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DECIMAL CONVERSION 2000: ARE THE MARKETS READY?

HEARING

BEFORE THE

SUBCOMMITTEE ON
FINANCE AND HAZARDOUS MATERIALS

OF THE

COMMITTEE ON COMMERCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

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DECIMAL CONVERSION 2000: ARE THE MARKETS READY?

WEDNESDAY, MARCH 1, 2000

HOUSE OF REPRESENTATIVES,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON FINANCE AND HAZARDOUS MATERIALS,
Washington, DC.

The subcommittee met, pursuant to notice at 10 a.m., in room 2322, Rayburn House Office Building, Hon. Michael G. Oxley (chairman) presiding.

Members present: Representatives Oxley, Shimkus, Wilson, Fossella, Ehrlich, Towns, Engel, Luther, Capps, and Markey.

Staff present: David Cavicke, majority counsel; Linda Dallas Rich, majority counsel; Brian McCullough, majority professional staff; Robert Simison, legislative clerk; Consuela Washington, minority counsel.

Mr. OXLEY. The subcommittee will come to order. The Chair will recognize himself for an opening statement.

Three years ago this committee led the effort to get the securities markets to convert from fractions to decimals. It was an important change. I wanted to do this for three reasons. One, I believe the free market, not the Government should determine stock prices; two, decimals would make the markets more accessible because they are easier to understand than fractions; and, three, decimals would promote the competitiveness of the U.S. stock markets because the rest of the world is already trading in decimals.

After we reported legislation the exchanges agreed that they would convert to decimals. We agreed to let the markets convert after their Y2K efforts. Now that the Y2K computer crunch has come and gone, mercifully, we thought it a good time to see how the markets are doing on decimal conversion.

Based on my recent visit to New York with our colleague Vito Fossella, and my review of the GAO testimony, the answer is, we're in pretty good shape. The markets are on schedule to convert this July. Initially there will be a spread of a nickel for most stocks. After we have had decimal trading for about 6 months, we anticipate that there will be no mandated minimum increment and we will have full free market pricing in decimals.

I understand that some firms in the options exchanges may experience some difficulties because of increased trading and message traffic that decimals will bring. We are phasing in decimals by providing for the nickel increments in an attempt to alleviate those problems.

Additionally, I'm open to other solutions that will help the options exchanges to get through this transition. Decimals was a good bipartisan achievement of which we can all be proud. I appreciate the work that the GAO has done, in monitoring decimal conversion for us and look forward to the GAO's testimony.

And with that the Chair yields back and is now pleased to recognize the ranking member, the gentleman from New York, Mr. Towns.

Mr. TOWNS. Thank you very much, Mr. Chairman.

In the 105th Congress you proposed a bill that was so simple it was monumental. Your bill H.R. 1053 required our markets to join the rest of the world and price stocks in decimals rather than in fractions. After our passing the bill out of subcommittee, the market participants agreed that it was time to enter the 21st Century by converting to decimals.

Now we are on the verge of reaching our goal; the markets were able to successfully navigate Y2K and they are now poised to conquer the next important task, converting from fractions to dollars and cents. While I'm anxious to see decimal conversion, I am a little concerned about some details. Fortunately my concern arises from one of the benefits that will occur in the market once it converts from fractions.

Due to the increase of "traffic" that is bound to occur with decimalization, I'm concerned about whether or not there is enough capacity in our trading system to handle the new flow of information being created by shrinking bid and offer quotes. It is vital to ensure that our system has the ability to handle this conversion. I hope that the testimony from the General Accounting Office will be able to alleviate any concerns that I have in this area.

I would like to applaud the industry who have worked to ensure that our capital markets will be ready to trade in decimals by July. Their steadfast commitment on this issue will help solidify that our markets remain the envy of the world and easier for every American to understand.

I would also like to congratulate you, Mr. Chairman, for your leadership on this issue. It's been a very important victory for American investors in our Nation's capital markets. I thank the GAO for their testimony today and look forward to hearing just how ready our markets are for decimal conversion.

Thank you very much, Mr. Chairman, again for having this hearing, and I yield back.

Mr. OXLEY. Thank you.

[Additional statements submitted for the record follow:]

PREPARED STATEMENT OF HON. TOM BLILEY, CHAIRMAN, COMMITTEE ON COMMERCE

During the 105th Congress, Finance and Hazardous Materials Subcommittee Chairman Mike Oxley proposed a very good idea—H.R. 1053, the Common Cents Stock Pricing Act of 1997. His bill would have required our nation's exchanges to price stock in dollars and cents, rather than in government set fractions.

