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Developments Since the Market Crash of October 1987

Statement of
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Senate Committee on Agriculture,
Nutrition and Forestry
United States Senate

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Mr. Chairman and Members of the Committee:

We are pleased to be here today to report on the progress being made by federal and self-regulatory organizations in response to the market crash last October and the differences in methodologies used by various groups to evaluate the effects of program trading on the stock price declines. Our assessment today covers the progress made since the crash, and we are continuing to follow these developments. As you requested, we will address specifically:

-- the progress made in developing a coordinated inter-market contingency plan and other changes to improve market coordination and operations.

-- the progress made in enhancing the capacity of the New York Stock Exchange's (NYSE's) order processing systems and an analysis of the Exchange's capability to identify program trading.

-- the differences in methodologies used to evaluate the effects of program trading by the Presidential Task Force on Market Mechanisms (Brady Commission), the Commodity Futures Trading Commission (CFTC), and the Securities and Exchange Commission (SEC).

Controversy persists about the problems which caused the October crash and how they might be addressed. The authors of most major studies agree that the stock, options, and futures markets' trading systems should be improved with respect to data sharing, contingency planning, coordination, and operating capacity. The various federal and self-regulatory bodies have made some progress. However, disagreement remains on some very important points--the need to increase margins on futures contracts and the concept of "circuit breakers", which would automatically halt certain types of trading if market prices changed more than a set amount in any trading day. Not surprisingly, less progress has been made in tackling the tougher questions, and as yet no mechanism exists to resolve intermarket disagreements.

I wish to emphasize that there is agreement among all of the groups who have studied the crash that the futures and equity markets are linked. In my view, any changes that are made must recognize this reality.

Even though there is agreement that the equity and futures markets are linked, controversy persists over the uses, benefits and risks of derivative stock index products. The Board of Governors of the Federal Reserve System along with the SEC and CFTC found in a 1984 Study of the Effects on the Economy of Trading in Futures and Options that derivative products serve a useful economic purpose. However, the study cautioned that the

potential existed for disruptive trading in the index product markets that could lead to speculative bubbles that could burst with destablizing results. In light of the events of last October, I believe the Federal Reserve should revisit its findings. We would be glad to review the results of the Federal Reserve's new efforts.

In recent months, the Congress has urged that the executive branch and the exchanges develop the leadership to resolve the controversies over the solution to the problems identified by the various groups who have studied the market crash. But the federal and self regulators have sometimes worked at cross purposes where disagreements existed. Despite the linkages that exist between these markets, some changes are being made unilaterally in the futures and equity markets that could disrupt rather than support their workings. I am somewhat encouraged by the recent formation of the President's Working Group on Financial Markets. This group offers the potential to resolve intermarket regulatory disagreements. It has held a number of meetings and I understand that it has begun to tackle some of the more difficult issues associated with intermarket regulation. I look forward to their mid-May report. At that time we will learn if the working group has been able to come up with a consensus solution to the problems that surfaced on

October 19. Because that solution has not yet emerged, Congress should continue to keep pressure on the various parties through continued oversight so that progress toward a truly coordinated solution remains on track. We will review the findings and proposals of the President's Working Group and are prepared to continue assisting the Congress in its oversight of market regulation.

PROGRESS MADE SINCE THE CRASH

Federal and self regulators are working to improve the stability, operation, and capacity of the stock, options, and futures markets. They told us they meet frequently to discuss what they are doing. They are trying to develop an intermarket contingency plan. The NYSE is making changes to enhance its computer systems. These changes respond to the recommendations of our preliminary report on the market crash. They are also making many other changes to improve communication and data sharing, enhance financial and market surveillance, adjust margins, improve clearing and settlement procedures, enhance capital adequacy, improve market making systems, and better assure credit availability. (See Attachment II.) Most of these changes have not as yet been fully implemented.

DISAGREEMENTS PERSIST ON IMPORTANT MARKET ISSUES

However, some changes are being implemented unilaterally by each of the markets despite considerable disagreement over the wisdom of these changes. These changes involve restrictions on index arbitrage, daily price limits in the futures markets, and margin requirements.

