dodd-Frank Act.

Based on the public input and its own analysis, the staff conclude, with respect to the first question, that current technology is capable of representing derivatives using a common set of computer-readable descriptions. These descriptions are precise enough to use both for the calculation of net exposures and to serve as part or all of a binding legal contract.

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[1] Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Pub. L. No. 111-203, § 719(b)(2), 123 Stat. 1376, 1655 (2010). A copy of the relevant text appears in Appendix A.

[2] Professional staff were designated to undertake the Study, including staff with expertise in financial economics, law, computer technology, and the derivatives industry.

As to question two, the staff conclude that before mandating the use of standardized descriptions for all derivatives, the following are needed: a universal entity identifier and product or instrument identifiers, a further analysis of the costs and benefits of having all aspects of legal documents related to derivatives represented electronically, and a uniform way to represent financial terms not covered by existing definitions.

To that end, the staff view standardized computer-readable descriptions for at least a broad cross-section of derivatives as feasible, leaving, for now, the industry to develop solutions that would achieve that this. The staff contemplates that other financial regulators and the Office of Financial Research, along with the Commissions' staff, may engage in a series of public-private initiatives to foster collaboration between the regulators and the derivatives industry to work toward representation of a broader cross-section of derivatives in computer-readable form.

The OTC derivatives markets are in transition. It is unclear what portion of transactions will become subject to mandatory central clearing through derivative clearing organizations or clearing agencies. For those contracts that remain un-standardized and continue to trade OTC, additional challenges remain for automating calculations of net exposures. Standardizing and automating legal definitions and terms across dealers in some asset classes, while maintaining flexibility for new types of products, would appear to benefit risk management. Although the comments to the Commissions regarding the Study differ on the merits of various approaches, there was general agreement on the benefit of having readily available data to calculate net exposures in the OTC derivatives market.

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The Study consists of five sections. Section I describes the congressional mandate for the Study. Section II describes the relevant aspects of the current OTC derivatives market. Section III describes the data that will become available to regulators and market participants under Dodd-Frank regulations promulgated by the Commissions. Section IV describes the three main challenges to mandating that the derivatives industry adopt standardized computer-readable algorithmic descriptions to describe complex and standardized financial derivatives. Section V provides the Study conclusion.

I. CONGRESSIONAL STUDY MANDATE

I.1.   STATUTORY LANGUAGE

Section 719(b) of the Dodd-Frank Act requires that the Commissions "conduct a joint study of the feasibility of requiring the derivatives industry to adopt standardized computer-readable[3] algorithmic descriptions which may be used to describe complex and standardized financial derivatives."[4] The Dodd-Frank Act states that the goal of using these algorithmic descriptions is to "facilitate computerized analysis of individual derivatives contracts and to calculate net exposures to complex derivatives."[5]

The Dodd-Frank Act specifies that algorithmic descriptions be "optimized for simultaneous use by (A) commercial users and traders of derivatives; (B) derivatives clearing houses, exchanges and electronic trading platforms; (C) trade repositories and regulator investigations of market activities; and (D) systemic risk regulators."[6]

The Dodd-Frank Act also requires that the Study determine whether an electronic representation of a derivatives contract, together with standardized legal definitions, can be legally binding.[7] Finally, to the extent appropriate and practical, the Commissions must coordinate with international financial institutions and regulators.[8]

I.2.   KEY TERMS

Section 719(b) of the Dodd-Frank Act requires that the Commissions consider "algorithmic descriptions" of derivatives for the purposes of calculating "net exposures."[9] An algorithm is a step-by-step procedure for solving a problem, especially by a computer, which frequently involves repetition of an operation.[10] Algorithmic descriptions, therefore, would refer to a computer representation of derivatives contracts that is precise and standardized, allowing for calculations of net exposures. While it is conceivable to represent derivatives as algorithms – by reflecting the steps necessary to calculate net exposures and other analysis as computer code – such an approach would be very difficult given the divergence of assumptions and complex modeling needed to calculate net exposures. Accordingly, the staff have interpreted "algorithmic descriptions" to mean the representation of the material terms of derivatives in a computer language that is capable of being interpreted by a computer program.

While many forms of derivatives themselves could be described as algorithms and some aspects of derivatives could be described as procedures, calculations of net exposures often require additional computer modeling, not just understanding the basic agreement between two parties. To accomplish this modeling, economic and legal terms need to be made machine-readable.

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[3] The terms "computer-readable" and "machine readable" are used interchangeably throughout.

[4] Dodd-Frank Act Section 719(b)(1).

[5] *Id.* at § 719(b)(2). Although we recognize that gross exposures play a significant part in evaluating systemic risk, an assessment of whether algorithmic descriptions can facilitate the calculation of gross exposures to complex derivatives is outside of the scope of the Study.

[6] *Id.*

[7] Id.

[8] *Id.* at § 719(b)(3).

[9] *Id.* at § 719(b)(2).

[10] MERRIAM-WEBSTER ONLINE DICTIONARY, http://www.merriam-webster.com/ (last visited Feb. 25, 2011).

The net exposure of market participants to derivatives can be viewed narrowly or broadly. A narrow interpretation might be the market value of an outstanding derivatives position, for a particular firm.[11] Using this method, a static view of net exposure for a given firm can be viewed as the sum of all of its marked-to-market positions, both positive and negative, less any hedging positions.

However, such a narrow definition may not adequately capture the full financial risk of the OTC derivatives positions for the firm or for the market as a whole. The risk associated with a derivatives instrument whose value likely will vary over time is a dynamic risk, depending on changes in market conditions and lifecycle events that affect the value of a contract, such that a single "snapshot" view of the instrument will not capture all risk exposure associated with potential future losses or counterparty credit exposure.[12]

In some cases, calculations of net exposure need to incorporate an analysis of obligations to pay or receive collateral, as well as counterparty credit risk and legal risk associated with collateralized obligations.[13] These details are frequently spelled out legal documents called credit support agreements,[14] and can substantially reduce the net exposure associated with a derivatives contract over its lifecycle.[15]

An "algorithmic description" of derivatives that allows for calculations of "net exposures" must be able to serve different users, each of which relies on different assumptions and modeling techniques, and thus an "algorithmic description" defined as a representation of a derivative as a step-by-step procedure may not fully describe a given contract. However, as discussed below, it may be feasible to describe the terms of these contracts in a sufficiently precise and standardized way as to facilitate the modeling necessary to calculate net exposure for different members of industry and for regulators.

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[11] Letter from International Swaps and Derivatives Association ("ISDA") and Securities Industry and Financial Markets Association ("SIFMA") at 2, Dec. 31, 2010, *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26827&SearchText=; Letter from Investance at 1, Dec. 23, 2010, *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26796&SearchText= ("Most of our clients define complex derivatives as those derivatives that are not exchange traded, allowing for a wide variety of deal specific attributes that do not allow for generic nomenclature that is sufficiently descriptive. These derivatives often . . . cannot be priced using a closed form solution, i.e., a formula and must be priced using mathematical techniques that estimates the price using a non formula methodology (*e.g.*, Monte Carlo simulation).").

[12] Letter from ISDA and SIFMA, *supra* note 11 at 2-3.

[13] *Id.* at 3.

[14] *See* COMMODITY FUTURES TRADING COMMISSION, PUBLIC ROUNDTABLE TO DISCUSS SWAP DATA RECORDKEEPING AND REPORTING REQUIREMENTS 269-71 (Jan. 28, 2011), *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=27489&SearchText= (hereafter "CFTC Staff Roundtable").

[15] Meeting with Michael Will, docGenix, Conf. Call (Jan. 20, 2010). The calculations can be complex. As ISDA and SIFMA observed, "even though a party may have negative exposure to its counterparty (such that the counterparty is in the money), that party may have credit exposure to such counterparty as a result of the party having over collateralized its counterparty." Letter from ISDA and SIFMA, *supra* note 11 at 3.

I.3. PROCESS AND APPROACH

The Commissions established a cross-agency staff task force composed of economists, technology experts, professionals with recent derivatives industry experience, and attorneys. The Commissions gathered public input by publishing a Notice of Request for Comment in the Federal Register and by posting this notice and these questions on their websites, which also were distributed to various market participants and organizations, and provided to the IOSCO Task Force on OTC Derivatives. The staff conducted research on the state of technology and industry practices regarding derivatives data management and analysis that included meetings with market participants, literature reviews, and examination of current industry practices and initiatives.

In all, the Commissions received 17 responses from a broad cross section of the public, including major participants, dealers in the derivatives markets, vendors, and others. The Federal Register notice and questions appear in Appendix B. Copies of responses appear on the CFTC's website.[16] A list of meetings with interested parties appears in Appendix C. We thank all of the individuals and organizations that provided information, insight, and recommendations to the Commissions.