I was an original co-sponsor of H.R. 1053. I agree with Chairman Oxley that pricing stocks in decimals will benefit American investors and our capital markets. Listing stock in decimals will make the ticker on the bottom of CNBC easier to understand for every American. It will also make our markets more competitive by allowing the market to determine the buy and sell price, rather than a government mandated spread.

Today I am pleased to see that decimal pricing is just around the corner. The Securities and Exchange Commission and the industry have worked together to ensure that our capital markets will be trading stocks in decimals, rather than fractions, by July of this year. We are here today to hear from the General Accounting Office about the progress that has been made towards this goal.

I congratulate Chairman Oxley, and Telecommunications, Trade, and Consumer Protection Ranking Member Ed Markey for their hard work which has led to an important victory for American investors and all participants in our nation's capital markets.

I also thank the GAO for their review of the industry preparedness, and look forward to their testimony today.

PREPARED STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS

Thank you, Mr. Chairman.

I would like to begin by commending you for calling today's hearing and for your persistent leadership over the last two years in pushing our nation's stock markets to move away from trading in fractions and towards trading in dollars and cents. This is an important pro-consumer initiative that will make our markets more efficient and competitive and save investors billions of dollars in lower trading costs.

Three years ago this month, I joined with you, with Chairman Bliley, and several other Members of the Committee in introducing H.R. 1053, the "Common Cents Stock Pricing Act of 1997." We introduced this legislation to correct an absurd anomaly in our nation's stock and options markets. More than two centuries after traders meet under the Buttonwood tree in lower Manhattan to form the New York Stock Exchange, stocks were still trading in increments of an eighth of a dollar—or 12½ cents. Some financial historians attribute this arcane practice to the time when the Spanish dollar was a widely used currency in America. These Spanish dollars routinely were cut up into "bits" or "pieces of eight." Others suggest that the eighth could also be derived from the old "New York dollar," a regional currency used during the early years of the Republic.

Regardless of its origin, 200 years later, the rest of the America had long since moved on to buying and selling goods and services using dollars and cents. Clearly, it was time for the securities industry to catch up.

Despite the protests of some in the industry that the issue was too complex, that we needed more hearings, that we'd destroy the profitability of the brokerage industry, this Subcommittee moved forward to approve our bill and direct the SEC to mandate a move to decimal pricing. And once we acted, the markets responded. The New York Stock Exchange, the NASDAQ, and the regional exchanges announced that they would immediately move from eighths to 16ths in preparation for a move to decimals in the summer of 2000. In response to this welcome and forward looking change of heart on the part of the securities industry, we decided to withhold further action on H.R. 1057 and closely monitor industry progress towards meeting the goal.

As part of the Subcommittee's ongoing oversight efforts, I joined with you and Chairman Bliley last year to ask the General Accounting Office to monitor what actions were being undertaken by the SEC, the exchanges, and Wall Street securities firms to make decimal pricing a reality. Today, we will be hearing from GAO on their findings and recommendations. The good news is that progress is being made. The bad news is that a number of challenges still remain and some in the industry may be dragging their feet. We will hear that the primary challenge is the systems capacity of the computers and telecommunications systems used to transact trading, and that these challenges are particularly acute for the options exchanges. We will also hear that concerns about antitrust issues may have delayed efforts to develop market standards and exchange rules relating to decimal trading.

Based on my review of GAO's testimony, I am convinced that it is possible for the industry to meet the deadlines for an orderly transition to decimals—if the industry has the willpower to do so. The SEC needs to be vigilant in pressing all market participants forward to decimals, and be willing to let market forces—rather than artificial exchange rules—set the minimum price increment for stocks. I continue to hear disturbing rumors that some in the industry might want to delay the move to decimals, or permanently lock in a nickel trading increment for stocks. This concerns me. The industry has now had three years to get ready. It's time for industry to do their bit, get off the dime, and give stock investors the opportunity to profit from spreads that range down to a penny.

Thanks again, Mr. Chairman, for calling today's hearing. I look forward to hearing the testimony.

Mr. OXLEY. If there are no further openings statements then let me turn now to our distinguished witness, she is Ms. Davi M. D'Agostino, Acting Associate Director for Financial Institutions and Markets issues with GAO in the General Government Division. Ms. D'Agostino thank you for being with us today. And if you will, would you identify and introduce your cohorts here at the table.

Ms. D'AGOSTINO. Yes, I'd be happy to. And thank you for inviting us.