Restriction on Index Arbitrage

Index arbitrage involves the simultaneous buying and selling of stocks and stock index futures. It is done to profit from differences in the market value of one compared to the other. The New York Stock Exchange proposed to forbid its members to do index arbitrage through its high-speed, automated Designated Order Turnaround (DOT) system, whenever the Dow Jones Industrial Average has moved 50 points, up or down, in a single trading day. The NYSE reported that the proposal is intended to curb intraday volatility and enhance investor confidence in the integrity, fairness, orderliness, and efficiency of the market during periods of significant volatility. The curb is based on the NYSE view that index arbitrage may exacerbate market volatility. This restriction on the use of the DOT system does not prohibit manual execution of index arbitrage strategies.

The SEC approved this rule change for a 6-month trial on April 19, 1988. NYSE officials told us that before this date its members were complying voluntarily. On Wednesday, April 6, and again on Thursday, April 14, when the Dow moved more than 50 points, the NYSE requested its members to refrain from entering index arbitrage orders through the DOT system for the remainder of the day. NYSE officials told us some members continued their index arbitrage strategies through manual execution of trades on the floor of the exchange.

The Chicago Board of Trade (CBT), where futures contracts on the Major Market Index are traded, indicated in its comments to the SEC that the NYSE should take action to restrict undue volatility, but disagreed that index arbitrage contributes to it. CBT stated that neither the NYSE nor SEC have provided the evidence needed to associate index arbitrage with increased volatility and stated that NYSE's role may exacerbate volatility and disconnect the markets at a critical time. The Chicago Mercantile Exchange (CME), where futures and options on futures contracts on the Standard and Poor's (S&P) 500 index are traded, stated that the unilateral NYSE proposal should not be approved unless and until it can be demonstrated that the proposal will further the goal of coordinated intermarket circuit breakers.

CFTC comments on the proposed rule change stated that the rule could substantially diminish the linkage between the stock and

derivative index markets. The comments also stated that alternative longer-term solutions to questions of intermarket coordination need further exploration both among securities and futures exchanges and in other areas of the federal sector.

Daily Price Limits on Index Futures Products

The futures markets adopted daily price limits on their stock index futures products shortly after the crash. This meant that prices could not exceed those limits during any single trading day. The limits at CBT and CME were originally set at levels roughly equivalent to a change of over 200 points in the Dow Jones Industrial Average. Subsequently, CBT and CME reduced the limits. Currently, the limits are roughly equivalent to a 100 and 120 point change respectively in the Dow. At CME, the limits get wider as the value of its index futures products increases.

The stock markets have not adopted price limits as a means of controlling large single-day price changes. Recently, we understand that there has been discussion of the advisability and feasibility of such a change relating to very large movements in the Dow.

CFTC officials said that although price limits have disadvantages, they can prevent the markets from overreacting during periods of uncertainty. On the other hand, SEC officials

said that price limits on stocks can deprive investors of the ability to liquidate positions when they need to do so and may thus induce panic and accelerate trading as the limit is approached. These differences of opinion need to be resolved. The use of price limits on futures index products and their absence in the stock markets create the distinct possibility of a transfer of buying or selling from the futures markets to the equities markets. Such a shift could create tremendous capacity and liquidity pressures and increase market instability, especially if there is a major market revaluation such as that which occurred on October 19, 1987.

Margin Requirements

Another area that is cause for concern involves margins on stock index futures contracts. Though the futures markets have recently increased margin requirements on some of their index related products, these requirements are still at a lower percentage level than those involved in the retail purchase of securities. Considerable disagreement remains over the appropriate level of margins on stock index futures contracts.

SEC officials have stated that stock index futures margins should be raised, while CFTC has reported that there is no justification for an increase. SEC has reported that the comparatively low margins on futures products permit investors to take undesirably

risky positions, which have the potential to ıd to the downward fall in a declining market. SEC officials said that increases in futures margin levels are warranted until the impact of margin levels across both markets can be determined.

CFTC officials counter that when the specific mechanics of the futures and securities systems are compared, especially considering the futures industry's requirement of daily contract settlements, the futures margining system is more rigorous during periods of market volatility than the credit system that applies to securities transactions. CME officials have expressed views similar to those of CFTC.

CONTINGENCY PLANNING NEEDS A DECISION MAKING COMPONENT

The lack of an intermarket decision making structure as evidenced by these unresolved disagreements is also inhibiting the development of a unified intermarket contingency plan. The regulatory organizations have made progress in developing such a plan, but key decision-making components are still missing.