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[16] Comment letters are available at http://comments.cftc.gov/PublicComments/CommentList.aspx?id=915.

II. BACKGROUND ON OTC DERIVATIVES MARKETS

This section focuses on derivatives products, market participants, and trade execution processes. It also discusses the documentation that establishes the rights and responsibilities of the parties who enter into OTC derivatives contracts, the machine-readable descriptions of transaction data and contracts that are currently available for OTC derivatives transactions, and the extent to which electronically rendered versions of these documents are legally binding.

II.1.   TYPES OF DERIVATIVES, COUNTERPARTIES, AND EXECUTION

II.1.a.   TYPES OF DERIVATIVES

A derivative is a contract whose value is derived from the value of an underlying asset (such as a commodity, equity, bond, or loan), an index, or a reference rate (such as an interest or exchange rate). Derivative contracts include futures, forwards, options, and swaps.[17] The contract could include a combination of futures, forwards, options, or swaps, which themselves may be a series of cash forward contracts.

Derivatives may be traded on exchanges or over-the-counter. The Study focuses on OTC derivatives such as swaps[18] because exchange-traded derivatives such as futures and options are standardized already and described in computer-readable languages, so that valuing them and understanding net exposure is not an issue. By contrast, the OTC derivatives market permits greater customization of agreement terms, which presents a challenge to the development of standardized forms for these agreements. Further, OTC derivatives often are not centrally cleared, and may be based on underlying assets that are more complex or more difficult to value than exchange-traded derivatives.

A swap is a bilateral agreement to exchange payments based on some agreed formula and according to a schedule of dates.[19] Swaps can be grouped into several asset classes. Swaps may include contracts for the exchange of a fixed interest rate for a floating one (interest rate swaps), protection against default (credit default swaps), hedging against an equity index, basket of equities or structured equity product (equity swaps), protection against fluctuating currency exchange rates (foreign exchange swaps), and other less common contracts, such as protection against weather conditions.[20] An example of a "plain vanilla" interest rate swap would be a contract composed, in economic terms, of a series of cash forward contracts, where one party makes periodic payments based on a fixed rate of interest while the other makes payments based on a floating interest rate.[21]

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[17] *E.g.,* John C. Hull, Options, Futures, and Other Derivatives 1 (4th ed. 2000).

[18] The Dodd-Frank Act provides definitions of the terms "swap" and "security-based swap." *See* Dodd-Frank Act Sections 721(a) (amending 7 U.S.C. § 1(a)(47)) and 761(a) (amending 15 U.S.C. § 78(c)(a)(68)). For purposes of the Study, the term "swap" is used generally to identify, in economic terms, contracts that would be swaps or security-based swaps under the Dodd-Frank Act definitions, as they exist currently in the OTC derivatives market. Dodd-Frank Act Section 721(a)(21) (swaps encompass master agreements and supplements).

[19] Don M. Chance, Essays in Derivatives 13 (1998).

[20] *See id.* at 14-15.

[21] *Id.* at 14.

II.1.b.   COUNTERPARTIES TO A SWAP AGREEMENT

Swaps are created in a number of ways. Some swaps are facilitated by dealers in the course of their market-making businesses.[22] Other swaps are entered into between two dealers acting on behalf of themselves, or between a dealer and an end-user or client. In fact, any two counterparties, including two end-users, may enter into a swap agreement.[23]

II.1.c.   EXECUTION OF A SWAP AGREEMENT

Before entering into a swap agreement, both counterparties to the swap will typically first negotiate and sign a master agreement and other agreements that govern all swap transactions subsequently entered into between the two parties. The terms of these agreements are documented using master agreements, credit support annexes, and other documents, generally using standardized forms created by ISDA or one of a few other standard formats. These documents will be discussed in detail below.

Once these agreements are executed, the counterparties may enter into specific swap transactions. At present, these transactions may be executed through multiple venues, including over the telephone, through central order systems, and through single-dealer platforms, depending on the degree of standardization of the swap.[24]

After a swap transaction is executed, the parties to the swap "confirm" the transaction, or verify the economic terms of the trade with one another.[25] The economic terms of a trade include the trade date, notional amount, and payment terms. Generally, to verify the economic terms, one counterparty sends a trade acknowledgement to the other counterparty for review and verification. The acknowledgment may be sent directly or through a third-party service that displays the acknowledgment for the recipients to review.[26] Some third-party firms also provide a matching service that receives trade acknowledgments from each counterparty and compares the documents.[27] Electronic processes for trade confirmations are discussed further in Section II.2.b.

For some types of swaps, a clearinghouse may be willing to accept the swap contract for central clearing, thereby assuming the risk of counterparty default. In this case each counterparty novates (or assigns) its rights and obligations under the contract to a clearinghouse. Clearinghouses are capitalized by clearing members and use this capital in the event that a

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[22] Further Definition of "Swap Dealer," "Security-Based Swap Dealer," "Major Swap Participant," "Major Security-Based Swap Participant," and "Eligible Contract Participant," 75 Fed. Reg. 80,174, 80,175-76 (proposed Dec. 21, 2010).

[23] Lawrence C. Tondel & Jonathan D. Gupta, *Introduction to Derivatives*, *in* DERIVATIVES: LEGAL PRACTICES AND STRATEGIES, 1.14 (Robert D. Aicher ed., Aspen Publishers 2010).

[24] *See* Registration and Regulation of Security-Based Swap Execution Facilities, 76 Fed. Reg. 10,948, 10,951 (proposed Feb. 28, 2011), and Core Principles and Other Requirements for Swap Execution Facilities, 76 Fed. Reg. 1,214 (proposed Jan. 7, 2011).

[25] Trade Acknowledgment and Verification of Securities-Based Swap Transactions, 76 Fed. Reg. 3,859, 3,860 (proposed Jan. 21, 2011).

[26] This process is referred to as affirmation. *See MarkitSERV for Confirmations,* MARKITSERV, http://www.markitserv.com/ms-en/solutions/by-service/confirm.page (last visited Feb. 21, 2011).

[27] *Id.* For credit default swaps, these transactions can be confirmed by sending an electronic copy to a matching service like Markit/SERV, using Financial Products Markup Language. *DTCC Trade Information Warehouse,* DTCC, http://www.dtcc.com/products/derivserv/suite/trade_reporting_repository.php (last visited Feb. 21, 2011).

clearing member defaults.[28] Some clearinghouses have specialized in clearing interest rate swaps between large banks,[29] and these swaps generally are highly standardized. Historically, most cleared swaps have been inter-dealer transactions. Most swaps between dealers and end-users are not currently cleared by a central clearinghouse, although a large percentage of both cleared and uncleared transactions have some level of electronic processing for trade confirmations. Highly customized swaps are typically processed manually due to the lack of standardized terms.[30]

II.2.   SWAP DOCUMENTATION

Participants in the OTC derivatives market typically document swap trading relationships by using industry standard legal documentation, including master netting agreements, definitions, schedules, and confirmations.[31] Industry standard documentation includes the ISDA Master Agreement and related definitions, schedules, and confirmations specific to particular asset classes, and offers a framework for documenting transactions between counterparties for OTC derivatives products.[32] The standard documentation details the legal, trading, and credit relationship between the parties. This facilitates cross-product netting of transactions, including netting in the event that parties have to close-out their positions with one another. Although the documentation uses standard clauses, the staff understands that the parties routinely negotiate terms that modify the standard clauses. A description of these standardized agreements follows.

II.2.a.   MASTER AGREEMENTS AND CREDIT SUPPORT DOCUMENTS

Master agreements provide the central documentation for swap counterparties' trading relationships and memorialize the parties' allocation of credit, legal, and operational risks. Master agreements also serve as master netting agreements and provide for close-out netting for all transactions,[33] which, along with collateral arrangements,[34] provide an important method of

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[28] *See* Order Granting Temporary Exemptions, 74 Fed. Reg. 10,647, 10,648-49 (Dep't of Treasury, Mar. 11, 2009).

[29] Matthew Leising and Mary Childs, *LCH.Clearnet Sees U.S. as 'Battleground' for Clearing Interest-Rate Swaps*, BLOOMBERG, Jul. 21, 2011, *available at* http://www.bloomberg.com/news/2010-07-21/lch-clearnet-seeks-u-s-dominance-in-rate-swap-clearing-amid-rule-changes.html.