This is Mr. Jean-Paul Reveyoso, Mr. Cody Goebel, and Mr. Keith Rhodes, our chief scientist.

Mr. OXLEY. Thank you. And you may proceed.

STATEMENT OF DAVI M. D'AGOSTINO, ACTING ASSOCIATE DIRECTOR FOR FINANCIAL INSTITUTIONS AND MARKETS ISSUES, GENERAL GOVERNMENT DIVISION; ACCOMPANIED BY CODY J. GOEBEL, ASSOCIATE DIRECTOR FOR FINANCIAL INSTITUTIONS AND MARKETS ISSUES; AND JEAN-PAUL REVEYOSO, SENIOR EVALUATOR FOR FINANCIAL INSTITUTIONS AND MARKETS ISSUES, GENERAL ACCOUNTING OFFICE

Ms. D'AGOSTINO. Okay. Good morning, everyone.

You asked us here this morning to discuss GAO's observations on the securities industry's progress toward implementing decimal trading. As you know, GAO has bee monitoring this issue at your request and testified on the actions needed to convert to decimals nearly 2 years ago.

May I submit my full statement for the record and summarize my remarks.

Mr. OXLEY. Without objection.

Ms. D'AGOSTINO. Okay. Thank you.

I'm going to focus my remarks today on three key areas. First I will discuss the progress made to date for converting to decimals. Second, I'll highlight some of the challenges that lie ahead for the U.S. securities industry to successfully trade at decimal prices. And third, I'll briefly cover some of the areas where we plan to focus our future efforts at your request and monitoring the industry.

In 1998 testimony before this subcommittee GAO recommended that the Chairman of Securities and Exchange Commission or the SEC ensure decimal pricing got implemented in a timely manner after the industry prepared for the year 2000 date change. Most importantly, we recommended that SEC ensure that the industry establish definitive timeframes for implementing decimal trading and assess the impact of decimal trading on the industry's processing and communication systems capacities.

SEC and the industry have taken actions to ensure that the markets begin decimal pricing in 2000. SEC has monitored the industry efforts coordinated by the Securities Industry Association, the SIA, to develop a plan, a schedule and standards for decimal pricing. SEC also issued two orders directing the industry participants to work jointly on these tasks. Importantly, SEC's most recent order issued on January 28, directs the stock and options and ex-

changes and the NASD to coordinate on a plan to begin decimal trading, as you said, by July 3, 2000.

Also very importantly, SIA did commission a study of decimals impact on trading and quotation volumes. And the industry has now scheduled three industry-wide tests of decimal trading in April, May and June of this year. Details of the industry's plan are in a state of flux right now and things may change, but the illustration on your left shows some of the more detailed recent thinking on the phase schedule for implementing decimals.

The industry plans a first phase to start in July 2000 as called for in the SEC order. And during that first month a small number of stocks, about 30, as discussed earlier this month at the SIA will be switched from fractions to decimal pricing in no greater than nickel increments.

A second phase would then begin in which all stocks would be switched to decimals. At the same time the industry would pilot some number of stocks to be traded in penny increments.

After January 2001, the final phase would begin in which individual markets would seek SEC approval for the specific increments in which they intend to quote their decimal prices. This phase is expected to end March 3, 2001.

While these SEC and securities industry efforts and activities represent progress in preparing for trading in decimals, some key challenges in our view remain ahead for success. Possibly one of the most serious challenges facing the industry is the systems capacity demands that Mr. Towns mentioned of decimal trading and quoting as projected by an industry study.

A private firm, SRI Consulting, did this study for the industry and its most recently updated projections show substantial increases in message traffic can be expected. The most striking increases in message traffic in a decimal/penny trading environment are projected in the options markets and the Nasdaq. The illustration board on your right shows the SRI projection that the options peak message traffic could increase over 3,000 percent from December 1998 levels by December 2001 if trading is in penny increments.

They also projected that Nasdaq's peak message traffic could increase by 700 percent in the same period if trading is in pennies.

It's important to note that SRI's projections take into account much more than just switching to decimal pricing. They also take into account recent record volumes in trading and increased competition among the options exchanges.

Now, both the Options Price Reporting Authority or the OPRA and the Nasdaq are already having difficulty meeting message traffic demands with current capacity.

OPRA plans to increase its capacity by the end of the year 2000, but that increased capacity will still be less than one-third of what SRI projects as needed to quote in penny minimum price variations, MPV. Even if OPRA could meet the needed capacity, the price changes would occur so quickly that human traders watching the computer screens might not be able to keep up. As a result OPRA is also taking steps to reduce quotation message traffic such as setting internal priorities on its own quote and trade reports.