The federal and self-regulatory organizations are approaching contingency planning by enhancing information sharing and communications systems that will improve day-to-day operations and be available for use in any future market emergencies that occur. The SEC and CFTC have prepared and distributed a crisis

management telephone book containing phone numbers of officials at SEC, CFTC, and the self regulators, as well as officials of certain foreign government agencies. Self regulators are also developing a hotline which will give them immediate conference call capability, enabling them to share information pertinent to all exchanges simultaneously. An interim system has already been tested and the final system is expected to be implemented in about 3 months. The NYSE may establish an administrative unit at a particular place off the trading floor that, as part of the hotline system, would be a focal point for questions from other exchanges about what was happening at the NYSE during market emergencies.

However, a very important part of a good contingency plan--namely, a clear delineation of intermarket emergency decision-making duties and responsibilities--is still not in place. Decisions about what constitutes a market emergency, the types of actions to be taken, and who will make the decisions are still not clear. As long as these issues are not resolved, progress toward completing a good contingency plan will be slowed. We believe the President's Working Group should produce such a plan by its mid-May reporting date.

IMPROVEMENTS IN NYSE'S COMPUTER SYSTEMS AND IDENTIFICATION OF PROGRAM TRADING

I would now like to discuss two areas of concern at the NYSE. I am pleased to say that the NYSE has made some progress in correcting the problems with its computerized order processing systems as described in our January 1988 report. We have also, in response to your request, obtained some information on the capability of the NYSE's and its member firms' computer systems to identify program trading and to distinguish between the different types of program trading strategies. Details on the results of our work are contained in two reports which we are issuing today.

Capacity Enhancements

The New York Stock Exchange has made a number of upgrades to its order processing systems and changes to the way it plans its computer capacity. These changes are designed to correct the problems we identified in our January report. These changes include: installing new equipment to handle odd-lot orders, installing additional automated specialist books to reduce its reliance on slow card printers, adding more specialist trading posts, developing the capacity to handle a 600-million share day by May and a 1-billion share day by 1990, and establishing system performance goals.

NYSE officials told us that NYSE plans to conduct a full scale test of the capability of its order processing systems in a 600-million share trading environment similar to that encountered in October 1987. We have been invited to observe the test. In our view, testing of the systems should include measures to successfully demonstrate that the NYSE's trading systems are capable of overcoming the processing problems that were described in our January report. A great deal will depend on the success of tests such as those scheduled on April 30, to help ensure that all systems will work smoothly under high order volume processing conditions. We encourage the Exchange to conduct future tests designed to stress the automated systems and electronic linkages of the NYSE, its member firms, regional stock exchanges, and intermarket components.

Since October 1987, the NYSE has modified its overall computer capacity goals. Rather than planning for its systems to be capable of routinely handling a 600-million share trading day by 1990, the Exchange is planning to have systems capable of handling a 1-billion share trading day by December 1989. Assuming present rates of volume growth, NYSE officials told us they believe that this represents the development of a system that can process roughly five times the average daily trading volume the Exchange expects to receive.

In addition to raising its overall computer capacity goals, the NYSE has also refined how it translates anticipated trading volumes into associated systems requirements. For example, the Exchange now will estimate the capability of subsystems supporting individual trading posts to handle anticipated trading volumes. Before October 1987, NYSE estimated the effect of volume only on the entire system that supports all trading posts. This is a significant change because during October 1987 the volume of orders overwhelmed the ability of some subsystems to print orders at some trading posts. NYSE has also established specific performance goals for its automated order processing systems.

In response to our recommendation, the Exchange plans for an independent assessment of its automated order processing systems. Exchange officials said they anticipate selecting a firm by the end of April 1988. SEC officials informed us they have no current plans to acquire additional technical resources to independently assess the NYSE's trading systems. However, they said they agree with the need for an independent assessment of the trading systems and with the Exchange's plans to contract for such an assessment. They said they plan to review the results of the Exchange's independent assessment, and they believe this review fulfills SEC's regulatory responsibilities. We continue to believe that SEC needs its own capability to evaluate computer systems.