[30] In this context, "standardized terms" means terms relating to highly traded swaps. The Study references "complex" derivatives, and market participants commonly refer to "bespoke" (or one-off) swaps. Because we are focused on the line between those swaps currently represented electronically and those that are not, we are not using these terms but are, instead, referring to "standardized" swaps, and those that are not. Some commenters have indicated that in the commodities space and to a lesser degree in the FX space, a number of end-user to end-user swaps are executed manually without electronic intervention.

[31] "Master netting agreements" are defined in the bankruptcy code as "an agreement providing for the exercise of rights, including rights of netting, setoff, liquidation, termination, acceleration, or close out under or in connection with one or more contracts," which include swap agreements. 11 U.S.C. § 101(38A) (2010).

[32] Copies of these documents can be obtained through the ISDA Bookstore, *available at* http://www.isda.org/publications/pubguide.aspx (last visited Mar. 7, 2011).

[33] "Close-out netting" has been defined as "a process involving termination of obligations under a contract with a defaulting party and subsequent combining of positive and negative replacement values into a single net payable or receivable." David Mengle, *ISDA Research Notes* at 2, ISDA (2010), *available at* http://www.isda.org/researchnotes/pdf/Netting-ISDAResearchNotes-1-2010.pdf. Enforceable bilateral netting arrangements are a common commercial practice and are an important part of risk management and minimization of capital costs. HOUSE OF REPRESENTATIVES COMMITTEE ON THE JUDICIARY, REPORT ON BANKRUPTCY ABUSE PREVENTION AND CONSUMER PROTECTION ACT OF 2005 125 (Apr. 8, 2005), *available at* http://www.law.ttu.edu/lawlibrary/library/research/bapcpa_library/house-report-109-31-121-130.htm#p125.

addressing counterparty credit risk arising from OTC derivatives transactions. Following a default, swap transactions between the two parties are terminated, and the value of each swap transaction is calculated and netted to determine a single net amount due from one party to the other.

Information contained in master agreements and similar documents such as credit support agreements may also be used by regulators for the analysis of systemic risk. Important information for this analysis includes, but is not limited to, the following: events of default; terms which establish the collateral relationship between two parties; variables contained in collateral systems that are required for calculating margin calls; netting provisions; a wide range of product-specific definitions and individual trade confirmations; termination events; rehypothecation provisions[35]; and lifecycle events that would result in a new swap or a change in the terms of an existing swap.

II.2.b.   CONFIRMATIONS

In addition to standardized master agreements, ISDA has created standardized documents for confirmation of many types of swap agreements. These documents contain the economic terms of a trade, and counterparties verify these documents with one another. Confirmation documents generally are subject to the master agreement and any amendments to it, but parties may modify the terms of the master agreement that relate to a specific confirmation or confirmations. Section II.1.c., above, describes methods counterparties may use to verify these confirmation documents.

II.2.c.   MASTER CONFIRMATION AGREEMENTS

The derivatives industry has developed master confirmation agreements as a bridge between master agreements and confirmations.[36] While the content of master confirmation agreements could be incorporated into the parties' master agreements, parties sometimes negotiate master confirmation agreements as stand-alone documents because they are often negotiated by product specialists on an asset class by asset class basis. A master confirmation agreement allows the parties to agree on most standard terms for a complex trade, and then enter into individual transactions by agreeing on a small subset of economic terms in a confirmation in the form of a transaction supplement. With respect to confirmations, after coming to an agreement on the terms of a transaction, parties document the transaction in a complete and definitive written master confirmation agreement.[37]

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[34] Obligations in swap trades are often secured according to the terms of a credit support agreement, but parties may use other methods to secure their obligations, such as guarantees from third parties.

[35] Rehypothecation takes place when an entity that is the recipient of a collateral pledge uses that same collateral to secure its own borrowing. Manmohan Singh and James Aitken, *Deleveraging after Lehman – Evidence from Reduced Rehypothecation* 3 (IMF, Working Paper, Mar. 2009), *available at* http://www.imf.org/external/pubs/ft/wp/2009/wp0942.pdf.

[36] Examples of Standard Master Confirmation Agreements that have been published are available at http://www.isda.org/publications/isdacredit-deri-def-sup-comm.aspx. They include: 2004 Sovereign Master Credit Derivatives Confirmation Agreement, the 2003 Master Credit Derivatives Confirmation Agreement (Asia-Pacific), the 2004 Americas Interdealer Master Equity Derivatives Confirmation Agreement, and others.

[37] If converted to an electronic format, parties can further agree that the electronic record is legally binding. *See Keeping 'gold' trade records 'gold,'* DTCC DERIV/SERV (Oct. 9, 2006), http://www.dtcc.com/products/documentation/derivserv/DerivSERV%20-%20Gold.pdf (last visited Mar. 10, 2011).

II.3. STANDARDIZED MACHINE-READABLE DATA THAT IS CURRENTLY AVAILABLE

Currently, some economic data for exchange-traded derivatives, and certain standardized OTC swaps, can be represented in standardized computer-readable messages for confirmation and clearing purposes. But legal documentation and data relating to non-standardized transactions generally is not represented in a machine-readable format, or if it is, it typically relies on proprietary systems that are not publicly available.[38] To the extent that non-standardized derivatives transactions are computer-readable, the derivative transaction and contract information is available only in internal, proprietary systems developed and used by dealers, clearinghouses, trade repositories, and large money managers.[39] Such systems have been customized to meet the institutions' needs, making extensive modifications to current and past industry standard electronic definitions. In response to the Commissions' request for comments, several commenters said that they have implemented new frameworks or standards for organizing and sending data.[40] Because these customized solutions do not rely on standardized computer languages and reference data, it may be difficult for counterparties and others to exchange and use the data.[41]

Standardization across firms currently exists to some degree, however. Specifically, to foster electronic communication of trades of certain derivatives, the financial industry has moved toward standardized methods of formatting data for messaging confirmations and clearing. The most commonly used standards are the Financial product Markup Language ("FpML") and the Financial Information eXchange ("FIX") Protocol.[42] Both standards are focused on messaging certain economic terms of standard exchange-traded or OTC derivatives. Each provides some of the data needed to perform net exposure calculations for the instruments they cover.[43]

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[38] Letter from Michael Atkin, EDM Council at 2, Dec. 22, 2010, *available at*
http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26952&SearchText=.

[39] Meeting with Pierre Lamy, Goldman Sachs, Conf. Call (Nov. 18, 2010); Meeting with Jennifer Han, Associate General Counsel, Managed Funds Association, Conf. Call (Jan. 13, 2011); *FpML Information*, FPML, http://www.fpml.org/about/factsheet.html (last visited Feb. 21, 2011).

[40] David M. Inggs, Goldman Sachs at 2 (Dec. 29, 2010), *available at*
http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26814&SearchText=; letter from David N. Gertler, letter from SuperDerivatives at 9 (Dec. 31, 2010), *available at*
http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26965&SearchText=; letter from BM&F Bovespa at 6 (Dec. 31, 2010), *available at*
http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26950&SearchText=; letter from CETIP at 6 (Dec. 31, 2010), *available at*
http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26951&SearchText=.

[41] *FpML Information*, FPML, http://www.fpml.org/about/factsheet.html (last visited Feb. 21, 2011).

[42] *The FIX Protocol Organization*, FIX PROTOCOL, http://www.fixprotocol.org/adopters/21 (last visited Feb. 21, 2011).

[43] Neither expresses the formulas by which the cash flows relevant to those net exposure calculations are calculated, but they could serve as wrappers, or vessels, for carrying certain algorithmic information. This is not a new idea. The SEC's Asset Backed Securities rule proposed last April called for issuers to file the source code of a computer program into which interested persons could plug the tagged data terms from the XML-tagged "asset data file" to calculate potential cash flows. Asset Backed Securities, 75 Fed. Reg. 23,328, 23,378 (proposed Apr. 7, 2010). Data tagged using FpML or FIX Protocol could serve as inputs into a computer program like the waterfall computer program to determine cash flows.

FpML is widely used in the OTC derivatives market to electronically message and confirm standard credit default swaps.[44] It is built from Extensible Markup Language ("XML"), which is a flexible text-based markup language[45] that has gained wide use in electronic communication.[46] FpML provides a common yet customizable language. ISDA oversees the FpML standard.

The FIX Protocol is widely used for electronic trading in exchange-traded securities,[47] and has significant industry support in clearing applications.[48] Compared to FpML, FIX offers a smaller data file for common products such as equities, futures and foreign exchange. FIXML is an XML representation of FIX (FIXML is the Financial Information eXchange Markup Language), and some firms already experienced in using FIX are now using FIXML for OTC derivatives.[49] FIX Protocol Limited ("FPL") oversees the FIX standard.[50]

FpML and FIX each have different strengths that reflect their intended purposes. The two major considerations in representing financial data that are often at odds are the speed of transmission (determined in part by the size of the data file), and the ability to capture complex or customizable information about products. FIX is most widely used as a messaging language to relay trade information quickly and concisely. Because it focuses on speed, FIX is not suitable for large files containing volumes of data (often referred to as "verbose" files). FIXML is being developed to accommodate larger message sizes.[51]

FpML is designed for the OTC derivatives market and supports large data files. While FpML can capture the complexity of products, the speed of transmission is secondary. By being very expandable, FpML allows for the electronic representation of customized or novel products.