Other proposals are to discontinue price quotes for options with low trading volumes and establish minimum increments of five or ten cents for options quotations. In any case, because of potential market implications of these steps the SEC will have to review the proposals and approve any needed changes to rules. The Nasdaq has told SEC that they would not be ready to fully deal with their own lower projections of message traffic volumes until the first quarter of 2001. Under its current plans, Nasdaq will not be prepared to deal with message traffic volumes projected by SRI.

In addition, because of capacity issues and readiness issues, Nasdaq will not be able to participate in the first two tests scheduled for April and May this year, and instead they plan to join the June 2000 test.

Beyond the critical capacity challenge, industry participants need to work closely together in several areas to successfully convert to decimal trading in a timely manner. For example, industry must cooperate to finalize standards for market operations and practices. However, cooperation and progress in developing market standards has been hampered by antitrust concerns. Despite SEC and Justice Department efforts to mitigate these concerns, industry meetings on decimal-related market standards were not proceeding because of an ongoing antitrust investigation of the options markets and pending lawsuits.

However, the January 28 SEC order, that I mentioned earlier, clearly states that industry cooperation in discussing developing and implementing decimal trading is imperative and in the public interest. And this order is expected to remove any further industry unwillingness to cooperate on decimals because of antitrust concerns.

Other challenges remaining for the industry include assessing and proposing revised exchange and market rules as may be needed to accommodate decimal trading and readying the systems of the exchanges, broker-dealers, the vendors, and others for decimal prices.

SEC has been encouraging the industry to address the needed rule changes and has been also examining the readiness of various firms' systems for dealing with decimals.

Now, as part of our continuing efforts to monitor the industry's progress at your request, we plan to stay on top of a number of different aspects of their efforts. We want to continue to focus on the approval process for market rule changes, the regulators' readiness assessments of broker-dealer systems to handle decimals, and the results of the tests conducted among the exchanges and the member firms.

In addition, we want to look at what the various industry committees are doing on market standards and implementation procedures.

Mr. Chairman and members of the subcommittee that concludes my summary and we would be happy the answer any questions you have at this time.

[The prepared statement of Davi M. D'Agostino follows:]

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Finance and Hazardous Materials, House Committee on Commerce

For Release on Delivery
Expected at
10:00 a.m. EST
on Wednesday
March 1, 2000

SECURITIES PRICING

Progress and Challenges in Converting to Decimals

Statement of Davi M. D'Agostino
Financial Institutions and Markets Issues
General Government Division

GAO/T-GGD-00-96

Statement

Securities Pricing: Progress and Challenges in Converting to Decimals

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to present the results of our assessment of the securities industry's progress toward implementing decimal trading as part of the monitoring we are doing at your request. In 1998, we testified before this Subcommittee about actions needed for the industry to convert from fractions to decimals. At that time, we noted that the industry should complete its work in preparing for the 2000 date change before attempting to implement decimal trading. However, we also recommended that the Chairman, Securities and Exchange Commission (SEC), take various steps to ensure that timely implementation of decimal trading would occur thereafter. These steps included ensuring that the industry established definitive implementation time frames and assessed the impact of decimal trading on the securities industry's information processing and communication system capacities.

Today, I will focus my remarks on two key areas: the progress made to date toward converting to decimals and the challenges that remain. In response to our recommendations, SEC and the industry have taken actions to help ensure that the securities markets implement decimal pricing in 2000. SEC staff have been monitoring the securities industry efforts, which are being coordinated by the Securities Industry Association (SIA), to develop time frames and standards for implementing decimal pricing and have issued two orders directing industry participants to work jointly on these tasks. In addition, SIA commissioned a study of decimal trading's impact on trading and price quotation volumes.

Although securities market participants have made progress in preparing for decimal trading, some key challenges remain for the industry to successfully implement decimal trading. Because the capacity study commissioned by SIA projected that decimal trading is likely to significantly increase trade and quotation message traffic, a primary challenge will be to ensure that the industry's communication and processing systems have adequate capacity. The options markets and the Nasdaq Stock Market, Inc. (Nasdaq) face the greatest difficulty in preparing for the increased message traffic from decimal trading. Other steps that must be completed before decimal trading can be implemented include developing market standards and implementation procedures, ensuring that market participants' systems are ready to process decimal prices, and revising all rules necessary to govern trading. However, these steps are not yet complete and, in some cases, progress has been hampered by other impediments, including an ongoing antitrust investigation of the options markets.