Ability to Identify Program Trading

In our second report, we reviewed the NYSE's ability to identify program trading through its automated systems. We: (1) obtained some information on the computer systems of 10 major firms that are members of the NYSE, (2) determined whether the NYSE's and members' systems have the capability of reporting basket trades (defined as program trading) and differentiating between trading strategies such as index arbitrage and portfolio insurance, and (3) determined whether the NYSE's and members' systems have been improved since October 1987, to permit more accurate reporting of various program trading strategies.

Member firms have direct computer-to-computer links with the NYSE for placing orders automatically and receiving order confirmations. All 600 of the NYSE's communications links are capable of handling any type of order, but some firms have dedicated certain communications lines for program trading strategies such as index arbitrage. Other firms conduct such trading out of specific branch offices that may be given unique identification codes. About 56 of the 600 lines and 24 branch office codes have been so identified. To the extent that member firms have informed it, NYSE therefore knows which communications lines or branch identification codes are being used for program trading.

NYSE has not asked its members to identify specific types of program trading strategies such as index arbitrage and portfolio insurance, and its computer systems cannot identify these strategies. Computer systems at 6 of the 10 member firms we surveyed, however, have this capability. The NYSE is considering alternatives to identify index arbitrage orders. Now that the SEC has approved the 50-point index arbitrage DOT cut-off rule, we believe it important that the Exchange develop this capability quickly in order to enforce the new rule.

CRASH STUDY METHODOLOGIES

Let me now turn to our review of the study methodologies used to determine the effect of program trading on the October price declines. Of all the sources of selling pressure that existed on October 19, 1987, program trading has been subjected to the most intensive scrutiny. The SEC, CFTC, and Brady Commission reports all discussed the role program trading played. The Brady Commission and SEC reached similar conclusions about program trading--that it was a significant factor contributing to the decline--although the Brady Commission conclusion related only to portfolio insurance strategies. CFTC, on the other hand, concluded that hedging in the futures markets and index arbitrage did not interact to cause a downward spiral in stock prices.

It is very important to emphasize that these conclusions do not necessarily contradict one another. The three studies' objectives with respect to the effects of program trading differed. The Brady Commission did not have a particular point-of-view, but considered program trading as one of several institutional trading strategies that illustrated the linked nature of the markets. The CFTC set out to substantiate or refute the so-called "cascade scenario". This may occur when hedging in futures markets sets off a chain reaction of index arbitrage selling in the equity markets which is then followed by endless rounds of subsequent futures hedging and index arbitrage equity sales, leading to a downward spiral of equity prices. The SEC had a number of objectives, but most important, set out to identify whether futures related program trading activity was associated with periods of significant equity price changes during the market crash period. This particular SEC test for effects does not necessarily require that the cascade scenario be validated.

Each of the three study groups used similar data and supplemental interviews to estimate the extent and timing of program trading that occurred, and the resulting estimates were similar. Each group matched the timing of trading activity and market price changes to ascertain if the former affected the latter. No more sophisticated quantitative analytical techniques were used because none of the study groups believed them to be feasible.

The objectives of each of the studies, and the judgments made by each study group in determining trade timing and intervals to review contributed to the different conclusions. And, because of the differing study objectives, the biggest contributing factor was the reduced number of program trades, considered futures related, that CFTC used in matching trades with price declines.

SIMILAR ESTIMATES OF TOTAL PROGRAM TRADING

Estimates of the levels of total program trading produced by the SEC, CFTC, and the Brady Commission on both an interday and intraday basis are similar. The SEC and CFTC derived these estimates primarily from a survey of 16 firms that were large program traders, active in the futures markets, either for their own account or for the accounts of others during the weeks preceding the crash. The SEC and CFTC, in turn, provided all of the information collected to the Brady Commission.

Each group supplemented the survey data by conducting interviews of the firms' customers to determine more precisely the trading strategies the firms employed. In addition, the groups verified the survey data against audit trail transaction data from the NYSE and CME. Total program selling reported by the SEC and CFTC was about 89 million shares on October 19 or 14.7 percent of the volume traded that day on the NYSE. We calculated the Brady

Commission estimate at 18.9 percent. The estimates of program trading used by the Brady Commission were expressed in dollars and had to be converted to share volume based on information in the Commission report. The somewhat different results can be accounted for by the inaccuracies in the calculation used to convert billions of dollars of selling activity into millions of shares sold.

