

Dennis J. Dirks
Chief Operating Officer

July 2000

Tel: 212 855 3700
Fax: 212 855 3014
ddirks@dtcc.com



**The Depository Trust &
Clearing Corporation**
55 Water Street
New York, NY 10041-0099

To: DTCC Customers

This white paper details DTCC's best thinking on the changes that we as an industry – and our depository and clearing corporation subsidiaries – need to make to provide for straight-through processing and, ultimately, T+1 settlement. In late March, a draft of this paper was sent to the Securities Industry Association T+1 Committee, The Bond Market Association T+1 Task Force, the Asset Managers Forum T+1 Committee, the New York Clearing House Association T+1 Committee and the Executive Committee of ISITC-IOA. Many comments and suggestions from those groups have been incorporated into this updated version of the paper. We would now like to request your firm's comments in order to help us finalize our planning for the changes outlined here. We would like to have all comments returned to us no later than September 18, 2000. You may submit comments in writing, by e-mail or using our new Web site discussion forum.

Moving securities settlement to a full straight-through-processing model, and from T+3 to T+1, will be a significant challenge. It will easily eclipse in scope the complexity and cost associated with the changes the industry had to make when moving from T+5 to T+3 settlement in June 1995, and to Same-Day Funds Settlement in February 1996. As DTCC and others have begun examining the changes required in some depth, the full scope of the effort that will be required throughout the industry has become more clear and more daunting.

Based on the comments by the industry groups who reviewed our earlier draft, there is now general agreement that DTCC should immediately begin to reengineer its systems to provide the capabilities outlined in the paper while the industry is still operating in a T+3 settlement environment, and we intend to do that. Some industry commentators felt, however, that delivery aggregation and pre-authorized receive instructions as described in the paper require further discussion. Through further comments from the industry, we hope to identify any other concerns or suggested changes we need to make. Once in place, the new systems, which will be designed to be T+1-ready, will provide the needed additional capacity for the industry to address ever-increasing trading volumes.

DTCC has established on the www.dtcc.com Web site a "forum" capability permitting industry members to comment on the paper and related issues on-line. The Forum section can be found by clicking on "Products and Services" and then clicking on "Forum." Access is controlled by passwords for security reasons. Industry members already assigned passwords to the www.dtc.org site may use those passwords for access to the Forum; others will be assigned passwords promptly upon applying for them through the www.dtcc.com site. The Forum will not be accessible to non-industry members.

The Forum capability will permit industry members to access this paper in PDF format, to submit comments on the paper generally or on specific sections or proposals, to review other comments DTCC has received and to participate in a dialogue with other commentators on the issues raised in the paper. An industry member wishing to react to another's comment may opt to have that reaction e-mailed to the original commentator, as well as posting the reaction on the site. DTCC, of course, cannot take responsibility for comments posted on the site and reserves the right to remove inappropriate postings if that is necessary.

E-mails should be sent to John Mancuso at jmancuso@dtcc.com. Our intention is to post all electronically submitted comments on the Forum as well; if you submit comments in this way and would prefer that your comments not be posted on the Forum site, please indicate that clearly early in the comment submission. Written comments may also be submitted to John at the following address: Mr. John Mancuso, The Depository Trust & Clearing Corporation, 55 Water Street, 26th Floor, New York, NY 10041.

Any questions about the concepts and proposals presented in the paper can also be addressed to John.

Sincerely,

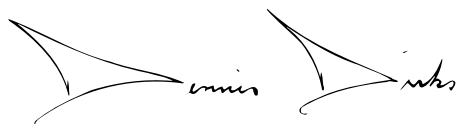


TABLE OF CONTENTS

Executive Summary 4

Trade Capture 9

Institutional Trade Matching 13

Settlement 20

Risk Management 25

Technology 29

Appendix: Risk Management Background 32

Comments should be forwarded to:
John T. Mancuso
The Depository Trust & Clearing Corporation
55 Water Street, 26th Floor
New York, NY 10041
212-855-1342
jmancuso@dtcc.com

EXECUTIVE SUMMARY

Overview

As trading volumes have continued their dramatic upward climb over the past decade, securities industry executives are focusing their attention on the transformation the industry must undergo to cope with these volumes, and the potential for even greater increases in the years ahead. On a single day in April 2000, volume at the National Securities Clearing Corporation (NSCC) reached 18.1 million transactions. This is up from the peak volume of 9.3 million in 1999 and 6.3 million in 1998. Well over 4 billion shares changed hands on the major markets on that peak day in April, more than double 1999's average daily share volume of 1.9 billion.

To deal with this expanding market, the industry has embraced the concept of straight-through processing, or STP, which in its most basic form means that once a determination is made to buy or sell securities, the order can be routed to the appropriate market, executed, reported back to the trading parties and then settled — all with no manual intervention. Concurrent with this objective, the industry and its regulators are seeking to reduce risk, particularly given increased market volatility, by shortening the time between trade date and settlement date. In 1998, Securities and Exchange Commission (SEC) Chairman Arthur Levitt challenged the industry to move to a T+1 settlement, following the success achieved after the move from T+5 in 1995.

Meeting that time frame will be a daunting challenge. Systems and processes for both the streetside and institutional side of the industry must be completely reengineered,

moving from batch overnight processing to real-time or near real-time processing. Every market participant will have to examine and improve all processes and applications, eliminating any inefficiencies. Many of these steps must be taken now to alleviate current capacity concerns and pave the way to T+1.

Changing the institutional post-trade model is called for — even without factoring in the move to T+1. The existing process is showing signs of strain as trade volume grows. As firms have increased their investments to add capacity and improve internal processing, confirm and affirm rates have not improved, leading to greater risk for the industry

The average daily U.S. institutional trade volume increased to 432,000 trades in 1999 from 182,000 trades in 1995. And in 1999, an average of 70,000 institutional trade confirms, for a value of \$15 billion a day, were *not* submitted by brokers into The Depository Trust Company's (DTC) TradeSuiteSM system on trade date, double the 1995 average of 36,000, valued at \$7 billion. DTCC experienced confirm input rates as low as 76% on certain peak days during the first quarter of 2000, compared with the average rate of 85%, which has held fairly steady over the past several years. In addition, only 12% of trades are currently affirmed on trade date and only 88% of trades are affirmed by noon of T+2, the deadline for automated settlement.

So while performance rates have held fairly constant during the past five years, the tremendous growth of volume, without a productivity increase, has led to a much higher overall number of exception items throughout the settlement period, resulting in significantly higher risk for the industry. A complete redesign of the

institutional post-trade model will allow the industry to streamline today's operating model, increase capacity significantly, decrease the number of exception items and reduce costs over time by eliminating many redundant and manual steps.

Discussion

The Depository Trust & Clearing Corporation (DTCC), whose operating subsidiaries — DTC and NSCC — represent the primary infrastructure for the settlement of streetside and institutional securities trades in the U.S., is planning the changes in its systems required to successfully facilitate straight-through processing and adopt T+1. While numerous details and issues still need to be studied, discussed, and refined, this paper is a preliminary overview of these processing changes. It does not address the many other open questions the industry is facing. Some examples include: how the industry moves to T+1 with certificates still available to investors; how customer confirmation rules need to be changed to accommodate the shortened settlement time frames; how retail customers pay for purchases or promptly receive sale proceeds if they do not keep their assets with their broker; and how brokers disseminate prospectuses on initial public offerings. Securities Industry Association (SIA) and other industry organizations are addressing these and many more questions.

As DTCC staff considered the changes needed to successfully facilitate straight-through processing and adopt T+1 settlement, several "building blocks" were identified and are described in this paper. Principal among them:

- All streetside trades must be reported to the clearing corporation (NSCC) in a

"locked-in" format (i.e., matched electronically at the time of execution) from the market where the trade was executed. For equity issues, this has largely been achieved, but this is not the case for corporate and municipal bond transactions. Government Securities Clearing Corporation (GSCC) is investigating the use of its real-time matching facility as a single point of entry for fixed-income street-side trades.

- High-volume sources of streetside trade data must submit data to the clearing corporation on a real-time basis, so that processing and risk monitoring can occur throughout the day, rather than only at the day's end. Marketplaces submitting lower volumes of trade data should move to multi-batch transmissions at a minimum.
- The Continuous Net Settlement (CNS) system will be substantially rewritten to accommodate real-time processing and other enhanced capabilities to bring greater efficiency to the settlement of streetside trades. These capabilities include: real-time CNS updates; expanded CNS and depository position information for participants; capabilities to add new trades and corrections to the netting process in real time; enhancements to the CNS Stock Borrow Program; the addition of foreign currency capabilities; and streamlined real-time reporting.
- In order to make certain that sufficient assets are freely available, if needed, DTC and NSCC will only accept cash or other instruments that are easily liquidated as participant contributions to their clearing funds. New mechanisms for obtaining assets from clearing firms whose trades have raised their risk

profile will be developed and implemented, so that NSCC can obtain clearing fund deposits much more quickly than at present.