Despite the industry's move toward standardization, some derivatives products are still incompletely represented in standardized machine-readable format, and the development of standardized tags typically follows behind the development of new instruments. As one commenter explained: "FpML relies on an existing body of contract type definitions, defined at too high a level of abstraction and thus it lags transaction innovation. This lag is often managed internally by the use of proprietary extensions to FpML, which further introduces inconsistencies between parties and sometimes incomplete representations of the full economic terms and contractual obligations of a contract."[52] Thus, to be truly useful, the staff believes that accelerated development of markup language tags may be needed for new and non-standard swaps.

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[44] In 2001, ISDA "integrat[ed] the development process of the FpML standard into [its] organizational structure." *History of FpML*, FPML, http://www.fpml.org/about/history.html (last visited Mar. 8, 2011).

[45] A markup language is defined as "a modern system for annotating a text in a way that is syntactically distinguishable from that text" and often includes instructions that are not visible to the end user of the text. *Markup Language*, WIKIPEDIA, http://en.wikipedia.org/wiki/Markup_languages (last visited Feb. 25, 2011).

[46] *E.g., Extensible Markup Language (XML),* W3C, http://www.w3.org/XML/ (last visited Feb. 25, 2011).

[47] D. Craig Nordlund, *Electronic Dissemination of Disclosure Documents*, 1093 PLI CORPORATE LAW AND PRACTICE COURSE HANDBOOK 39, 113 (Jan.-Feb. 1999).

[48] Meeting with Pierre Lamy, Goldman Sachs, Conf. Call (Nov. 18, 2011).

[49] *Id.* For example, CME Group uses FIX in credit default swap clearing.

[50] Mary Ann Burns, *FIXML Moves Ahead as Global Messaging Standard*, FUTURES INDUSTRY, Jan. 2010 at 43, *available at* http://www.futuresindustry-digital.com/futuresindustry/201001?pg=43#pg43.

[51] *Id.* Files representing terms of OTC swaps are, by nature, more verbose than data files reflecting exchange traded derivatives, often because they contain less standard terms or more variables.

[52] Letter from Olu Oni at 3 (Dec. 31, 2010), *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26828&SearchText=.

In summary, FpML, FIX and FIXML are messaging languages commonly used to facilitate storage and analysis of derivatives contracts, but do not represent all aspects of the contracts that they are used to describe, and do not cover all types of derivatives. Much remains in the form of written contracts or proprietary data formats and would be expensive for firms to convert to machine-readable data, to store the data, and to use the data in analysis.[53]

II.4. ELECTRONIC REPRESENTATION OF MASTER AND CREDIT SUPPORT AGREEMENTS

As noted in Section II.3, at present, derivatives industry participants have established data standards for messaging the terms in a confirmation. However, there is no standardized electronic language that represents legal agreements. As many commentators have noted, master agreements establish the contractual basis for the relationship between counterparties, and are crucial tools for valuation and risk management. Because they contain critical information, some large financial institutions store data from master and credit support agreements in electronic form in their risk management systems.[54]

As early as 2001, the FpML Institute at ISDA began considering whether and how to represent the terms of the master agreement in a shared repository or standard format. Since then, working groups coordinated by the FpML Institute have also been considering whether and how to represent terms of these legal documents electronically, and at least one private company has created a proprietary XML-based representation of master and credit support agreements that helps clients assess counterparty exposure in their risk management systems.[55] But no standardized language for representing the terms of these agreements has yet emerged from these efforts.

The concepts of a master agreement "library" and portfolio data warehouse were raised at a recent CFTC roundtable titled "Public Roundtable to Discuss Swap Data Recordkeeping and Reporting Requirements."[56] The focus of the discussion was whether a separate data collection infrastructure should be created to collect information from master and credit support agreements and store them in a portfolio data warehouse. The master agreements include the legal and credit terms, and credit support agreements contain the margin terms. Collecting this information would allow regulators to compare the value of a portfolio with the value of the collateral. Big disparities would alert regulators to potential red flags that require further investigation.

However, a significant amount of interpretation is needed when sorting through master and credit support agreements. The task of interpreting agreements and systematically representing them in a central repository is likely to be expensive. A built-in netting arrangement that deals

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[53] At the CFTC Staff Roundtable on Dodd-Frank data requirements, a representative from JP Morgan stated that it has "spent tens of millions of dollars to build systems to take the data . . . in our master agreements and in our transaction and data repositories to look at our exposures in different ways" and perform other analysis. CFTC Staff Roundtable, *supra* note 14, at 279.

[54] *Id.*

[55] One such company is docGenix. DOCGENIX, http://www.docgenix.com/Pages/Home.htm (last visited Mar. 8, 2011).

[56] CFTC Staff Roundtable, *supra* note 14. The discussion of a master agreement library, or a repository for machine readable files containing master agreement contracts, starts on page 326. The discussion of the portfolio data warehouse, or a centralized repository for data relating to exposure-related information, starts on 261.

with this interpretation issue is currently used in the Basel process.[57] Under a process established by the Basel Committee on Banking Supervision, regulators rely on the regulated banks to analyze the legal documentation, subject to the regulators' oversight.[58] A similar process of incorporating the terms of master agreements and credit support agreements into the portfolio exposure and then reporting this portfolio data to a portfolio data warehouse may assist in facilitating greater market transparency in OTC swaps.

II.5. CREATING MACHINE READABLE, LEGALLY-BINDING DOCUMENTS

Currently, parties to OTC derivatives contracts document their legal relationship in written and signed documents.[59] These documents are often converted to PDF files after signing, but even when they are rendered in this format they are not necessarily machine-readable.

After the legal relationship is negotiated and memorialized in master agreements and credit support agreements and annexes, for confirmations of individual swap transactions there are currently ways to create machine-readable files that become legally binding. Currently, certain trades "matched" through a third-party service usually are machine-readable. These matched confirmations become legally binding by virtue of agreements with the repository that does the matching. For example, counterparties to a credit default swap submit trade acknowledgments to a matching service such as MarkitSERV or ICE Link, which sends all matched confirmations to the DTCC Trade Information Warehouse, an industry repository for credit default swaps that stores the confirmations. Counterparties that use this service have written agreements that a trade confirmed by the service and subsequently stored in the warehouse is the primary record of the trade over and above any records held by the parties and is legally binding.[60] This is possible because the economic terms of these transactions are standardized and in machine-readable format (FpML), and the parties have negotiated and signed written master agreements with each other, and confirmation agreements with DTCC.[61]

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[57] *See, e.g.,* Basel Committee on Banking Supervision, International Convergence of Capital Measurement and Capital Standards Paragraphs 176-77, June 2004, *available at http://www.bis.org/publ/bcbs107.pdf* (stating a calculation for net exposure).

[58] CFTC Staff Roundtable, *supra* note 14, at 296 (stating that banks perform exposure calculations and prudential regulators evaluate the data and models used in those calculations).

[59] Even when one of the parties or a third party service renders a master agreement in a structured data format, this file cannot be legally binding because it has not been agreed to by both parties. *See* Trade Acknowledgement and Verification of Security-Based Swap Transactions, 76 Fed. Reg. 3,859, 3,860 (proposed Jan. 21, 2011) (stating that counterparty must sign the document "manually, electronically, or by some other legally equivalent means").

[60] Meeting with Marisol Collazo, Vice President DTCC DerivSERV, Dec. 20, 2010; *see also Keeping 'gold' trade records 'gold'*, DTCC DERIV/SERV (Oct. 9, 2006), *available at* http://www.dtcc.com/products/documentation/derivserv/DerivSERV%20-%20Gold.pdf.

[61] Letter from Stuart J. Kaswell, Managed Funds Association at 4-5 (Dec. 31, 2010), *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=26825&SearchText=.

Under the proposed Trade Acknowledgement and Verification of Security-Based Swap Agreements rule that would formalize current practice and seek to improve it, the SEC has proposed a regime that would, together with the proposed rules regarding reporting obligations to a swap data repository, encourage derivatives market participants to establish electronic platforms to capture and transmit for more trades the information necessary to engage in the confirmation process in an electronic format.[62] The CFTC has proposed a similar regime.[63]

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[62] *See* Trade Acknowledgement and Verification of Security-Based Swap Transactions, 76 Fed. Reg. 3,859, 3,860 (proposed Jan. 21, 2011).