This statement is based on our monitoring efforts to date. To monitor SEC and securities industry efforts to implement decimal trading, we observed the industry meetings being coordinated by SIA and interviewed SEC officials. Regarding the industry's efforts to assess decimal trading's impact on its system capacities, information technology and research methodology experts among our staff evaluated the private consulting firm's study. We interviewed officials from the consulting firm that prepared the capacity study, as well as representatives from the equities and options markets to discuss capacity issues. We also obtained and analyzed information from the Securities Industry Automation Corporation (SIAC) and the Options Price Reporting Authority (OPRA), which are the

entities that administer the systems used to disseminate trade and price quotation messages for the stock and options markets.

Progress Made Toward Implementing Decimal Trading

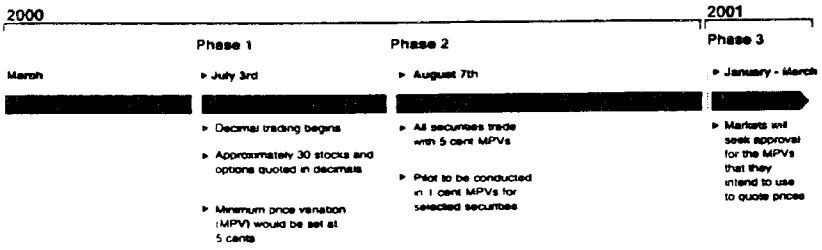
As recommended in our 1998 testimony, SEC and the securities industry have taken various steps to help ensure that the securities markets transition to decimal trading in 2000. SEC staff have conducted periodic meetings with industry participants about decimal issues and have monitored the efforts of SIA committees working to implement various aspects of decimal trading. SEC staff also cooperated with the private consulting firm that prepared the study of decimal trading's impact on industry systems capacity and held discussions with this firm and other market participants on the study's results.

For its part, the securities industry, under the auspices of SIA, has been meeting to coordinate plans and standards for implementing decimals. In addition, the various U.S. exchanges, Nasdaq, and other securities organizations have also scheduled three industrywide tests of decimal trading in April, May, and June 2000.

In January 2000, SEC took a significant step towards the implementation of decimal trading. On January 28, 2000, SEC issued an order[1] requiring certain market participants, including the stock and options exchanges, and National Association of Securities Dealers, Inc. (NASD),[2] to work together to prepare a plan that would ensure that decimal trading would begin by July 3, 2000. Specifically, the order directed these market participants to develop and submit a plan to implement decimal trading to SEC by March 14, 2000.[3]

The market participants subject to the order have not yet formally submitted their implementation plan to SEC and the details are subject to change. However, the industry members, working under the auspices of SIA, developed a draft schedule for implementing decimal trading using a phased approach. According to that draft plan, the industry intends to begin the first phase of implementation in July 2000, as reflected in the SEC order. As shown in figure 1, under the draft plan, during the first month, the prices of a small number of stocks (about 30) would be quoted in decimals with a minimum price variation (MPV) no greater than a nickel. A second phase would then begin in which all stocks would be quoted with an MPV of no more than a nickel. During the second phase under that draft plan, a pilot would also be conducted in which a selected number of stocks would be quoted in penny increments. After January 2001, the final phase of the implementation would begin in which the individual markets would file rule changes with SEC seeking approval of the MPVs with which they intend to quote prices.

Figure 1: Industry Draft Implementation Phases for Decimal Trading (as of February 25, 2000)



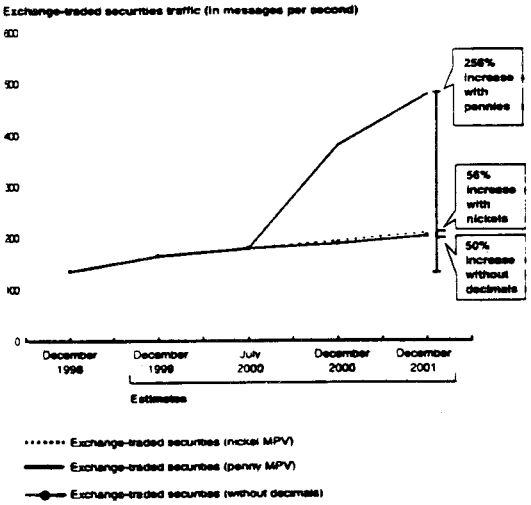
Adequate Systems Capacity Is the Primary Challenge to Decimal Trading

As we noted in our 1998 testimony, successful implementation of decimal trading in the United States would require regulators and the industry to ensure that adequate capacity exists to accommodate the expected trade and price quote message traffic that would have to be processed and communicated industrywide. The SIA-commissioned study of the impact of decimal trading on processing and communication capacities was performed by a private consulting firm, SRI Consulting. The SRI study concluded that substantial increases in message traffic in both the equities and options markets would likely occur.