- A new matching model, which fundamentally reengineers the process today handled through confirmation and affirmation, should be adopted to streamline the institutional post-trade processing cycle to eliminate redundancies and place immediate emphasis on exceptions. This is consistent with input DTCC gave to SIA's Institutional Transaction Processing Committee (ITPC), the industry group redefining the post-trade processing model for U.S. institutional trades¹. DTCC, working with Thomson Financial ESG through our recently announced proposed global joint venture², will work to implement the new model quickly.
- This global joint venture will develop and implement a single global workflow solution in line with this model and will guide its customers through a seamless migration path toward the new matching model that takes advantage of investments in DTC TradeSuite and Thomson Financial ESG products. In addition, careful attention will be paid to the requirements for processing prime broker trades, which are currently processed in the same environment as institutional trades.
- The global joint venture will develop functionality in the new workflow solution to support the "aggregation" of institutional trades to bring greater efficiency to institutional trade settlement. This aggregation concept is being stud-

ied in detail by an SIA committee, with both DTCC and Thomson Financial ESG acting as advisers. Aggregation (which likely will be an optional feature) combines into a single deliver order multiple allocations from the same investment manager that have the same custodian *within a single block trade* to reduce the number of overall transactions settled. Since aggregation means the settlement of fewer, but larger, transactions, DTCC will explore with the industry the benefits of developing an automated stock lending facility for institutional trades, with the depository acting in partnership with its participants having loanable positions, to avoid the possibility of partial delivery processing of aggregated deliveries if the deliverer is short the aggregated quantity.

- Also related to institutional settlements is the industry's exploration of moving institutional trade settlement into a netting environment, similar to CNS. While not part of the initial plans for T+1, this will be actively discussed in the industry, with a recommendation expected by year-end 2001.
- DTCC will develop plans for a combined, single settlement system to replace the two separate systems now in place at DTC and NSCC. The risk management implications of this change are significant and will be fully investigated, along with the effect on participants.
- The timing of the trade guarantee provided by NSCC will be changed to midnight between trade date and T+1 when T+1 settlement goes into effect. (Today, the guarantee takes effect midnight

¹ A copy of the ITPC's White Paper describing its work is available on SIA's Web site at www.sia.com.

² The venture has not been named yet. References to it throughout this document will use the term "global joint venture."

between T+1 and T+2.) Assuming other recommended changes are made, this will provide NSCC with sufficient time to evaluate transactions and assess the need for additional clearing fund deposits, while providing a level of certainty and safety for CNS trades.

- To ensure settlement finality, DTCC will eliminate the depository's next-day resale to deliverers procedure (available to the depository in the event of the insolvency of a participant that has failed to settle).
- In order for NSCC to effectively manage the risk associated with its trade guarantee, trades cannot be submitted in a compressed format, as the parties to a trade are not clearly identified and risk cannot be fully assessed. ("Compression" occurs when a clearing corporation member submits one "representative" trade to the clearing corporation that is actually a summary of multiple trades in the same security executed at different prices and with multiple correspondents and/or executing brokers. This practice results in the loss of identity of original trade parties or prices.)
- To bring greater efficiency and reliability to data communications with the clearing corporation and the depository, DTCC will increasingly rely exclusively on industry-standard telecommunications methods and applications (Connect:Direct and FTP for file transfers, MQ Series for messaging), with a specific program providing for the retirement of older and proprietary technologies in this area. To support

industry members' efforts to achieve straight-through processing, DTCC will provide support for the three standard messaging formats — ISO 15022, FIX and ISITC.

- DTCC will explore with an industry group, under the auspices of SIA and the New York Clearing House Association (NYCH), the benefits of developing functionality in DTC's settlement system to support two-sided settlement authorization. This would require both the receiver and the deliverer to authorize institutional settlements, eliminating reclaims by participants, while preserving the agency relationship between custodian banks and their institutional customers.

Next Steps ...

The White Paper that follows requires in-depth industry review and comment. It is intended to be a work in progress, with further refinements and additions as the industry reacts to the ideas presented here. As with the conversion to Same-Day Funds Settlement and T+3, DTCC will continue to publish updates to these plans as open issues are resolved and plans become more detailed.

DTCC will work closely with SIA, which through its T+1 Committee,³ co-chaired by Diane Schueneman of Merrill Lynch Investment Managers and Arthur Thomas of Merrill Lynch Securities Services Division, has spearheaded the discussion on T+1. DTCC is also keeping the SEC and other industry regulators informed of its progress. SIA has initiated a review of the business issues associated with moving to

³This committee includes representatives of The Bond Market Association, The Asset Managers Forum, ISITC-IOA, the New York Clearing House Association and the Global Straight Through Processing Association.

T+1 and is preparing its own estimate as to when the change to T+1 settlement can be scheduled. Conscious of Chairman Levitt's challenge, the industry is considering implementation by mid-2004. However, since a review of all the steps that must be accomplished is in its preliminary stages, a final target date for T+1 implementation is yet to be determined.

DTCC staff will also review its plans with other markets and clearing organizations to determine what adjustments must be considered relative to the linkages between those organizations and DTCC. The Options Clearing Corporation (OCC), for example, has long worked closely with NSCC and DTC to add efficiency and safety to the options clearance process. Options and other instruments, such as government bonds, already settle T+1. DTCC staff will compare its T+1 plans with the successful settlement systems being used for those markets.

One of the most challenging issues that must be addressed during this process will be retail and institutional customers' reactions to this industry and regulatory initiative. Much will have to be done to explain the changes required and the rationale for those changes, particularly those that require customers to make behavioral changes or incur costs. DTCC staff is offering to work with industry organizations, the SEC and other regulators to develop plans for beginning this discussion with the industry's customers.

We welcome and encourage your feedback and reactions to this paper. Please forward written comments to:

*John T. Mancuso
The Depository Trust &
Clearing Corporation
55 Water Street, 26th Floor
New York, NY 10041
212-855-1342
jmancuso@dtcc.com*

SECTION I: TRADE CAPTURE

Introduction

Accelerating the settlement cycle to T+1 requires that all clearance and settlement processes occur faster, beginning with the capture of executed trades from the marketplace.

DTCC's operating subsidiary, NSCC, acts as the central clearing hub for broker-to-broker (street-side⁴) trades. NSCC captures trade information electronically from exchanges, electronic communications networks (ECNs), exercises and assignments of options from the Options Clearing Corporation, trading systems and correspondent clearing organizations. These trades are then guaranteed and netted by NSCC to reduce both market and settlement risk for the trading parties.

To effectively move to T+1 settlement, the industry must adopt uniform trade submission practices as follows:

Recommendations

Locked-In Trade Submissions: All street-side trades — equity and fixed income — must be “locked in”⁵ by the marketplace at the time of execution before being sent to NSCC for clearance and settlement. This centralizes the matching function at the marketplace and ensures that trades that do not match are identified and corrected sooner.

Real-Time Transmission of Street-side Trade Data: High-volume sources of street-side trade data, including the New York Stock Exchange (NYSE), the Nasdaq Stock Market and certain ECNs, must transition

to real-time transmission of trade data, so that processing can occur throughout the day, rather than only at end of day. At a minimum, marketplaces that represent a smaller percentage of trade data should move to multi-batch transmissions.

Adoption of International Standards: DTCC will adopt standardized formatting for trade records to meet international standards. This includes supporting internationally recognized identifiers, such as ISIN (International Security Identification Number), where necessary, and BIC (Bank Identification Code). The use of CUSIP numbers and participant numbers to identify U.S. domestic issues and participants will continue. To ease the industry's transition to these new standards, older input formats will be supported for some time after the introduction of the new standards.

Streamlined Output and Trade Reporting: DTCC will streamline trade reporting by eliminating redundant reports and printed output.

Rationale for Recommendations

WHY ARE LOCKED-IN TRADE SUBMISSIONS IMPORTANT?

Close to 99% of equity trades are locked in at the time of trade execution on a real-time basis. It makes sense to centralize this functionality at the marketplace for all securities issues cleared by NSCC and not require a trade comparison function at NSCC. Clearly, trade comparison is best handled by the marketplace at the time of execution. Trades that do not match are identified more quickly, so that they can be corrected promptly, limiting risk to the counterparties. The speed with which

⁴ Street-side refers to a transaction between buying and selling broker/dealers.

⁵ “Locked in” means the trade details from the buyer and seller are matched electronically at the time of execution.

trades are geared up for settlement in a high-volume, time-compressed environment is also increased.