Total program selling drops dramatically on October 20 in the SEC and CFTC studies. The numbers of total shares sold through program trading strategies on the NYSE that the SEC and CFTC reported are not strictly comparable on October 20. However, CFTC officials told us that their study's estimate is inaccurate because of a computer error and the actual number should be comparable to SEC's.

DIFFERENT APPROACHES TO ASCERTAINING ASSOCIATION BETWEEN PROGRAM TRADING AND PRICE VOLATILITY

As we stated earlier, much attention was directed in the CFTC, SEC, and Brady Commission studies to the effects of program trading on stock prices. While the Brady Commission seemed to place it more in context with all trading throughout the crash period, the two federal regulatory agencies more directly addressed the question of causality between program trading and stock price volatility. The SEC and CFTC studies are more

comparable on specific aspects of their analytical approaches, so we focus on them. Where appropriate, we also comment on the Brady Commission's analysis.

The analytical approaches used by SEC and CFTC differed in two major ways. First, because of different study objectives SEC and CFTC used different categories of program trades to ascertain the effects of this trading technique on price changes. Second, SEC and CFTC emphasized different intraday time intervals over which to measure the effects of trades on prices.

Different Groups of Program Trades

SEC included in its analysis of the effects of program trading, all index arbitrage, index substitution, portfolio insurance, and all other program trading on the NYSE. Because the CFTC was testing for the existence of the cascade scenario, it included all index arbitrage and index substitution, but did not include portfolio insurance stock selling because it involved no futures component. By limiting its analysis only to program trades that included a futures component, CFTC reduced the amount of trading considered to be relevant to the effect of futures trading on the stock market decline to less than half of that used by SEC.

The SEC's report indicates that index related program trading on October 19 amounted to 89 million shares. On the other hand,

CFTC considered only 37 million of those shares to be relevant to its test for the existence of the cascade scenario. The CFTC did not include the other 52 million shares, because those trades did not include a futures component, and because it was testing for the interaction between futures hedging and index arbitrage that would have to have been occurring in order to verify the existence of the cascade scenario on October 19. The SEC was testing for the effects of all futures related program trading. Because its interviews with traders and customers indicated that the 52 million in program trade share sales would have occurred in the futures market were it not for the large apparent discount, SEC included those share sales in its analysis of the effects of futures related program trading on the price declines.

Different Intraday Intervals Selected for Analysis

SEC analyzed program trading data all-day on October 19 and 20 and at 30-minute and 10-minute time intervals, while the smallest interval CFTC used was 30-minutes. Selection of time intervals is important in these data analyses because the shorter the time interval examined, the greater will be the incremental impact of a large trade on beginning and ending stock prices, other things being equal.

SEC officials told us that program trading strategies tend to hit the stock market in concentrated bursts which temporarily exceed

the markets' ability to absorb them. For example, the SEC report stated that, on October 19 between 1:00 and 2:00 p.m., the combination of index arbitrage and portfolio insurance selling totalled more than 40 percent of volume in the stocks comprising the S&P 500. Furthermore, they reported that this selling totalled more than 60 percent of S&P 500 volume in three different 10-minute intervals within that hour. Although SEC officials told us they relied on all the data to reach their conclusions, the 10-minute interval analysis shows the greatest effects of program trading on stock price volatility.

CFTC officials said that available data was not precise enough to analyze 10-minute intervals. They pointed to the fact that the trade execution times were difficult to determine and some trade order entry times were not exact. The Brady Commission report presented data in 30-minute intervals. A Brady Commission official said he did not believe that the available data was accurate enough to permit a meaningful analysis of trading by 10-minute intervals. SEC officials said they believed their conclusions were supported by examination of the 30-minute interval data as well as the 10-minute interval data.

The SEC assumed a 5-minute time lag from order entry to execution in arraying its trading data. Both CFTC and the Brady Commission used order entry times. This difference could change the alignment of trading and price change data and lead to

different conclusions about the effect of program trading on the price decline.