[63] *See* Confirmation, Portfolio Reconciliation, and Portfolio Compression Requirements for Swap Dealers and Major Swap Participants, 75 Fed. Reg. 81,519 (proposed Dec. 28, 2010), Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. 76,574 (proposed Dec. 8, 2010), and Reporting, Recordkeeping, and Daily Trading Records Requirements for Swap Dealers and Major Swap Participants, 75 Fed. Reg. 76,666, 76,675 (proposed Dec. 9, 2010)).

III. DATA THAT MAY BECOME AVAILABLE THROUGH ONGOING RULEMAKING UNDER THE DODD-FRANK ACT

This section describes the data on swap agreements that may become available to regulators and market participants under proposed Dodd-Frank Act regulations promulgated by the Commissions. In addition to mandating the Study, the Dodd-Frank Act established new requirements for executing, confirming, and reporting data relating to derivatives transactions, and defined entities that will be involved in these activities.[64] The Commissions are currently considering rules that would increase the data available for computerized analysis of derivatives contracts, including calculations of net exposure. For purposes of the Study, regulations relating to the storage, distribution, and use of derivatives data facilitated by swap data repositories and security-based swap data repositories (collectively referred to as "SDRs")[65] are of particular interest.

III.1.   SDR ENHANCEMENT TO MARKET ANALYSIS

SDRs are defined as "centralized recordkeeping facilit[ies] for swaps."[66] The Dodd-Frank Act requires that all swap transactions be reported to an SDR, whether they are cleared or uncleared.[67] The SDRs, in turn, will disseminate real-time[68] information on swaps transactions to facilitate price discovery and also will provide other information about swaps transactions to regulators.[69] The Dodd-Frank Act also requires that SDRs take steps to ensure that the data they receive is accurate.[70] The Commissions are proposing regulations to implement the SDR provisions of the Dodd-Frank Act.[71]

III.1.a.   REGULATORS WILL HAVE DIRECT, CENTRALIZED ACCESS TO DATA

Currently, to obtain information about swap transactions, regulators must request data from repositories established by the private sector or from counterparties directly. The Dodd-Frank Act significantly changes this regulatory environment by requiring that SDRs register with one or both Commissions, depending on the type of instrument, and provide the Commissions with "direct electronic access" to data contained in these repositories.[72] The Commissions have discretion to define "direct electronic access." The SEC has proposed to interpret this access to

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[64] *E.g.,* Dodd-Frank Act § 721 (adding 7 U.S.C. § 1(a)(50) defining swap execution facilities), § 761 (adding 15 U.S.C. § 78(c)(a)(75) defining security-based swap data repositories), and (defining security-based swap dealers, (a)(71) and major security-based swap participants (a)(67)).

[65] For purposes of the Study, SDRs include both swap and security-based swap data repositories.

[66] 7 U.S.C. § 1(a)(48) (2011), 15 U.S.C. § 78(c)(a)(75) (2011).

[67] Dodd-Frank Act § 723(a) (adding 7 U.S.C. § 2(h)), and § 763(a) (adding 15 U.S.C. § 78(c)-(1)(e)).

[68] Proposed real-time reporting rules vary between the Commissions.

[69] Regulation SBSR – Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. 75,208, 75,217 (proposed Dec. 2, 2010). *See* Real-Time Public Reporting of Swap Transaction Data, 75 Fed. Reg. 76,139, 76,150 (proposed Dec. 7, 2010).

[70] Dodd-Frank Act § 728 (adding 7 U.S.C. § 21) and § 763 (adding 15 U.S.C. § 78(m)(n)(5)(B)) require SDRs to "confirm with both counterparties . . . the accuracy of the data that was submitted."

[71] *See* Security-Based Swap Data Repository Registration, Duties, and Core Principles, 75 Fed. Reg. 77,306, 77,318 (proposed Dec. 10, 2010); Swap Data Repositories, 75 Fed. Reg. 80,898, 80,80,899 (proposed Dec. 23, 2010).

[72] *See* Dodd-Frank Act § 728 (adding 7 U.S.C. § 21(c)(4)(A)) and § 763(a) (adding 15 U.S.C. § 78(m)(n)(5)(D)).

mean, in part, "the ability to query or analyze the data in the same manner that the SDR can query or analyze the data."[73] The CFTC's rule proposal interprets it to mean an "an electronic system, platform or framework that provides Internet or web-based access."[74]

III.1.b.   DATA CAN BE USED TO ANALYZE THE MARKET

The Dodd-Frank Act anticipates that regulators and market participants will use data provided by SDRs to analyze the swaps market. Certain swap transaction and pricing data would be publicly disseminated in real-time to enhance price discovery. These data would include asset class, date and time of execution, notional size and price.[75] Other information proposed to be required to be submitted to SDRs would help regulators monitor the market for systemic risk, but would not be made public.[76] This information would include unique legal entity identifiers[77] and "data elements necessary to calculate the market value of a transaction."[78]

III.2.   SDR LIMITATIONS RELATING TO MARKET ANALYSIS

While SDR regulations, if adopted, could result in more machine-readable data becoming available than is available at present,[79] gaps would likely remain. Three such gaps are discussed below, and in Section IV.

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[73] *See* Security-Based Swap Data Repository, 75 Fed. Reg. at 77,318.

[74] *See* Swap Data Repositories, 75 Fed. Reg. 80,898, 80,906 (proposed Dec. 23, 2010).

[75] Regulation SBSR – Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. 75,208, 75,212 (proposed Nov. 19, 2010). The SEC has established a baseline of elements that must be reported in real-time, which includes asset class, date and time of execution, price, and the notional amount of the SBS. The SDR must set up policies and procedures that "specify the data elements of a SBS . . . that a reporting party would be required to report" and to make these publicly available. *Id.* Similarly, the CFTC has proposed suggested data elements that must be reported in real-time for swaps. Real-Time Public Reporting of Swap Transaction Data, 75 Fed. Reg. 76,140, 76,176 (proposed Dec. 7, 2010).

[76] The SEC's SBSR release states that this data will "facilitate regulatory oversight and monitoring of the SBS market by providing comprehensive information regarding SBS transactions and trading activity." Regulation SBSR -- Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. at 75,217.

[77] *Id.* Identifiers include counterparties to the transaction and its brokers. The SDR would be required to create a unique transaction identifier for every derivatives contract reported to it. *Id.* at 75,220. Counterparties would be required to submit information necessary to delineate a participant's parent and affiliate relationships. *Id.* at 75,222.

[78] *Id.* at 75,218. The rules proposed by the SEC contemplate that the SDR would determine what data elements are necessary for reporting a life cycle event. *Id.* at 75,220. The CFTC rule contemplates that the CTFC would determine what data elements are necessary. For this purpose, the CFTC's proposed rule includes tables of minimum required data elements, and also specifies reporting of terms verified or matched by the counterparties, and of the terms of confirmation done by the counterparties. Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. 76,574, 76,581 (proposed Dec. 8, 2010).

[79] At present there appear to be three industry sanctioned repositories for swap trade data, and these are operated by the following entities: TriOptima (interest rates), *Rates Repository*, and TRIOPTIMA. http://www.trioptima.com/repository.html (last visited Mar. 3, 2011), DTCC (equity), *DTCC Launches Equity Derivatives Reporting Repository,* DTCC, http://www.dtcc.com/news/press/releases/2010/dtcc_launches_equity.php (last visited Mar. 3, 2011), and DTCC (credit), *Products and Services*, DTCC, http://www.dtcc.com/products/derivserv/suite/trade_reporting_repository.php (last visited Mar. 3, 2011).

III.2.a.   UNIVERSAL, UNIQUE IDENTIFIERS

The Commissions have proposed rules for the use of standard entity identifiers that could be applied across all repositories and by all market participants under the Commissions' jurisdictions.[80] These identifiers do not currently exist.

Entity identifiers could provide a consistent reference for the counterparties, products, and reference entities. As stated in a recent paper on the subject, "[t]he financial crisis . . . demonstrated the . . . 'complexity of interrelationships' and dependencies that exist between . . . counterparties, issuers, guarantors, and the domino effect that can result should one or more of [these entities] come under pressure."[81] An identifier consistently applied to a counterparty across all of its transactions recorded in an SDR would allow regulators to, among other things, "aggregat[e] and monitor[ ] . . . the positions of [swap] counterparties, which could be of significant benefit for systemic risk management."[82] The same benefit would appear to also apply to product and instrument identification, particularly for more standard products. Universal data standards also would avoid the translation and data mapping that would be needed if different data standards emerged.