Since corporate and municipal bond trades are not currently locked in at execution, NSCC now compares these trades on a batch basis. This method of processing will not provide trading counterparties with enough time to correct and settle mismatched trades in a shortened settlement environment. Industry discussions are under way to develop a workable solution to match fixed-income transactions in an effective, efficient and timely manner. GSCC is investigating the use of its real-time matching facility as a solution for comparing corporate and municipal bond broker/dealer trades.

WHY MOVE TO REAL-TIME TRANSMISSION OF STREETSIDE TRADE DATA?

Last year, NSCC averaged 6.4 million transaction sides per day, nearly double the average of 3.8 million transaction sides just two years ago. Growth is accelerating on a monthly basis. The average number of transactions processed daily between October 1999 and January 2000 increased 40%. On the major markets, average daily volume has grown to almost 2 billion shares, up from 768 million only four years ago.

In April 2000, the clearing corporation processed a daily average of 11.7 million transactions, 22% higher than the daily average of 9.6 million transactions processed in the fourth quarter of 1999.

As both volume and volatility continue to escalate, real-time transmission of trades to NSCC is necessary for three primary reasons:

1. To begin risk management processing as soon as possible, thus ensuring safety for participants and the industry as a whole.

2. To prevent the possibility of end-of-day processing backlogs, which might delay or disrupt trade settlement.
3. To accelerate preparation for next-day settlement.

WHY ADOPT INTERNATIONAL STANDARDS?

Investors increasingly look across national borders for investment opportunities. Since 1990, U.S. firms and individuals have tripled their investments in foreign securities to \$4 trillion. Last year alone, foreign investment in U.S. securities reached \$3 trillion. U.S. marketplaces have continually explored listing shares of foreign issues in their ordinary form, rather than using American Depositary Receipts (ADRs). Expanding cross-border trading will make the listing of foreign securities in the U.S. commonplace.

The adoption of international standards for transaction input recognizes the growth of cross-border trading. ISIN will be the standard used for securities identification, and BIC numbers will be the counterparty identification standard. The use of CUSIP numbers and participant numbers to identify U.S. domestic issues and participants also will be acceptable.

WHY STREAMLINE OUTPUT AND TRADE REPORTING?

Redundant trade reporting must be eliminated to achieve greater efficiency at both the broker/dealer, where the reports are reviewed, and at NSCC, where they are created. Today's trade reporting produces too many redundant reports for an accelerated settlement environment.

For example, on T+1, contract sheets are issued to broker/dealers to report trades executed in the marketplace. On T+2, these trades are summarized and reported to

broker/dealers again in the Consolidated Trade Summary file. In a next-day settlement environment, these two separate, but very similar, sources of settling trade information would be distributed just hours apart on trade date. Consequently, internal reconciliation steps will become backed up against one another causing timing conflicts.

These reports will be consolidated into a single report that will be distributed through data transmissions (and will continue to meet legal and regulatory obligations). Print image reports will be made available for low-volume participants. No hard-copy reports will be printed.

Efforts at DTCC and in the Marketplace

LOCKED-IN TRADE SUBMISSIONS

All equity trades executed on exchanges located outside of New York City are already submitted as locked in, while locked-in trades represent 99% of the volume now coming from the NYSE and Nasdaq. The NYSE has committed that all trades from its market will be locked in before they are sent to NSCC prior to the industry move to T+1. Likewise, Nasdaq has committed to expand its Automated Confirmation Transaction (ACT) service to include all Nasdaq equity trading, eliminating the need for NSCC to provide matching capabilities for these trades. NSCC plans to adopt a procedure requiring that all equity trades submitted for clearance and settlement be matched prior to submission.

The challenges related to developing a matching solution for fixed-income transactions are greater. NSCC still compares trades in corporate and municipal debt and unit investment trusts on a batch basis. Recently, industry solutions have been considered to develop a closer-to-real-time

matching system for fixed-income trading. As part of an initiative to provide price transparency, Nasdaq has proposed the inclusion of corporate bond trades into a system called Trade Reporting and Comparison Entry Service (TRACE). TRACE has been filed with the SEC and is under review by the industry, which has not reached a conclusion on the acceptability of this proposal. DTCC has been, and will continue to be, part of the industry discussion to determine the most effective approach to provide a solution to the transparency and T+1 issues.

As previously noted, GSCC has begun a review of the real-time matching process it has in place for U.S. Treasury securities to ascertain its applicability for comparing corporate and municipal bond broker/dealer trades. Using GSCC has the further advantage of providing a single point of entry for all firms for fixed-income transactions.

REAL-TIME TRANSMISSION OF STREETSIDE TRADE DATA

DTCC, through its operating subsidiary NSCC, has already made significant strides in obtaining trade information earlier on trade date. In early 1999, work began with Nasdaq and ECNs to develop strategies to speed up the transmission of equity transactions. Starting with Nasdaq, NSCC began receiving five batches of trades at set intervals throughout the trading day. This multi-batch process has been expanded to include four ECNs, with the percentage of transaction volume captured in slices throughout the trading day now at more than 70%. In January 2000, a project was initiated with the NYSE to transition to an intra-day, real-time trade capture process, which should be completed by mid-2001.

These efforts will be expanded to cover all ECNs and other marketplaces. Preliminary discussions have already been held with the Boston, Philadelphia, Chicago, Cincinnati and Pacific stock exchanges; the Chicago Board Options Exchange; and the Options Clearing Corporation. Ultimately, all trade input will have to be reported to NSCC in real time or multiple batches.

ADOPTION OF INTERNATIONAL STANDARDS

DTCC will work with SIA's T+1 Streetside Sub-Committee to identify and adopt standards for trade reporting. This group consists of business and technical representatives from the NYSE, NASD and major firms.

STREAMLINED OUTPUT AND TRADE REPORTING

DTCC will work closely with its user base to review the timing and content of all trade reports. Specifically, the usefulness of contract sheets will be compared to the Consolidated Trade Summary to determine what makes the most sense in a T+1 settlement environment. DTCC will also work to prepare the industry for the elimination of hard-copy reporting.

Next Steps ...

- Work toward an industry solution to ensure that all streetside trades are submitted to NSCC locked-in from the marketplace. Eliminate equity trade matching at NSCC by 2002.
- Complete the conversion of NYSE equity trade input to real time by mid-2001.
- Transition Nasdaq from multi-batch to real-time trade input by mid-2001.
- Bring two regional markets to multi-batch by year-end 2000 and establish a time frame for the remaining markets.
- Establish the criteria for real-time versus multi-batch input by ECNs and Qualified Special Representatives by year-end 2000. Require them to submit real-time or, at a minimum, multi-batch, based on those criteria by year-end 2001.
- Complete the analysis of file formatting as it relates to international standards by first quarter 2001 and issue revised record layouts by year-end 2001.
- Evaluate all trade reporting output to determine redundancies by year-end 2000. Determine a date when NSCC will cease production of all redundant output and hard-copy output by mid-2001.

SECTION II: INSTITUTIONAL TRADE MATCHING

Introduction

In a move that will redefine trade processing globally, DTCC and Thomson Financial recently announced plans to create a new global joint venture, building on the existing trade processing businesses of DTCC's depository subsidiary and Thomson Financial ESG, a unit of Thomson Financial. The venture will link a broadened community of custodian banks, investment managers and broker/dealers, accelerating the industry's drive to manage operational risk through the real-time straight-through processing of securities. DTCC and Thomson Financial ESG plan to execute a final definitive agreement and seek the necessary regulatory approvals during the summer.

The new company will combine the DTC TradeSuiteSM family of products (including confirm/affirm services [originally known as the Institutional Delivery system], TradeMatch, TradeHub and the Standing Instructions Database [SID]) with Thomson Financial ESG's OASYS, OASYS Global, ALERT, MarketMatch and ITM Benchmarks.

While delivery of a single global trade management platform and migrating customers to it are key goals of the venture, early emphasis will be on integrating current services, including possibly Thomson Financial ESG's OASYS allocation service and DTC's TradeMatch. This will facilitate the industry's goal of achieving STP and help manage the tremendous growth in trading volumes and the move to shorter settlement cycles worldwide.

While it is clear that the current post-trade processing model for institutional trades

requires a complete transformation to handle T+1 settlement, it is also becoming evident that even with settlement on T+3, the industry is showing signs of strain using the current process. Today, institutional trades are primed for settlement through a series of sequential and repetitive steps, using a process developed when the volume of trades was far lower than it is today and settlement occurred on T+5. As institutional trading continues to expand, great attention has been placed on defining the characteristics of the future post-trade model — for both the U.S. domestic and cross-border markets. To make a successful move to T+1, work must begin immediately to transition to the new model, so that a critical mass of the industry has significant experience with it prior to the implementation of T+1.