SEC officials told us that orders for stock trades are usually executed within 90 seconds from entry into NYSE's DOT system. They said they assumed a 5-minute delay to account for the confusion and problems in executing orders that occurred on October 19 and 20. CFTC and Brady Commission officials told us they thought no reasonable assumption could be made about delays in execution times because of the extensive number of trading halts and DOT system problems that occurred. SEC officials told us they believe that the 5-minute assumption did not materially affect the analysis. They said that because program trading occurred in concentrated bursts, the effect would have appeared to be equally concentrated using order entry times because it would have appeared 5-minutes earlier.

MORE RIGOROUS ANALYSIS IS DIFFICULT

As I indicated, the basic approach followed in the studies involved comparing program trading activity with price change data during specific time periods and looking for significant associations between those two measures. Officials of all three study groups told us that a rigorous quantitative analysis of the trading data was not possible given the short time frames they

had to complete the studies, and the limitations of the data. SEC officials also pointed to the lack of a proven economic model that could handle the complex variables involved in a phenomenon such as the market crash. In addition, they noted that it may be impossible to measure psychological, political, or macroeconomic variables. Thus, the conclusions of the studies are subjective and depend on such factors as point-of-view, differing regulatory perspective, and judgment of the study group.

CONCLUSION

Reasonable people may disagree about which of the measurement methodologies and interpretations of data are most appropriate. And because of the acknowledged limitations of the studies of program trading, we will probably never know its precise effects on price behavior of markets during October 19th and 20th.

From the standpoint of seeking solutions to better enable market participants and investors to cope with a major price swing, I am not sure we need to know the precise effects of the new market demands on price volatility. The buying and selling of large groups of stock baskets is a reality of today's markets. Program trading of these baskets is a technique used by institutional portfolio managers who control huge positions. When all these traders want to move in the same direction, either buy or sell, they are bound to put stress on the markets. The key policy

question that must be answered is: what is the best way to manage this stress--try to control it when it becomes a problem or adjust market structures to better deal with it day-to-day.

Progress has been made in some areas to enable the individual markets to better cope with large trading days. However, other changes, such as price limits on stock index futures and the cut off of the NYSE's DOT system for index arbitrage, have not been agreed upon by all of the federal and self regulators. Because these changes have not been coordinated across markets, they have potentially adverse implications for intermarket stability. These uncoordinated changes greatly concern us. Differences of opinion among the exchanges and federal regulators must be resolved quickly by the President's Working Group. If this does not occur, the disagreements should be dealt with through Congressional action.

ATTACHMENT I

SCOPE AND METHODOLOGY

We conducted interviews and gathered data from the following federal agencies, self-regulatory organizations, and others during our work on these assignments.

Federal Agencies

Commodity Futures Trading Commission (CFTC)

Department of Treasury

Federal Reserve System (Fed)

Securities and Exchange Commission (SEC)

Self-Regulatory Organizations

American Stock Exchange (AMEX)

Chicago Board of Trade (CBT)

Chicago Board Options Exchange (CBOE)

Chicago Mercantile Exchange (CME)

Midwest Stock Exchange (MWSE)

National Association of Securities Dealers (NASD)

National Securities Clearing Corporation (NSCC)

New York Stock Exchange (NYSE)

Options Clearing Corporation (OCC)

Pacific Stock Exchange (PSE)

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Other Organization

Securities Industry Automation Corporation (SIAC)

Progress Analysis

Our review of regulators' progress in implementing suggested actions to better manage a future market crisis involved analyzing: (1) market crash reports prepared by the Brady Commission, SEC, CFTC, NYSE, and CME; (2) proposed rule changes submitted to the SEC and CFTC from the securities and futures self regulators respectively; (3) operational and communications changes proposed or implemented to facilitate intermarket coordination and improve market capacity; and (4) results of intermarket meetings and plans for future meetings.

Methodologies Analysis

To prepare a description and comparison of the SEC, CFTC, and the Brady Commission reports as they pertained to their evaluation of the effects of program trading on intraday stock price volatility we: (1) obtained and analyzed the official reports from the SEC, CFTC, and the Brady Commission; (2) studied research literature on the effects of program trading on stock price volatility obtained from both the academic community and

other government agencies; (3) examined some of the data provided by major firms which formed the basis of the SEC and CFTC studies; (4) talked to members of the SEC, CFTC, and the Brady Commission study groups; and (5) obtained informal comments on this analysis from government agencies and external consultants.