III.2.b.   GENERAL CONTRACTUAL OBLIGATIONS

Rules proposed by the Commissions would require the reporting of the economic terms of a transaction such as the counterparties, notional amount, and reference entity, but would not require the reporting of all of the terms of the governing documents.[83] Credit support, termination and default, and other provisions from master agreements that affect multiple trades are not proposed to be reported. As a result, regulators would not have direct access to information contained in those provisions in a central location. Having these documents in a machine-readable format could, among other things, facilitate analysis of how market events that trigger conditions in these legal documents would change the value of a derivative, and also a counterparty's leverage and net exposure.[84]

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[80] Regulation SBSR - Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. 75,208, 75,218 (proposed Dec. 2, 2010) (stating that SDRs must assign each entity a "unique identification code" provided by an "internationally recognized standards-setting body" if such a code exists). Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. at 76,602.

[81] *See* John Bottega & Linda Powell, *Creating a Linchpin for Financial Data: The Need for a Legal Entity Identifier*, at 3 (Dec. 10, 2010) (unpublished manuscript), *available* at http://ssrn.com/abstract=1723298.

[82] Regulation SBSR, 75 Fed. Reg. at 75,217.

[83] *E.g.,* Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. at 76,605. This proposed rulemaking requests comment on whether a "collateral warehouse system" or a "master agreement library" should be created. *Id.* at 76,586. Trade Acknowledgment and Verification of Securities-Based Swap Transactions, 76 Fed. Reg. 3,859, 3,864 (proposed Jan. 21, 2011).

[84] One response to the Study's request for comment stated the following:
Typically derivatives transactions exist within a framework of agreements between the firms. A single transaction may be a represented as a transaction supplement within a master confirmation which contains standard terms for that type of transaction, and that operates within a master agreement that covers various contingencies such as credit issues and extraordinary events. This transaction supplement is legally binding but references other materials. To provide a complete standalone economic description of the transaction would require a "long form" representation of the transaction, which includes both the standard economic terms (found in the master confirmation) and the variable terms for the individual transactions (found in the transaction supplement).
Letter from ISDA and SIFMA, *supra* note 11, at 12-13.

III.2.c. CONSISTENCY ACROSS ALL REPOSITORIES

As this Study has noted, there exists no single standard for describing in machine-readable format all aspects of all derivatives transactions and, as a result, it may not be possible to achieve consistency of data standards across all SDRs. The SEC's proposed rules allow for, but would not mandate, the use of a single standard across multiple repositories for reporting derivatives information.[85] The proposed CFTC regulations would require an SDR to maintain all swap data reported to it, and to report such data to the CFTC, in a format acceptable by the CFTC. The proposed CFTC regulations would require reporting entities and counterparties to use the facilities, methods, or data standards provided or required by an SDR to which they report data, but also would allow an SDR to permit reporting via various facilities, methods, or data standards, provided that its requirements in this regard enable it to maintain swap data and transmit it to the CFTC as the CFTC requires.[86]

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[85] *E.g.,* Regulation SBSR - Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. 75,208, 75,222-23 (proposed Dec. 2, 2010). Proposed Regulation SBSR would require each data repository to specify one or more data formats (each of which must be an open-source structured data format that is widely used by participants), connectivity requirements, and other protocols for sharing information. The format or formats selected by one SDR need not be shared by other SDRs. The SEC preliminarily determined not to dictate a uniform data standard for use across all SDRs, recognizing that technology and industry conventions may evolve over time to produce improved data standards. The SEC did note that it believed that FpML would be an appropriate format for data reporting.

[86] Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. at 76,594.

IV. SIGNIFICANT ISSUES AND CHALLENGES

Based on this Study, the staff believes that it is too soon to require using a standardized, agreed-upon description for all derivatives. Before such a requirement could be imposed, three issues should be resolved: the absence of a universal entity and product identifiers, the need for further analysis of the costs and benefits of electronic representation of all aspects of legal documents, and the lack of standard reference data for financial terms not covered by existing definitions.

IV.1. THE ABSENCE OF UNIVERSAL ENTITY AND PRODUCT IDENTIFIERS

Many in the financial sector have come to recognize the need for universal, accurate, and trusted methods of identifying particular financial transactions, the legal entities that are parties to financial transactions, the underlying corporate entity referenced in a particular financial transaction, and the product type involved in particular financial transactions.[87] Legal entity identifiers ("LEI"), unique counterparty identifiers ("UCI"), and product identifiers could be crucial tools for financial regulators tasked with measuring and monitoring systemic risk, preventing fraud and market manipulation, conducting market and trade practice surveillance, enforcing position limits, and exercising resolution authority.[88] Such identifiers also could have great benefits for financial transaction processing, internal recordkeeping, compliance, due diligence, and risk management by financial entities. Consequently, technology to represent derivatives may need to incorporate a unique counterparty identifier and corporate hierarchy information (such as immediate or ultimate parent). As a member of the Board of Governors of the Federal Reserve System said recently:

> Clearly, the [recent financial] crisis exposed the need for a regulatory mechanism that will provide real time analysis across multiple financial markets to identify systemic risk and stresses in market conditions before they occur. A unique entity identifier for data sharing and use in data collections between the federal financial regulatory agencies is the critical missing component for this analysis.[89]

Information concerning a counterparty's affiliations and corporate hierarchies must be available in conjunction with LEI/UCIs. This could enhance regulators' abilities to aggregate data across entities and markets and also facilitate monitoring systemic risk. To better help them assess systemic risk, regulators need to be able to identify all swap positions within the same ownership group. Thus, "corporate affiliations" would mean the identity of all legal entities that own or are owned by the counterparty, or that are under common ownership with the counterparty.

A consistent way to identify products across SDRs, asset classes, and jurisdictions also is needed. There are a number of vendor-supplied identifiers[90] currently available to regulators and market

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[87] *See* CFTC Staff Roundtable, *supra* note 14, at 1-261.

[88] Bottega and Powell, *supra* note 81.

[89] Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. at 76,589 (quoting Daniel K. Tarullo, Member, Board of Governors of the Federal Reserve System, *Equipping Financial Regulators With the Tools Necessary to Monitor Systemic Risk*, before the Subcommittee on Security and International Trade and Finance, Committee on Banking, Housing, and Urban Affairs, U.S. Senate, Washington, DC, Feb. 12, 2010).

[90] For example, Markit has created a regime of reference entity identifiers, called the RED code, and Standard & Poors operates the CUSIP system. Market participants can use these identifiers in credit default swaps. Meeting with Brian Okupski, Markit, Feb. 23, 2011.

participants at a cost. These identifiers can be reliable and critical to well functioning markets and would be more useful if they were available without limitation to regulators and market participants needing to follow transactions and associate instruments and products to entities.

Regulations proposed by the SEC contemplate the possibility that universal identifiers may become available in the future. If and when they are, SDRs may require reporting parties to use these identifiers in their reports. Similar regulations proposed by the CFTC would impose the requirement to use UCIs if they are available sufficiently prior to the implementation date for the CFTC's final swap data reporting regulations.[91] We discuss the current state of market development of LEI/UCIs in our conclusion below.

IV.2. DESCRIBING CONTRACTUAL TERMS IN A MACHINE-READABLE FORMAT

As noted above, market participants have suggested that there may be benefits to representing already standard legal documents in an electronic format. However, currently there appears to be a lack of industry consensus on whether the benefits would outweigh the costs. As one commenter opined: "there are benefits because using computer readable descriptions creates an environment that is less susceptible to operational errors, decreases the total cost of ownership and helps to bring transparency and efficiency to the system."[92]

Indeed, many firms are already representing parts of their contractual agreements in machine-readable format to help them understand counterparty risk and calculate net exposure, but they use proprietary representations that vary from the standards used by other firms. This may speed analysis in termination event situations, but it continues a "Tower of Babel" problem where risk systems cannot communicate without "manual reconciliation and transformation processing."[93] ISDA has been exploring using FpML to represent its master and credit support agreements, and at least one company has developed a proprietary technology that electronically represents master and credit support agreements.[94]

As stated above, essential information needed to calculate net exposures is found in master agreements and other legal documents, including when collateral must be transferred or increased; what constitutes a default or credit event; and what otherwise triggers changes in the relationship between the parties. Even something as simple as having the names of all parties and referenced entities identified in an agreement is useful for understanding the net exposure of trades or risks to markets. Yet detailed analysis of lengthy legal agreements in paper format, and how they interact with individual transactions, is time consuming and potentially inefficient.[95]

Some participants in the OTC derivatives markets have indicated that they are working to improve their internal risk management systems, including analysis of their net derivatives

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[91] Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. at 76,591.