Although parts of the institutional trade processing flow are highly automated, the entire chain does not work together in a fast-moving, straight-through processing stream. A number of industry committees and working groups are focused on rethinking the process, rather than just improving aspects of it. In the U.S., SIA's Institutional Transaction Processing Committee (ITPC) is redefining the post-trade processing model for U.S. institutional trades. (A copy of the ITPC's White Paper describing its work is available on SIA's Web site at www.sia.com.) Meanwhile, the Global Straight Through Processing Association (GSTPA) is concentrating on the challenges of post-trade processing for cross-border institutional trades. These groups are composed of representatives from major market participants — investment managers, broker/dealers and custodian banks.

DTCC, through its operating subsidiary DTC, has been a major provider of institutional post-trade processing services with

the TradeSuite system. As a result of its experience serving the institutional market, DTCC actively participates in many of the industry initiatives under way and supports the following recommendations.

Recommendations

Redesign the Matching Model: A matching model should be adopted to streamline the institutional post-trade processing cycle, eliminate redundancies and place immediate emphasis on exceptions. This recommendation is consistent with the input DTCC gave to SIA's ITPC.

Several concepts are central to the new model, including:

- Execution matching⁶
- “Just-in-time,” or continuous, enrichment
- Continuous real-time transaction monitoring by all trade parties
- Peer-to-peer interoperability with the GSTPA's proposed Transaction Flow Manager (TFM)

(Settlement concepts related to the new model are covered in Section III — Settlement.)

DTCC and Thomson Financial ESG support the industry call for multiple matching service providers to link their systems to facilitate the connectivity necessary to enable all customers to have a single point of access to post-trade processing, regardless of the service providers used by their trading and settlement counterparties.

Transition to a Reengineered Institutional Transaction Process: The global joint venture will develop a single global workflow system to offer DTCC's and Thomson

Financial ESG's customers a single point of access to the new matching model. DTC TradeSuite and Thomson Financial ESG's current products will be used as important avenues for migration to take advantage of customers' current investments in them. A move to a matching model should begin now as a replacement for confirmation/affirmation processing. This transition would be greatly aided by a link between OASYS and TradeMatch, one of the links that the global joint venture is exploring.

In addition, careful attention will be paid to the requirements for processing prime broker trades, which are currently processed in the same environment as institutional trades.

A Code of Practice: The global joint venture will take a leadership role in helping the industry to outline and agree to a Code of Practice governing the responsibilities of each trading and settlement party. A Code is essential so that all market participants understand their roles, adhere to common standards and recognize the appropriate response times for all steps when interacting under the new matching model.

Execution-to-Execution Matching: The global joint venture will extend execution matching functionality to support trade agreement at the block level between institutions and broker/dealers, especially on fixed-income trades. Because of the high value of these transactions and the resulting risks involved, there is a distinct need to match these transactions at the block level before the institution sends the allocation breakdown detail to the broker/dealer. This would replace the current use of phone and fax to acknowledge these trades, avoiding errors and reducing risk

⁶ Execution matching compares broker/dealer final notices of execution with investment manager allocations.

for fixed-income trades. In addition, consistent with the new model described in SIA's White Paper, this same functionality will be extended to equity trades in the form of order-to-execution matching or affirmation by the investment manager of the execution notice. DTCC and Thomson Financial ESG believe that investment managers' adherence to this option, or sending in allocations within minutes of receiving the execution notice, will lead to prompt locking in of institutional trades in a manner consistent with that being recommended for streetside trades. It should be noted that this locking in of trades is between the trading parties (investment manager and executing broker/dealer) and that settlement of the trade will remain subject to the control of the settlement parties (clearing broker and custodian).

Rationale for Recommendations

WHY REDESIGN THE INSTITUTIONAL MATCHING MODEL?

Numerous shortcomings exist in today's institutional post-trade processing model. These include extensive redundant and manual processes, a lack of cross-industry messaging standards and difficulties in obtaining and properly using customer account, security identification and settlement instruction data. Consequently, there are many potential bottlenecks along a transaction's life cycle, creating multiple opportunities for failure.

To address these weaknesses, the new post-trade processing model, which controls the process from the broker's notice of execution through to settlement authorization, incorporates several key principles, including:

- *Execution matching*, which compares the broker's notice of execution to the investment manager's allocations, to

provide for early identification of errors. Execution matching eliminates the confirmation and affirmation steps, both part of today's process, to ensure rapid trade agreement.

- *"Just-in-time,"* or continuous, enrichment in which data required for identification, net amount computation and/or settlement is automatically appended to a trade at points along the trade cycle when it is required, to automate and eliminate manual input.
- *Real-time transaction monitoring*, based on real-time accessibility of trade information, so that all trading parties can interactively monitor trades progressing through the trade cycle. This is crucial for the early identification and correction of unmatched trades to reduce fails and aggressively manage risk.
- *Peer-to-peer interoperability with the GSTPA's proposed TFM*, a central facility that will support matching, enriching, and monitoring — concepts similar to those just described — for cross-border transactions. While the U.S. industry may be primarily concerned with the processing of cross-border trades of U.S. securities, since the global joint venture has customers around the world, this interoperability will include all securities.

DTCC and Thomson Financial ESG believe that a new institutional post-trade processing model is called for, even without factoring in the move to T+1, due to capacity limitations in current systems and risk management issues. Although firms have increased their technology investments to add capacity for volume growth and improve their internal processing, the number of trades awaiting confirmation on trade date grows. For example, an average of 70,000 institutional trade confirms, for a

value of \$15 billion a day, were *not* input by brokers into TradeSuite on trade date in 1999, double the average number of 36,000 in 1995, with a value of \$7 billion. In addition, only 12% of trades are currently affirmed on trade date and only 88% of trades are affirmed by noon of T+2, the deadline for automated settlement. So while performance rates have held fairly constant during the past five years, the tremendous growth of volume, without a productivity increase, has led to a much higher overall number of exception items throughout the settlement period, resulting in significantly higher risk for the industry.

An institutional trade is processed through a series of sequential and repetitive steps. It flows back and forth among the trading parties with each of them incrementally adding trade detail along the way. All of the transaction's data moves through each step in the process, rather than just the specific data elements required in each particular step. This slows down trade processing time significantly, especially in cases when trade data is input manually.

The current process is also reactive in nature. Trade participants wait for a "trigger" before moving to the next stage of the process, causing delays. This situation is further compounded by the fact that a significant amount of post-trade processing still occurs in a batch environment, instead of real-time. Batch processing causes errors to be identified and corrected late in the trade cycle.

Due to the lack of cross-industry messaging standards, electronic connectivity among trading parties is limited. The industry "speaks many different languages," with both firms and vendors using various industry standards and many proprietary standards.

The reliance on manual processing due to insufficient automation also contributes to the inefficiencies of the current process. Trade information is often exchanged between parties via phone or fax, rather than electronically. Trade data is often re-keyed manually into several systems; review of trade data and affirmation processing is often done manually; settlement information may also be entered manually. These antiquated ways of processing lead to greater opportunities for delays, errors or omissions.

Finally, too many parties maintain the same data in today's environment. For example, many broker/dealers store the same standard custodian settlement instructions because they have not yet integrated the industry's standing instructions databases into their processing streams.

WHY TRANSITION TO A REENGINEERED INSTITUTIONAL TRANSACTION PROCESS?

Clearly, DTC TradeSuite and Thomson Financial ESG's OASYS and OASYS Global require major modifications to support the redesigned matching model. The entire post-trade process must be transformed with functionality developed for execution matching, continuous enrichment and real-time transaction monitoring and reporting. In addition, a link to the GSTPA's TFM and any other competing or complementary systems could provide a single point of access for customers, incorporating their cross-border transactions with counterparties around the world, regardless of the service provider used by those counterparties.

Moving the entire industry to the new processing model will not occur overnight though. DTCC and Thomson Financial ESG already offer functionality to support the early phases of a transition to the new

model. DTCC recommends a migration to the new model in phases as follows:

- As a first phase, the global joint venture should continue the efforts of its parent companies to have more investment managers submit allocations to match with brokers' confirmations, which are already submitted into TradeSuite. A major step in this direction would be implementing a link between TradeMatch and OASYS. This facilitates allocation matching,⁷ functionality already available in TradeSuite. Allocation matching is the first step in getting trading parties accustomed to the concept of matching.
- Next, the global joint venture will concentrate on bringing more broker/dealer notices of execution into its current services. In time, these execution notices will become the broker/dealer's primary input into the post-trade cycle, replacing the broker/dealer's current primary input — confirmations. Helping broker/dealers automate execution notices is critical to moving to execution matching, envisioned in the future model.
- The global joint venture will also explore providing the capabilities to match cross-border institutional trades with our customers' counterparties that are customers of the GSTPA's TFM service, as well as with their counterparties that are customers of the global joint venture itself. The venture's new workflow solution would interact with the TFM, acting as a single point of access for its customers on both U.S. domestic and cross-border trades. Customers will then be able to submit all trades for all securities to the global joint venture for matching with global

counterparties, regardless of the service provider used by those counterparties.