We did not attempt to independently verify the accuracy of the data provided by major firms to the SEC, CFTC, and the Brady Commission. Furthermore, we did not verify the accuracy of data transcription from the data forms provided by the major firms to the computer generated analyses of the SEC and CFTC.

Analysis of NYSE Computer System Enhancements

To assess NYSE's upgrades to its systems' capacity we toured the exchange floor and the Securities Industry Automation Corporation (SIAC) computer facility and observed the new specialist posts, additional printers, automated specialist books, and the new Limit Order System. We did not corroborate written or oral representations due to time constraints and the proprietary nature of certain information.

We interviewed officials from 10 of the 31 brokerage firms that the NYSE has determined execute program trades for their own or client accounts. These firms were randomly selected and represent both the large and small volume program traders. We also interviewed various NYSE and SIAC officials. We reviewed pertinent documents obtained from these sources and reports provided by SEC, the Brady Commission, and NYSE.

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MARKET ACTIONS SINCE THE CRASH

Federal and self regulators are working together and within their markets to improve market operations in response to the October 1987 crash and to the recommendations contained in the studies that followed. These changes relate to communication and data sharing, market surveillance, financial surveillance, margins, clearing and settlement procedures, market making systems, and capital adequacy and credit availability.

Communication and Data Sharing

-- The self regulators are trying to make trading information more useful and timely. For example, CBOE has developed a "wish list" of trade information which includes the percentage of stocks currently open for trading in various indices, a listing by index of stocks delayed or halted, and the index values. NYSE is determining the feasibility of providing this information through the Consolidated Quote System of the SIAC or through private vendors. In addition, CBOE is drafting a joint letter with other exchanges to a quotation vendor requesting automation of trading halt indicators and improved quality controls.

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-- The NYSE is looking into disconnecting the ticker tape for routine trade information if, in high volume situations, the tape is more than 3 minutes late. The tape could then be used as a message board during such periods. The tape could contain messages such as the current Dow Jones Industrial Average and the time needed for trade executions. NYSE officials told us that the disconnection of the ticker tape might prevent investors from being misled by untimely information. In addition, the NYSE is considering arrangements with private market data vendors by which it would be able to page into the vendors' systems to directly provide operational messages.

-- NASD has introduced a new communications enhancement called the Order Confirmation Transaction (OCT) Service. This service will enhance communication among market makers, eliminating the need for telephone contact, and create an audit trail of firms accepting, rejecting, or not responding to market orders.

-- NASD officials told us their Board of Governors has approved a rule which will streamline its emergency decision-making process. They plan to submit this proposal to SEC for approval.

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Market Surveillance

-- Futures exchanges currently attend subcommittee meetings of the Intermarket Surveillance Group (ISG) concerning stock index products. This group coordinates investigations of trading abuses such as stock manipulation. However, futures exchanges are not formal members of the group. Negotiations are underway for a more formal role for futures exchanges in the ISG.

-- In an attempt to detect frontrunning from the stock to the futures markets, the NYSE will provide futures exchanges with audit trail information on stock trading that will enable them to conduct routine surveillance for frontrunning. This information includes times of trades, identities of the buyers and sellers, and whether the trade is for a customer or for a firm's own account.

Financial Surveillance

-- CME hosted a meeting in March 1988, concerning financial surveillance data. The exchanges attending discussed the available financial surveillance information and procedures currently followed in the

futures and securities industries. The exchanges want to determine what information they can share on a routine and emergency basis.

-- Futures and options clearing organizations plan to routinely share cash flow data on member firms and their affiliates. CBT and CME also plan to share information on margin excesses and deficits, option premiums, and, possibly, on firms' margin requirements.

-- CFTC is refining large trader and exchange clearing member position data. It is producing aggregate intermarket position data for CFTC-regulated markets. The purpose is to identify concentrations of similar or related positions in futures markets held by customers or clearing firms on multiple exchanges which could pose a financial threat to a clearing firm.

Margins

-- CBT has tripled its Major Market Index-Maxi futures margins since October 19. The initial margin was increased from $4,500 to $15,000 per contract and the maintenance margin was increased from $3,000 to $10,000 per contract. The new initial speculative level is

equivalent to approximately 17 percent of contract value. CBT officials told us they had raised margins because CFTC and SEC wanted higher stock index futures margins.