[92] Letter from BM&F Bovespa, *supra* note 40, at 7.

[93] Letter from Michael Atkin, *supra* note 38, at 2.

[94] DocGenix, for one, is developing an XML language for describing all terms of swap contract, master agreements and trades. Meeting with Michael Will, docGenix, Conf. Call (Jan. 20, 2010).

[95] As a Deutsche Bank Research report observed, when AIG, a major dealer in Credit Default Swaps failed, "market reactions were heavy, owing to the fuzziness of information on actual credit exposures in a market where trading takes place over-the-counter." Deutsche Bank Research, *Credit Default Swaps: Heading towards a more stable system,* at 3 (Dec. 21, 2009), *available at* http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000252032.pdf.

exposures. As part of these efforts, proprietary and commercial systems are being developed that would render the key legal documents, such as the ISDA master agreement and credit support agreement, in machine-readable format.[96]

However, one commenter observed that the desirability of making computer-readable descriptions legally binding hinges on the accuracy of the legal description and the degree of confidence that market participants have in them.[97] Another commenter expressed skepticism about whether legal aspects of all OTC trades could be represented through legally-binding computer readable descriptions.[98] This commenter reasoned that paper confirmations are needed for complex transactions because "electronic platforms and their common terms and algorithms cannot account for bespoke terms. Critical terms to a customized trade [include] tailored additional termination events, embedded optionality, or allocation of legal rights in respect of a referenced security. These bespoke terms necessarily must be memorialized in a paper confirmation."[99]

At the CFTC's recent roundtable, discussed above, participants supported the establishment of an SDR for exposure and credit support information,[100] but said that an SDR for master agreements may be unworkable due to variation and cost. Participants at this roundtable generally agreed that regulators need access to more swap agreement data than what is provided by trade reporting.[101] However, at least one commenter expressed concern that building the systems needed to store and analyze the data may take more time and money than regulators anticipate.[102]

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[96] As stated above in footnote 91, docGenix, is marketing a service to render master agreements, credit support agreements, and other documents in an XML format. Meeting with Michael Will, docGenix, Conf. Call (Jan. 20, 2010), *docGenix Overview*, DOCGENIX, http://www.docgenix.com/Pages/Topic_docGenixOverview.htm (last visited Mar. 8, 2011). JP Morgan has its own proprietary systems in place for storing and analyzing such data. CFTC Staff Roundtable, *supra* note 14 at 264.

[97] Letter from CETIP, *supra* note 40, at 7.

[98] Letter from Stuart J. Kaswell, *supra* note 61, at 4.

[99] *Id.* at 5.

[100] *E.g.,* CFTC Staff Roundtable, *supra* note 14, at 264. A TriOptima representative stated that their repository provides an "exposure management service" for facilitating the "move[ment] and settle[ment of] the collateral."

[101] *Id.* at 267-279. But some may not agree on whether regulators should have direct access without request. *Id.* at 273 (an ISDA representative stated that prudential regulators should require the keeping of master agreement-level data but not reporting of such data until its need is determined).

[102] *Id.* at 279-80. According to a JP Morgan representative, it has "taken [JP Morgan] years to build the infrastructure . . . to manipulate this data and use it effectively in [its] risk management regime."

These comments suggest to the staff that there is continued disagreement about whether regulators should mandate that legal documents underpinning derivatives transactions be represented in a computer-readable format, and if so, the pace at which this change should occur.[103]

IV.3.   LACK OF COMMON INDUSTRY-WIDE REPRESENTATION OF REFERENCE DATA

"[F]acilitat[ing] computerized analysis of individual derivative contracts" and "calculat[ing] net exposures to complex derivatives"[104] across all markets and counterparties, requires, in the staff's view, consistent and comparable reference data for all derivatives, not just the standardized contracts currently represented in machine-readable format. This includes data that describes the attributes and cash flows of derivative contracts, regardless of whether the instrument is standardized, and whether key terms are detailed in a lengthy legal document.[105] While some firms already have data standards and semantic representations for non-standard derivative contracts, not all do, and there is no universally accepted set of standards that would enable regulators or others to calculate net exposures on a system-wide basis.

Due to the lack of industry standards for reference data and instrument descriptions, when capturing and storing derivatives position information internally, many firms rely on proprietary data models and databases.[106] This approach, which was born of necessity, is less of a problem for individual firms than it may be for regulators that need to analyze cross-market or system-wide risks.

Industry consensus or regulatory mandate could respond to this problem by shaping new standards for reporting data to SDRs, including non-standard agreements, contractual terms and conditions, entity and instrument identification, and hierarchies. Such standards could be a critical component of the data infrastructure that regulators need to quickly and accurately analyze systemic risk and conduct market surveillance. The unique identification of market participants, and the comparability of position data from the various repositories, are essential to prudential risk management and market oversight.

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[103] Creating documents containing computerized descriptions of master agreements and other provisions of swap transactions may be more challenging than making these documents in electronic format legally binding. As stated above, in order for a document containing contract terms to be legally binding, it must be agreed to by both parties. The current practice for matching the terms of credit default swap trade acknowledgments shows that the process for obtaining an agreed upon document can be automated. Where a data standard exists for making documents machine readable, such as FpML for credit default swap trade confirmations, matching services are able to compare versions submitted by counterparties and the matched copy can become legally binding. If similar data standards were created for master agreements and other documents, then these should be able to be confirmed in a similar manner.

[104] Section 719(b) of the Dodd-Frank Act.

[105] *See* letter from Michael Atkin, *supra* note 38, at 1-2.

[106] *Id.* at 2. European financial firms are burdened by the same problem. *See* Francis Gross, Directorate General Statistics, European Central Bank, Paper Presented to the IFC Conference on Initiatives to Address Gaps Revealed by the Financial Crisis, *Microdata As Necessary Infrastructure* at 3 (Aug. 24, 2010), *available at* http://www.bis.org/ifc/events/5ifcconf/gross.pdf. (stating that European regulators attempt to create a "Centralised Securities Database" has been hindered by "diversity in data formats, taxonomies and definitions").

V. CONCLUSIONS

The representation of all aspects of all financial derivatives in a computer-readable language is technically feasible, although it may be difficult to do so for non-standard derivatives products as a practical matter. Regardless of whether terms are standardized, technology exists to make the terms machine-readable, and thus it is feasible, in a technological sense, to algorithmically describe derivatives.

Furthermore, not only is it feasible to represent these instruments in machine-readable format, many already are represented this way. The economic terms of significant portions of the derivatives marketplace are messaged electronically in FpML or FIX. In those cases where derivatives are currently described electronically, these electronic messages, together with certain written documents, form the basis of legally-binding agreements. Moreover, market participants often are able to take the data from these messages and use it in computer-modeling programs that analyze net exposure calculations.

Despite the fact that it is technically feasible to represent derivatives contracts in machine-readable format, before requiring standardized, agreed-upon computer descriptions for all derivatives, three issues need to be resolved: (i) the absence of a universal entity identifier and product identifiers; (ii) the need for further analysis of the costs and benefits of electronic representation of all aspects of legal documents; and (iii) the lack of standard reference data for financial terms not covered by existing definitions.

With regard to the question of whether it is feasible to mandate electronic representations of derivatives in order to make them legally binding, the Study concludes that this would be possible if all material aspects of derivatives contracts were represented in machine-readable format. Specifically, an agreement rendered in a structured data file could be legally binding upon the parties provided they both agreed to it.[107] Whether this would benefit participants in the swaps market is a separate question that, together with the question of the costs imposed by such a regime, necessitates further analysis, including input from those participating in these markets. As regulators, we can see benefits to participants such as ensuring the quality of the data, but it is less clear that others would see a benefit.

To resolve the above-identified three issues, the staff believe that collaborative public-private initiatives with other financial regulators and the derivatives industry would be useful. In essence, rather than mandating the adoption of a particular solution, the staff would identify broad requirements for implementation, and the industry would agree on solutions that meet these requirements.

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[107] Legal questions around the need for an actual paper copy of the agreement or a signature on some document, as occurs currently with respect to master agreements and confirmation agreements with the DTCC Trade Information Warehouse, would require further analysis.