Separately, the prime brokerage industry must examine how prime broker trades, which are generally handled in the same environment as institutional trades, will be processed in a T+1 time frame under the new matching model. Today, prime brokers generally affirm trades on trade date or T+1, and affirmed trades are passed to NSCC's CNS system. Prime brokers then have up until noon on T+2 to disaffirm a previously affirmed trade, which reverses it out of CNS and places it in disaffirmed status. DTCC is working with a Prime Broker User Group to reach consensus about how prime broker trades should be processed in the new model and will work with that group and the SIA Institutional Transaction Processing Committee to suggest any necessary adjustments to the model to accommodate prime broker requirements.

WHY IS A CODE OF PRACTICE NECESSARY?

DTCC and Thomson Financial ESG believe a Code of Practice is necessary to explicitly state the data requirements and the timing of all inputs by each party operating in the new environment. Compliance with the Code should be monitored on a real-time basis with all parties knowing exactly which party is responsible for any noncompliance that delays processing. A mechanism to ensure enforcement will be critical to maintaining the discipline necessary for the efficient functioning of the reengineered process. The Code should, over time, become mandatory, and enforcement mechanisms, including penalties for noncompliance, should be developed.

⁷Allocation matching compares investment managers' allocations with broker/dealer confirmations.

The global joint venture will discuss with its industry advisers the key issues to be addressed by such a Code and offer its views as input to a broader industry forum for more detailed analysis. The global joint venture believes the ISITC-IOA⁸ group is the most appropriate forum for this topic. The ISITC-IOA, composed of securities operations professionals from custodian banks, investment managers, broker/dealers and vendors, works to advocate standards to promote the straight-through processing of securities transactions.

Efforts at DTCC and in the Marketplace

A REDESIGNED MATCHING MODEL

DTCC and Thomson Financial ESG have served as advisers to SIA's Institutional Transaction Processing Committee, the primary industry group examining how U.S. institutional trades might be processed on a T+1 schedule. The committee acknowledges that industrywide support and involvement are necessary to successfully put the new model in place. The ITPC White Paper outlines a number of open issues and additional factors for consideration, including several operational, commercial, legal and regulatory issues.

One of the major issues covered in the paper is the need for the linking of multiple matching service providers (referred to as the "Virtual Matching Utility" in the paper). DTCC and Thomson Financial ESG support the paper's position, as well as the SEC's regulatory stance on this issue. The SEC's May 1999 order approving Thomson Financial's application for an exemption

from registration as a clearing agency makes it clear that any provider of central matching services must develop "fair and reasonable linkages" with other matching services that are regulated by the Commission or that receive an exemption from clearing agency registration. Without such linkages, industry participants would require multiple interfaces to matching providers' systems and incur unnecessary redundant technology investments. For example, if there were six unlinked matching service providers in the U.S., each with many investment manager customers, all broker/dealers and custodian banks would likely need to interface separately with all six to match trades with all their counterparties, properly enrich trades, and receive settlement instructions. The Virtual Matching Utility concept and the SEC position on linkages ensure that this scenario will not take place.

The global joint venture will apply for an exemption from registration as a clearing agency. It will be open to develop fair and reasonable linkages with other providers of central matching for trades in U.S. securities, who, therefore, would also be subject to the Commission's jurisdiction and the Commission's mandate respecting the development of linkages. Once in place, these linkages could be used for all institutional trades in all securities.

Representatives of the global joint venture will work with SIA to resolve the complex economic, operational and liability issues to meet the "fair and reasonable linkages" standard set by the SEC.

⁸ ISITC (Industry Standardization for Institutional Trade Communications) and IOA (International Operations Association) recently merged.

Next Steps ...

The global joint venture (pending regulatory approval) and the industry as a whole should take a number of steps related to trade matching in the coming months. While all of them are important, each investment manager, broker/dealer and custodian bank should immediately take action to improve its level of automation, streamline internal procedures, increase use of industry standards, and expand connectivity with trading parties. The ultimate goal is to process an institutional transaction, from execution notice to settlement, without manual intervention.

Outlined below are the next steps for the global joint venture and the industry:

- SIA's Institutional Transaction Processing Committee will continue its work to gain even wider support for the new processing model from investment managers, broker/dealers and custodian banks and to address the open issues included in the White Paper.
- The global joint venture must map out and release a detailed system development schedule for its global workflow solution along with an industry transition plan by year-end.
- The global joint venture will work with The Bond Market Association and The Asset Managers Forum on the issue of execution-to-execution matching for fixed-income institutional trades.
- The global joint venture will discuss with its industry advisers the key issues to be addressed in a Code of Practice. An outline of these issues will be the starting point for a broader industrywide forum to build a detailed Code of Practice.

SECTION III: SETTLEMENT

Introduction

The Continuous Net Settlement (CNS) system settles broker-to-broker equity, corporate bond, municipal bond and unit investment trust trades — netting and thereby reducing the value of obligations requiring settlement by about 95% each day. Relatively minor adjustments were made to CNS in 1995 when settlement accelerated to T+3 from T+5. To increase flexibility and processing efficiency, while preparing for T+1, CNS requires significant reengineering.

While the most significant change to institutional post-trade processing centers on matching, the industry is also contemplating the changes needed to move institutional settlements into a netting environment. This effort most likely will not be completed by the move to T+1 settlement. DTCC is an active participant in industry discussions on this subject.

Recommendations

CNS Rewrite: Substantially rewrite CNS to accommodate real-time processing and enhance the system's capabilities. The changes anticipated include:

- Real-time CNS updates
- Improved access to CNS and depository position information for participants
- Capabilities to add new trades and corrections to the netting process real-time
- Enhancement to the CNS Stock Borrow Program

- Addition of foreign currency capabilities
- Real-time reporting

Automated Processing for Non-CNS-Eligible

Issues: Replace balance orders with depository deliver order (DO) instructions (for depository-eligible issues) to automate the current manual processing for non-CNS-eligible issues. Non-CNS securities that are not reported as trade-for-trade will continue to be netted and allotted to minimize delivery and receipt obligations, and both netted and trade-for-trade balance orders will have the option to have them replaced by DOs.

Aggregation of Institutional Trades and Automated Stock Lending:

Develop functionality in the DTC settlement system and in the global joint venture's workflow solution to support the aggregation⁹ of institutional trades to bring greater efficiency to institutional trade settlement. Aggregation will most likely be an optional feature. Further, DTCC will explore with the industry the benefits of developing an automated stock lending facility for institutional trades. The depository would act in partnership with its participants having loanable positions to avoid the possibility of partial delivery processing in case the deliverer's position is short of the aggregated quantity. DTCC will actively take part in the SIA working group analyzing these concepts.

Two-Sided Settlement Authorization for Institutional Trades:

With broad cross-industry discussion under the auspices of SIA and NYCH, consider developing functionality in DTC's settlement system to support two-sided settlement authorization, requiring both the receiver and the

⁹ Aggregation combines into a single deliver order multiple allocations from the same investment manager that have the same custodian *within a single block trade* to reduce the number of overall transactions settled.

deliverer to authorize institutional settlements, instead of just the deliverer, which is the case today. This would eliminate reclaims by participants while preserving the agency relationship between custodian banks and their institutional customers.

One possibility might be to explore the desirability of limiting reclaims by participants to only extreme cases where a participant acting as an agent submits a receive instruction for a customer that becomes insolvent prior to settlement completion. This exception would serve to guard against changing any current agency role into a principal role, but would virtually eliminate reclaims since most are due to a lack of instruction from the customer to the settlement agent. A settlement party match would complement the trading party match in the new institutional matching model, which submits all instructions to custodians on behalf of the investment manager and can be facilitated by a link between the global joint venture's workflow solution and DTC's settlement system. The overall change will also facilitate the development of deliver-versus-payment links to central securities depositories (CSDs) around the world, many of which have irrevocable settlement systems. However, any exceptions to the general rule will have to be evaluated as to their effect on such linkages.

A Single Settlement System for NSCC and DTC Activity: Develop plans for a combined, single settlement system to replace the two separate systems now in place at DTC and NSCC. The risk management implications of this change are significant and will be fully investigated, along with the effect on participants.

Rationale for Recommendations

WHY REWRITE CNS?

The basic CNS infrastructure was developed over 25 years ago. A rewrite of CNS is necessary, not only to prepare for T+1 settlement, but also to enhance and expand CNS processing capabilities. DTCC will thoroughly examine the operation of the entire CNS system and actively seek input from participants, but anticipates the following enhancements will be part of the CNS rewrite:

- *Real-time CNS updates:* CNS is currently updated with receive and deliver information every 15 minutes during the day cycle. To provide accurate, up-to-the-moment receive and deliver activity information, the CNS Stock Record will be updated real-time, and on-line access will be provided.
- *Improved access to CNS and depository position information:* DTCC already allows participants access to real-time information through the Participant Terminal System (PTS). This will be restructured to include all related information by security issue, including a CNS position, long or short depository positions, and free, pledged and memo segregation breakdowns.
- *Capabilities to add new trades to the netting process real-time:* CNS will be redesigned to accept trades into the continuous "day cycle" and re-net open obligations after the "night cycle,"¹⁰ and potentially once more during the day, to include late trade input, such as corrections and as-of trades. This will ensure the ability to take a trade from any marketplace at any time and settle it within the confines of a shorter settlement cycle.