-- CME has raised its initial speculative margins from $10,000 to $19,000 and its maintenance speculative margins from $7,500 to $10,000. Margins for hedgers were also increased from $7,500 to $10,000.

-- According to CBOE officials, SEC suggested that options exchanges increase their margin requirements. Accordingly, NYSE, AMEX, PHLX, PSE, and CBOE raised margin requirements for broad-based market index options. The new requirements were designed to protect both investors and firms by assuring that broad-market index option positions are adequately covered. In addition, the new margin requirements should maintain a reasonable cushion of protection for investors.

Clearing and Settlement Procedures

-- The National Securities Clearing Corporation (NSCC) filed a proposed rule change with the SEC to require its members to make an additional clearing fund deposit if

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the member's clearing fund obligation increases by 10 percent during the month.

-- CBT, CME, and OCC asked NSCC to participate in a routine clearing information sharing effort. NSCC is considering the proposal.

Market Making Systems

-- NYSE and AMEX have been reviewing the performance of specialists to determine if they met their market making responsibilities during the crash period. Based on these reviews, NYSE has reallocated six stocks and AMEX has reallocated two stocks.

-- The NYSE has developed additional specialist performance standards based on objective measures, such as DOT order handling and reporting and the timely opening of securities.

-- NASD has submitted a proposed rule change to SEC which will increase the penalty for an unexcused market maker withdrawal from a 2 to 20 business day suspension from trading in that security and has reduced the number of reasons for excused withdrawals.

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-- NASD has also submitted a proposed rule change to SEC to enhance its Small Order Execution System (SOES). These enhancements include, among others, a change from voluntary participation to mandatory participation in SOES, thereby, committing all market makers to make a continuing market in NASDAQ/NMS securities; continued operation of SOES during locked/crossed markets; and creation of different maximum size limits for SOES orders, depending on the security.

Capital Adequacy and Credit Availability

-- CME amended a position limit rule which requires traders in the S&P 500 futures and option contracts to obtain prior CME approval before exceeding speculative, hedge, arbitrage, or spread limits. However, under this proposal, a trader intending to exceed such limits could request verbal approval from CME before exceeding the limits. If verbal approval is granted, the trader would then be required to file the written application with CME promptly after receiving such verbal approval. This rule amendment will enable CME to maintain stricter control over its members' position limits and to review each

application to exceed position limits on a case-by-case basis. According to CFTC, the requirement that traders obtain prior exchange approval before exceeding speculative limits is a condition imposed by most exchanges.

-- The NYSE Board approved an increase in the minimum capital requirement for specialists from the greater of $100,000 in capital or an ability to assume a position of 5,000 shares in each of the common stocks in which they make a market, to the greater of $1,000,000 in capital or an ability to assume a position of 15,000 shares in each common stock. NYSE is also exploring the need for specialists to maintain additional lines of credit and other lending arrangements.

-- The AMEX is in the process of working on a proposal to increase specialist capital requirements. Current capital requirements of the greater of $100,000 or an ability to carry 2,000 shares of each security are far below the actual financial commitments of the AMEX specialists. The AMEX believes that an increase in the minimum capital requirements may be in order to reflect more closely the normal level of capital used. The AMEX believes such increases could more accurately reflect the

adequacy of specialists' capital and emphasize their obligations.

-- The NYSE also has implemented a change in its frequency of monitoring specialists' capital. In the past, whenever a substantial increase or decrease occurred in the price of NYSE listed securities overall or in an individual security, the NYSE obtained capital information from each specialist unit or from the individual specialist over the telephone. In a memo to specialist organizations dated February 23, 1988, the NYSE reported that in light of the current increase in market volatility and in order to formalize past practices, specialist units were asked to report capital and position data on a daily basis. Two forms were developed: one was designed for self-clearing specialists while the other is for specialist units that clear through other brokers.

-- Discussions on the need for improved communication are underway between banks and clearing organizations. CME held a meeting on April 4, 1988, with banks and clearing organizations to discuss ways to improve communication. The group plans to include bank phone numbers in its telephone directory, develop guidelines on requesting an

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extension of Fedwire hours, and discuss access to collateral and pay and collect information by banks.