V.1.   STANDARDIZING ENTITY AND PRODUCT IDENTIFIERS

Work on developing standard entity identifiers is already underway. In the Fall of 2010, the Commissions proposed rules that would regulate SDRs as well as reporting to SDRs and require those repositories to use a standard entity identifier (described as a unique counterparty identifier in CFTC rulemaking),[108] developed by a voluntary standard-setting body, if one is available.[109] These rules were published around the same time that the U.S. Treasury's Office of Financial Research published a policy statement calling on industry to work together with regulators to develop standard entity identifiers.[110] And in December of 2010, staff members from U.S. financial regulatory agencies published "Creating a Linchpin for Financial Data: The Need for a Legal Entity Identifier," ("the Linchpin paper") which called for an international standard setting process to develop a reliable universal entity identifier.[111]

It is too early to tell whether this process will develop an LEI/UCI that satisfies the needs of industry and domestic and foreign regulators. Staff representing U.S. regulators involved in the development of the Linchpin paper continue to engage industry members on this topic, and the financial industry is developing a process that may reasonably soon produce a single identifier for each participant in our markets.[112]

If successful, the LEI/UCI would include freely and publicly available attribute information – reference data about the LEI/UCI that provides context and meaning. Included as an attribute – or in some other dataset that uses the LEI/UCI to connect entities to one another – would be hierarchical information. At a minimum, the marketplace would be served by current information identifying each entity, their immediate parent, and their ultimate parent. Additionally, market participants and regulators should be able to link this information to instrument or product identification information.

With respect to creating a reliable and universal way to identify products and instruments across different datasets, firms, and markets, a public-private partnership like that unfolding for the LEI/UCI may be appropriate. As the authors of the Linchpin paper noted, while the development of an LEI/UCI is an appropriate first step, the development of product and instrument identifiers also is critical to understanding markets.[113] As with an LEI/UCI, the product or instrument identification would need to be universal across international markets, reliable (persistent, unique and current), and freely available to regulators and investors. In the coming months, the staff of the Commissions will continue to monitor developments in the industry development of an LEI/UCI, and will evaluate, with input from other regulators and industry, approaches to establishing universal product or instrument identifiers.

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[108] Swap Data Recordkeeping and Reporting Requirements, 75 Fed. Reg. 76,574, 76,589 (Dec. 8, 2010).

[109] *Id.* at 76,590. *See also* Regulation SBSR – Reporting and Dissemination of Security-Based Swap Information, 75 Fed. Reg. 75,208, 75,217-18 (proposed Dec. 2, 2011).

[110] OFFICE OF FINANCIAL RESEARCH; STATEMENT ON LEGAL ENTITY IDENTIFICATION FOR FINANCIAL CONTRACTS (Nov. 30, 2010), *available at* http://www.federalregister.gov/articles/2010/11/30/2010-30018/office-of-financial-research-statement-on-legal-entity-identification-for-financial-contracts.

[111] Bottega and Powell, *supra* note 81.

[112] CFTC Staff Roundtable, *supra* note 14. Panels 1-5 discussed identifier issues. At this event, representatives from industry groups, vendors, data managers, and entity and instrument registration authorities unanimously agreed that a single identifier is critical. They appear to be working toward a consensus process for the development and maintenance of a universal entity identifier.

[113] Bottega and Powell, *supra* note 81.

V.2. POSSIBLE FURTHER USE OF COMPUTER READABLE REPRESENTATIONS FOR LEGAL DOCUMENTS

Master agreement documents might benefit from electronic representation in at least two areas. First, a standardized electronic representation of key quantitative terms embedded in these agreements would aid in tasks such as calculating exposures to various events. For example, if a credit support agreement required the addition of collateral in the event of a credit downgrade to a specified level, an electronic representation of this term could be included in a model that would provide for risk analysis or event notification. Thus, electronic representation of collateral terms in credit support agreements could be helpful. Credit support terms are routinely contained in a credit support agreement between market participants. Terms that would appear to benefit from electronic representation include: calculation methodology for initial margin; amount of any credit threshold; amount of any minimum transfer amount; rounding convention; forms of eligible collateral; collateral valuation haircuts; timing of collateral demand; timing of collateral delivery; and amount of collateral already held. This could assist counterparties, and could also, in certain circumstances, serve regulators seeking to understand the effects of such events as deterioration of ratings of systemically important institutions.

Second, even block tagging[114] written provisions of these agreements could help managers, auditors, lawyers, and regulators more quickly understand the implications of various market events, particularly in a crisis. Thus, an electronic representation of master agreement provisions could provide attorneys seeking to unwind relationships with failing institutions with important tools such as the ability to quickly extract important clauses from different agreements with the same counterparty.

Given the work to date in representing these legal documents in standard computer-readable languages, it may be possible, without great burden and with significant benefit, to tag appropriate sections of these agreements in the near term. Published standard legal clauses are available for tagging, and industry and vendor efforts can continue to develop an electronic representation of those clauses most useful for determining net exposures.

The staff intend to monitor the progress of this work and participate as appropriate, coordinating our efforts with other financial regulatory agencies. We anticipate that the Office of Financial Research will be actively involved in working with industry to evaluate the benefits and costs of representing and collecting this data relating to exposures and risks given its responsibilities to develop certain data repositories. We encourage market participants to help our efforts by actively engaging efforts to analyze the propriety of tagging legal documents, and we welcome their input.[115]

V.3. REPRESENTATION OF REFERENCE DATA

The final, and perhaps most difficult, area to resolve is the creation and maintenance of standard definitions for financial data and contractual terms, along with a standardized language for

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[114] "Block tagging" is defined as tagging an "entire footnote, or other discrete item" of text as one individual element. Interactive Data to Improve Financial Reporting, 74 Fed. Reg. 6,776, 6,786 n. 134 (Feb. 10, 2009).

[115] As more aspects of derivatives contracts become machine readable, regulators and market participants should explore whether documents containing machine-readable terms can become legally binding. As stated previously, the technology required to accomplish this may be costly and it may not be feasible to do this for some time. Credit support agreements may be a next step for expanding the scope of machine readable, legally binding derivatives contracts. If information in these agreements can be rendered in a format for analysis, then it may be possible to implement standards for matching these agreements.

composing these terms, so that any new contract could be described electronically. One commenter described working with others to build a "semantic repository" that could house those standard definitions and relationships among them.[116] This semantic repository does not use a language like FpML that defines the detailed syntax of specific documents and messages; instead, it uses Web Ontology Language that has multiple layers of definitions, potentially supporting a greater variety of applications. Another market participant proposed a way to break all financial contracts down into their most basic form, develop a programming language (or use an existing one) that represents these basic clauses and terms, and then build even the most complicated contract according to this language.[117] Other efforts in this area also are underway.[118]

As consideration is given to some sort of reference data standard or universal data utility, a key challenge will be establishing a governance structure for the maintenance of the standard or for the utility that is fair and efficient and that does not stifle innovation. Such a structure should also reflect an acceptable business model that is sustainable and not unduly burdensome.

We recognize that change is not without cost. Thus, the staff have determined that, while feasible, further consideration is needed to determine whether to require use of technology that fully represents all aspects of all derivatives transactions. While one Study commenter expressed optimism and explained that technological change requires a transition period, during which companies have to run both "new" and "old" systems,[119] another commenter was pessimistic on the prospect of immediate progress, and cautioned against prescribing a specific technology for the financial derivatives market.[120] In this commenter's view, "[c]omplex derivatives and customized derivatives do not currently lend themselves to the use of algorithms or standardized computer readable descriptions."[121] The commenter reasoned that OTC derivative participants can "use more sophisticated proprietary algorithmic valuation models to value complex derivatives that have multiple factors driving their value" and that "[i]n general, the more complex a derivative might be, the more difficult it is to arrive at a market standard algorithmic valuation model that can be used by counterparties to reach a common valuation."[122]

We recognize that, as one commenter stated, to "encourage standardization in markets without hindering market efficiency," a key role for regulators "is that of a facilitator."[123] At a minimum, an ongoing dialogue about how best to move the markets in the proper direction is essential, which is why a public-private initiative would go far in further answering the questions that gave rise to the Study.

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[116] Letter from Michael Atkin, *supra* note 36, at 3.

[117] Meeting with Harvey Stein and Adam Litke, Bloomberg, Conf. Call (Dec. 13, 2010. *See also How to Write a Financial Contract*, Peyton Jones, S.L. and Eber, J-M. (unpublished paper, 2001), http://research.microsoft.com/en-us/um/people/simonpj/papers/financial-contracts/pj.eber.ps (last visited March 14, 2011).

[118] Francis Gross, *Microdata As Necessary Infrastructure* at 9, *supra* note 106.

[119] Letters from David N. Gertler, *supra* note 39, at 9; and BM&F Bovespa, *supra* note 40, at 6.

[120] "[T]he ultimate manner in which uniform computer readable description standards are adopted and the timing of such adoption should be left to the market." Letter from Stuart J. Kaswell, *supra* note 61, at 4.

[121] *Id.* at 2.

[122] *Id.*

[123] *Id.*