¹⁰The "night cycle" occurs during the early morning at approximately 1:30 a.m. ET.

- *Addition of second processing run to Stock Borrow Program:* The CNS Stock Borrow Program gives participants the ability to lend excess securities in their DTC accounts to CNS to fill priority needs in the CNS system. A second “pass” will be added to the CNS Stock Borrow Program to allow firms to submit the availability of securities on settlement day. With a change to T+1 settlement, trade date is also the day before settlement, and participants may need a later input time to determine the excess securities they have available to lend.
- *Addition of foreign currency capabilities:* The new CNS system, as well as the settlement system and other systems more broadly, will be upgraded to support the settlement of securities in other currencies. These capabilities will allow for the clearance and settlement of trades in securities that may settle in currencies other than the U.S. dollar.
- *Real-time reporting:* CNS trade settlement reports will be made available in real time and all reports will be streamlined to eliminate redundancies. For example, the current CNS Projection Report, which is produced each morning, displays information on trades settling for the current settlement day, as well as the next two settlement days. This report, and all other CNS settlement reports, will require modifications to their timing and content.

Even as DTCC moves forward with a new CNS system, certain fundamentals will remain constant. Currently 70% of all activity in CNS settles in the night cycle. Since the bulk of the trades will be in NSCC’s

possession via intra-day trade feeds from the various markets and trading systems, it is anticipated that a high volume of trades will continue to settle in the night cycle. DTCC also anticipates that settlement times (for transactions in U.S. dollars) will not change; thus, recycles of activity will continue, as they do today, until 3:10 p.m. ET. Final settlement figures should continue to be available at 4:00 p.m. ET.

WHY AUTOMATE THE PROCESSING OF NON-CNS-ELIGIBLE ISSUES?

DTCC recommends a change to streamline the delivery of securities that are not CNS-eligible,¹¹ but are eligible at the depository. Instead of producing manual balance orders, an automated delivery file should be generated on behalf of the delivering participant and forwarded to DTC for processing. The delivering participant then would automatically deliver each trade if there was sufficient position in its DTC account. If the deliverer does not wish to complete settlement using securities in its DTC account, the existing position should be placed into memo segregation.

WHY AGGREGATE INSTITUTIONAL TRADES AND EXPLORE AUTOMATED STOCK LENDING?

Aggregation, which combines into a single deliver order multiple allocations from the same investment manager that have the same custodian *within a single block trade*, is being considered by the industry to make the settlement of institutional trades more efficient. If adopted, aggregation will most likely be an optional feature, with functionality developed in the depository’s settlement system and the global joint venture’s workflow solution.

¹¹ Certain issues are not eligible for CNS processing (e.g., 144A issues) but may be eligible at the depository.

Aggregation is often discussed in conjunction with the development of an automated stock lending facility since aggregation will mean the settlement of fewer, but larger, transactions. While not anticipating a change in existing securities lending practices, DTCC will explore with the industry the benefits of developing an automated stock lending facility for institutional trades to reduce the number of delivery failures and avoid breaking aggregated deliveries into individual customer segments (a form of partial delivery processing that would in no way result in delivery of part of an individual customer's position). Such a lending facility might entail the depository acting in partnership with its participants having loanable positions. It may be possible to leverage existing functionality in the CNS Stock Borrow Program for this purpose. The feasibility of this concept will be fully reviewed with the industry.

WHY CONSIDER TWO-SIDED SETTLEMENT AUTHORIZATION FOR INSTITUTIONAL TRADES?

DTCC should consider developing capabilities in DTC's settlement system for two-sided settlement authorization, requiring both the receiver and the deliverer to authorize institutional settlements, to help achieve settlement irrevocability. These pending settlements would be set up via links with the global joint venture's workflow solution and any other matching service that becomes part of the Virtual Matching Utility envisioned in SIA's white paper.

In today's environment, only the delivering party must authorize the automated staging (for settlement) of book-entry delivery of trades previously confirmed/affirmed by the trading parties. A receiving participant can later reclaim the securities back to the deliverer. A change to dual authorization,

requiring both sides of the trade to submit authorization instructions, will provide the advantage of settlement and cash management certainty for the deliverer. This change is also beneficial in supporting the development of deliver-versus-payment links with central securities depositories around the world, many of which require this type of two-sided authorization.

This capability could be viewed as requiring additional processing, however, since both the receiver and the deliverer must authorize settlement. DTCC will work with the industry to consider various methods of implementation, including exception-based methods, where files of pending settlements would be provided to receiving participants for their approval, or implementing the procedure only for trades processed through a CSD link. Any solution chosen will need to acknowledge the agency relationship between custodian banks and their institutional customers. If it is not provided for U.S. domestic trades, reclamations could at times still occur, even for trades matched by the trading parties in the global joint venture's workflow solution. Industry review and comment on this topic is necessary.

WHY DEVELOP A SINGLE SETTLEMENT SYSTEM FOR NSCC AND DTC ACTIVITY?

Designing a single settlement system for NSCC and DTC, replacing the two distinct systems in operation today, will provide the opportunity to make clearance and settlement more efficient.

The risk management implications of this change are significant and must be fully investigated, along with the effect on participants. Implementation of this change is still at an early stage.

Efforts at DTCC and in the Marketplace

Rewriting CNS is a complex undertaking requiring careful planning and analysis. Since the changes made will have significant implications for the users of CNS, DTCC will work closely with the industry to gather feedback during all stages of the project. Clearly, industry input will be invaluable to this effort.

Many open issues related to institutional trade settlement are being discussed in industry forums. DTCC will continue its work with SIA's Institutional Transaction Processing Committee, the primary group focusing on these topics. Industry consensus is required to move forward on many of the suggestions for change.

Next Steps ...

- Form an internal task force to manage the CNS rewrite and develop a comprehensive plan outlining the project by year-end 2000.
- Create a CNS Rewrite Advisory Committee composed of a cross-section of users of the system to counsel DTCC during the rewrite. Additional working groups will be formed to focus on specific topics, such as changes to the CNS Stock Borrow Program.
- Actively participate in industry working groups focusing on institutional settlement issues, including aggregation, automated stock lending, institutional netting and two-sided settlement authorization.
- Review settlement changes with other clearing organizations (e.g., Options Clearing Corporation) to determine what other factors should be considered when preparing for STP and T+1.
- Discuss with DTC and NSCC participants the advantages participants could realize if there were a single settlement system, instead of the two separate systems used today.

SECTION IV: RISK MANAGEMENT

Introduction

In a marketplace of soaring volume and increasing volatility, DTCC must identify, manage and minimize risk to ensure the safety and soundness of the clearance and settlement system. DTCC has considered the risk management practices of its operating subsidiaries — DTC and NSCC — while moving to greater levels of straight-through processing and T+1 settlement.

Risk management at NSCC and DTC is designed to minimize the financial risks to the clearing agencies and their participants to achieve the following goals:

- For NSCC, to guarantee the settlement of trades as soon as it is prudent to do so following NSCC's receipt of trade information. Currently, this guarantee applies to compared, or "locked-in," trades on midnight between T+1 and T+2.
- For DTC, to assure that the parties to book-entry deliveries obtain with finality the securities and money credits that they are due.

A comprehensive summary of risk management at DTC and NSCC is included in the Appendix.

Recommendations

Change NSCC Guarantee Timing: DTCC recommends that the timing of NSCC's guarantee be changed to take effect midnight between trade date and T+1 when T+1 settlement goes into effect. This will require new procedures to permit NSCC to obtain additional clearing fund deposits more quickly when participants' trading

activity on trade date results in the need for additional assets to protect NSCC from potential loss.

Timely Access to the Clearing Fund: DTCC recommends that only cash or instruments that are easily liquidated be accepted as participant deposits into the clearing fund to ensure that such deposits are freely available if needed.

Eliminate DTC Delivery Resale Procedures: DTCC recommends the elimination of the depository's next-day delivery resale procedure (available to DTC in the event of the insolvency of a participant that has failed to settle) to ensure settlement finality.

Trade Submission Cannot Be Compressed for Guarantee: NSCC cannot guarantee trades that are submitted in a compressed format as the parties to a trade are not clearly identified and risk cannot be fully assessed. "Compression" occurs when a clearing corporation member submits one "representative" trade to the clearing corporation that is actually a summary of multiple trades in the same security executed at different prices and with multiple correspondents and/or executing brokers. Such combination, prior to submission to the clearing corporation, results in the loss of identity of the original trade parties or prices.

Timely Access to Regulatory Information: DTCC recommends that it have more timely access to self-regulatory organization disciplinary and examination information on broker/dealer participants, so that it is alerted to any actionable items, intraday warnings or other anomalies as quickly as possible, considering the shortening settlement time frame.

Rationale for Recommendations

WHY CHANGE NSCC GUARANTEE TIMING?

NSCC's trade guarantee is a critical element in the U.S. clearance and settlement system. With the guarantee, NSCC becomes the contra-party to each compared trade and guarantees settlement for eligible transactions "at midnight following the reporting of trades back to participants as compared." Originally established when netting was introduced, the guarantee protects trading firms by guaranteeing that a trade will be completed once it enters NSCC's system as compared. Since trades are currently reported back to participants as compared on the morning of T+1, the guarantee takes effect at midnight between T+1 and T+2.

DTCC plans that NSCC will move up the guarantee, placing it at midnight between T and T+1. Assuming other recommended changes are made, this will provide sufficient time for NSCC to evaluate the vast majority of transactions and take action, if necessary, to assess additional clearing fund deposits. At the same time, regulators, participants and their customers will still have a level of certainty and safety in today's fast-moving market.

WHY IS TIMELY ACCESS TO PARTICIPANT DEPOSITS TO THE CLEARING FUND NECESSARY?

To ensure that the depository and clearing corporation have sufficient funds to complete settlement in the event of a participant failure, a shortening of the settlement cycle demands that additional clearing fund deposits by participants be in the form of cash or instruments that are easily liquidated. Similarly, ready access to additional fund contributions

that a participant is required to post is necessary in light of additional risks resulting from unsettled positions.

WHY ELIMINATE DTC DELIVERY RESALE PROCEDURES?

One of the primary reasons for moving to T+1 settlement is to reduce the risk associated with market volatility. Volatility between trade date and settlement date can cause a transaction to fail because one of the trading parties cannot or will not meet its obligations because of a sudden change in the price of the security involved. Reducing the time period between trade date and settlement date substantially mitigates this risk. Current DTC procedures, however, allow the depository to resell delivered securities back to the original deliverer in the event the receiver of those deliveries fails to settle. These procedures, which contribute to settlement uncertainty, will be eliminated so that all deliveries are final.

Because DTC risk management controls are designed to assure that there is sufficient collateral in a failed participant's account to support the debit owed the depository, the depository will take on the risk associated with selling the collateral and eliminating the failed participant's money obligation, rather than reselling the securities to the delivering parties and putting the risk of closeout on them.

WHY CAN'T TRADE SUBMISSION BE COMPRESSED FOR GUARANTEE?

In light of the potential financial exposure associated with its trade guarantee, NSCC constantly monitors all the open positions of its participants, including positions acquired directly through proprietary trading and those acquired because of the

activities of a correspondent, trading party or customer. As information is received, NSCC begins to look for the build-up of potentially risky positions or other irregularities. Trade information must be submitted in the same form as it is reported in the marketplace, i.e., on a trade-for-trade basis, so that pertinent risk will be apparent. NSCC must have full information about each trade that it is expected to guarantee so that the risks to which the participant is subjecting NSCC can be evaluated and, where necessary, additional clearing fund deposits can be obtained.

Compression occurs when a clearing corporation member submits one “representative” trade to the clearing corporation that is actually a summary of multiple trades in the same security executed at different prices and with multiple correspondents and/or executing brokers. This practice results in the loss of identity of original trade parties or prices. NSCC’s risk management controls are based upon knowing the price, size and identity of both clearing and executing parties to a trade so that the risk of open positions can be assessed and sufficient clearing fund deposit collected. NSCC cannot extend its guarantee to trades that are not reported to NSCC in a form that permits it to protect the clearing agency and its entire participant base.

Compression also inhibits NSCC from clearly identifying certain high-risk situations (such as market makers, which are not clearing firms, building positions in volatile issues, and exposing clearing firms to such risk). Also, from an operations perspective, compression only has value when trades are compressed at the end of the trading day. This is contrary to DTCC’s objective of real-time trade capture to accelerate the clearance process and bring greater efficiency as trading volume

grows. Submitting trades in a compressed format, only at the end of the trading day, increases the possibility of end-of-day processing backlogs, which might delay or disrupt trade settlement.

WHY IS TIMELY ACCESS TO REGULATORY INFORMATION NECESSARY?

Effective risk management at NSCC and DTC depends in part on access to disciplinary and examination information available to the self-regulatory organizations responsible for examining broker/dealer participants (“Designated Examining Authorities,” or “DEAs”). Specifically, more timely access to the following is needed:

- Examination results regarding all identified actionable items
- Intra-day warnings on firm customer complaints as they are filed
- Any other anomalies that are detected by the DEA regarding a participant that is the subject of special surveillance by the clearing agency
- FOCUS reports

The DEAs for broker/dealer participants have responsibility for conducting regular on-site examinations of those participants. If deemed necessary, both DTC and NSCC have the right to request that the DEA for a broker/dealer participant perform a special examination on their behalf. While from time to time the DEA may alert DTC and NSCC to a problem uncovered in the course of an examination, with the further shortening of the settlement cycle and the reduction in time available to protect against unforeseen risks, it is essential that DTC and NSCC have more timely and regular access to such information.

Efforts at DTCC and in the Marketplace

Accomplishing these changes requires the active involvement of many in the industry. DTCC will work closely with participants, marketplaces, trading systems and regulators on all of the topics presented.

With respect to trade compression, participants and their correspondents may not even be aware that information about their transactions is being provided to NSCC in compressed form and assume that the trade guarantee will apply to their transactions. Therefore, a clearing firm that submits compressed trades must, at a minimum, be required to fully disclose this practice and its potential consequences to its customers.

With the cooperation of the DEAs, more timely access to regulatory information can easily be accomplished. For example, the Central Registration Depository (CRD) contains, among other information, the disciplinary history of all SEC-registered firms and their associated persons. The CRD would be a much more useful source of information concerning an applicant for admission if the database were reengineered to make the system responsive to inquiries by the clearing agencies and to

allow easier navigation. Also, the CRD could be used as a tool for monitoring if the system could provide immediate alerts to the clearing agencies of any new infractions by a firm or associated person (if possible, based upon criteria established by the user clearing agency).

Next Steps ...

- DTCC will meet with DEAs to discuss reporting changes necessary for T+1.
- DTCC will discuss with participants the need to have highly liquid clearing fund assets to support its trade guarantee. Letters of credit will no longer be acceptable as clearing fund deposits.
- DTCC will work with the industry on the mechanisms necessary to collect additional clearing fund deposits as soon as NSCC's risk management tools indicate additional margin is required. Providing the trade guarantee as of midnight on trade date will necessitate a streamlined procedure for obtaining additional margin.
- DTCC will recommend to DTC's regulators that the depository's next-day delivery resale procedure be eliminated.

SECTION V: TECHNOLOGY

Introduction

Gearing up for the challenges that lie ahead, DTCC has completed a review of its key processing systems, resulting in a series of recommendations for improving its technology platforms going forward. These recommendations for change were presented in a paper released to the industry in June 2000. Some of the major topics addressed in this paper include:

- The implementation of a technology renewal plan for DTCC's infrastructure to provide for the ongoing growth of DTCC's technology platforms and systems;
- The status of the effort to migrate DTCC's terminal-based interactions with participants to Internet technologies;
- Plans to complete the consolidation of the depository's current networks; and
- Transition to industry-standard telecommunications methods and applications.

DTCC hopes to receive responses on this paper and the issues it raises from a broad range of industry participants.

In addition, DTCC will look to move toward increased real-time processing with its participants and other industry users. Hard-copy reports will be replaced with machine-readable output or Internet-technology-based distribution of data. Standing instruction databases to enrich trade data as it progresses from order routing to execution to settlement will be the norm for institutional trades.

Recommendations

Standardized Communications Capabilities:

DTCC will increase its support for the use of TCP/IP (Transmission Control Protocol/Internet Protocol) and focus on several standard communications capabilities. These standards will bring greater efficiency to the transmission and receipt of data and help reduce support costs. The communications standards are:

- FTP (File Transfer Protocol)
- Connect:Direct, also known as NDM (Network Data Mover)
- IBM's MQ (Messaging and Queuing) Series

Standardized Messaging Formats:

Recognizing that many participants have adopted the following message formats as industry standards, DTCC will look to support these message formats in communications with participants and others:

- International Organization for Standardization (ISO) standard series of messages based on 15022 "data dictionary" standard
- ISITC (Industry Standardization for Institutional Trade Communications) formats
- FIX (Financial Information Exchange) formats

Real-Time Environment: DTCC recommends the industry transition to a real-time environment and plans to support real-time data access and processing for all DTC and NSCC clearance and settlement services. Low-volume organizations should move to multi-batch transmissions, at a minimum.

Rationale for Recommendations

WHY STANDARDIZE COMMUNICATIONS CAPABILITIES AND MESSAGING FORMATS?

The use of standards is obviously key to obtaining as much efficiency as possible when transmitting data among DTCC, its participants and other industry users. By supporting standards, DTCC can assure that the communications among all parties to a trade are simpler, cost-effective and efficient, and can minimize the burdens on participants in exchanging information with DTCC. Over time, DTCC will retire older proprietary protocols and formats by persuading participants that use them for certain activity transmissions to convert to the newer standards.

TCP/IP and the three communications capabilities that DTCC plans to support provide excellent flexibility in terms of overall connectivity across platforms and are used extensively throughout the industry. Supporting transmission traffic based on the TCP/IP protocol and standardizing on a limited number of computer-to-computer communications capabilities will reduce the support burdens for both participants' technology staffs and DTCC itself, leading to cost reductions and greater efficiency throughout the industry.

Similarly, DTCC will support three trade-messaging standards:

- ISO 15022-compliant messages are used for trade and cash movement instructions between many broker/dealers and banks, especially those active in cross-border transactions. Support for the ISO standard messages will enable participants to achieve greater straight-through processing capabilities.
- ISITC messages are used by investment managers to send allocation and delivery

instructions to custodians and to exchange account reconciliation data between investment managers and custodians.

- FIX format supports messaging between investment managers and broker/dealers for indications of interest, notices of order execution and allocations on U.S. domestic and cross-border equity trades, and certain types of fixed-income trades and foreign exchange transactions.

WHY MOVE TO A REAL-TIME ENVIRONMENT?

The topic of real-time processing has been discussed throughout this paper since it is tremendously important for all phases of trade processing. Moving to real time is truly an imperative for:

- The transmission of streetside trade data to NSCC by high-volume marketplace sources (see Section I — Trade Capture).
- The processing of institutional trades (see Section II — Institutional Trade Matching).
- The processing of streetside trades within NSCC's CNS system (see Section III — Settlement).

Efforts at DTCC and in the Marketplace

Despite the compelling benefits of using standard communications protocols and capabilities and message formats, and moving to a real-time environment, universal adoption of these suggested standards will take time. These changes will require technology investments by some participants. DTCC staff will work with participants' technology staffs to obtain their concurrence that the messaging and communications standards recommended here will in

fact become the foundation for the communications required to effect T+1 settlement.

Next Steps ...

DTCC and the Securities Industry Automation Corporation (SIAC) staffs have begun evaluations of the changes to all clearance and settlement systems needed to get to T+1 settlement. Participant reaction and comments to the

ideas presented in this white paper will be incorporated into later memoranda as DTCC continues to involve the industry in its plans for T+1. Once a final systems design is agreed to, DTCC will communicate the technical specifications to participants, their vendors and service bureaus, and others who will need to make systems changes to move the industry to T+1 settlement.

Appendix

RISK MANAGEMENT BACKGROUND

MINIMIZING THE RISK OF A PARTICIPANT FAILURE

DTC and NSCC each perform an analysis of an applicant for admission to assure that the applicant meets reasonable standards of financial responsibility, operational capability and character. This review is intended to identify applicants that the clearing agency should decline to accept and help establish the amount of the required clearing fund deposit and any other preconditions to the applicant's admission as a participant.

Once admitted, participants are subject to ongoing monitoring of their financial conditions and changes in their business activities, as well as daily surveillance of unsettled positions and clearance activity. If a troubled participant is identified, the clearing agency will more closely scrutinize the participant and, if warranted, will institute special protective measures by limiting or imposing conditions on the participant's continued clearing agency activities, including requiring the participant to make an additional deposit to the clearing fund. In extreme cases, when the participant is facing severe financial or operational problems, the clearing agency may insist upon an orderly wind-down of the firm's activities followed by its retirement as a participant.

NSCC employs a variety of position tracking systems to identify significant risks associated with open trading positions and, where appropriate, requires collateralization of those positions. These position monitors include the following:

- A system to detect concentrated positions that could expose the participant to substantial losses in a volatile market
- A system to identify open positions of all participants in illiquid or less liquid securities
- A system to calculate the volatility of open positions
- A system to track mark-to-market exposure
- A system to track projected settlements

Currently, a significant amount of that day's trade information is transmitted in bulk to NSCC only at the end of T. In most cases, therefore, NSCC is not in a position until the morning of T+1 to evaluate fully its risk exposure and, where necessary, demand that the participant deposit additional assets (which may include an immediate deposit of same-day funds into the Clearing Fund).

The risk management activities at NSCC and DTC are closely coordinated, and DTC is given access by NSCC to position risk information respecting NSCC participants that are also participants of DTC. Similarly, DTC provides information to NSCC on institutional transactions that have been confirmed and affirmed or matched in the DTC TradeSuite system and are pending settlement at DTC. These positions may offset open positions at NSCC.

DTC's principal risk tracking systems are:

- A Participant Financial Analysis System that contains a profile of significant risk information about each participant obtained upon admission and that tracks its daily settlement history and monthly changes in its reported financial condi-

tion on a rolling two-year period. Using this information, the system, among other things, permits DTC to identify on a real-time basis, any participant whose settlement activity exceeds the threshold established for it or whose net debit exceeds 50% of the participant's required regulatory capital.

- A Market Risk System that tracks the market value of the securities used by participants as collateral to support their net debits at DTC, including intra-day changes in market share. Among other things, the system shows the percentage of a participant's collateral represented by each issue, total DTC inventory in that issue, and the percentage of the total DTC inventory the participant is holding. The system also indicates for Nasdaq issues whether the participant is a market maker for that issue or clears for a market maker, and if so, whether there are other market makers.

MINIMIZING THE OPERATIONAL AND FINANCIAL CONSEQUENCES OF A PARTICIPANT FAILURE

The risk management controls of DTC and NSCC are designed to minimize both liquidity risk and the risk of loss associated with a participant failure.

Since both clearing agencies are required to pay out funds to participants that are in a net credit position, if a participant has failed to settle its debit obligation, the immediate risk is that the sources of liquidity available to the clearing agency are insufficient to fund the amount owed by the participant.

Currently, DTC has liquidity of \$1.4 billion, composed of \$400 million in required cash deposits to the DTC Participants Fund and a \$1 billion committed line of credit provided by a consortium of banks.

Currently, NSCC has a total of \$2.1 billion of liquidity resources to support settlement, including the \$900 million cash component of its Clearing Fund and a \$1.2 billion committed line of credit provided by a consortium of banks.

NSCC's first line of defense in the event of a failure to settle is the collateral posted by the participant. Whenever, in honoring the trade guarantee, NSCC must close out the unsettled positions of an insolvent participant, NSCC is subject to market risk and will use the collateral collected from that participant to cover any losses. With the consent of the Securities Investor Protection Corporation (SIPC) and the courts, in conducting the closeout, NSCC attempts to minimize financial loss and avoid disruption of the markets by completing transactions of the insolvent participant that are offsets or hedges to the participant's open positions at NSCC (e.g., institutional transactions to be settled at DTC).

In addition to the Participants Fund, DTC employs the following principal controls to minimize the consequences of a participant failure:

- A net debit cap control that systematically blocks any transaction that would cause a participant's net debit to exceed its net debit cap. Each participant's cap is normally set at an amount that is based on its three largest net debit peaks over a rolling 70-business-day period. In appropriate circumstances, DTC can directly limit its exposure by lowering a participant's net debit cap. The maximum cap is set at an amount, currently \$1.15 billion, that is less than DTC's total liquidity resources.

- A collateral control (the “Collateral Monitor”) that systematically prevents a participant from accruing a net debit that exceeds the value of the collateral in its account by blocking any transaction that would have that effect. For this purpose, collateral includes: (1) the participant’s deposit to the Participants Fund, (2) the value of securities in the participant’s account that it has designated as collateral, and (3) the value of securities that are the subject of deliveries from other participants. The collateral value attributed to securities is equal to their market value minus a “haircut,” as determined by DTC (in appropriate circumstances, DTC can adjust the haircut intra-day).

Furthermore, because DTC may have to finance a participant’s obligation overnight, the haircut structure takes into consideration haircuts that would be imposed by DTC’s line of credit banks.

- If the participant is insolvent and application of the participant’s deposit to the Participants Fund does not eliminate its net debit obligation, DTC may either: (1) on the business day following the failure-to-settle, resell to deliverers the securities they had delivered to the insolvent participant (the “delivery resale procedure”), or (2) sell in the open market those securities and other collateral in the insolvent participant’s account.