At our request, SRI provided us with its most recent projections for peak message traffic volumes arising from decimal trading. These projections include not only the impact of decimal trading, but also of other developments in the markets that are increasing message traffic, such as record trading volumes and increased competition among options exchanges. SRI has developed projected peak message traffic volumes for exchange-traded securities, Nasdaq securities, and for equity and index options. For each type of security, SRI has estimated what the message traffic volumes will be by December 2001 for three scenarios: (1) without decimal trading, (2) with decimal trading with a nickel MPV, and (3) with decimal trading with a penny MPV.

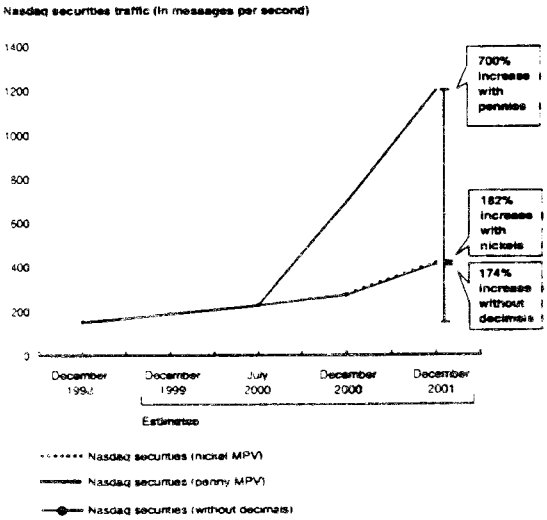
As shown in figure 2 below, SRI estimates that peak message traffic for securities traded on the exchanges would be 50 percent higher by the end of 2001 from its December 1998 levels without any impact from decimal trading. However, if these securities trade in decimals with a penny MPV peak message traffic could increase by as much as 256 percent from December 1998 to December 2001.

Figure 2: SRI Projections for Exchange-Traded Securities' Peak Message Traffic From December 1998 to December 2001 (Data as of February 24, 2000)



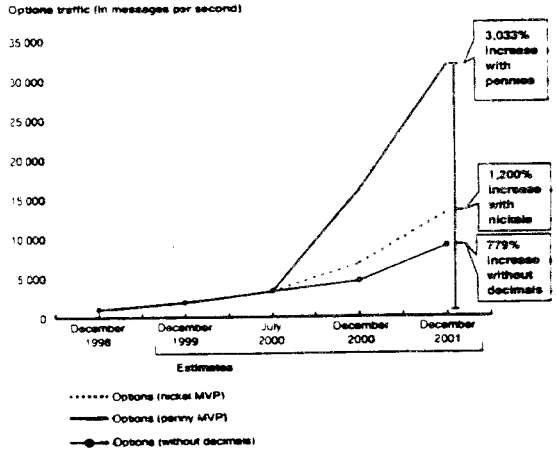
As shown in figure 3 below, SRI estimates that peak message traffic for securities traded on Nasdaq will be 174 percent higher by the end of 2001 from its December 1998 levels without any impact from decimal trading. However, if Nasdaq securities trade in decimals with a penny MPV, SRI projects that peak message traffic for securities traded on Nasdaq could increase by 700 percent by December 2001.

Figure 3: SRI Projections for Nasdaq Securities' Peak Message Traffic From December 1998 to December 2001 (Data as of February 24, 2000)



As shown in figure 4 below, SRI estimates that peak message traffic for equity and index options will be 779 percent higher by the end of 2001 from its December 1998 levels without any impact from decimal trading. However, if these options trade in decimals with a penny MPV, SRI projects that their peak message traffic could increase by 3,033 percent by December 2001.

Figure 4: SRI Projections for Options Peak Message Traffic From December 1998 to December 2001 (Data as of February 24, 2000)



As you requested, we evaluated this study and found that it generally used reasonable methodologies to produce its findings. The study's projections

for securities trading with a nickel MPV and for options traffic were produced using historical data and projection models similar to those already used in the industry. However, the traffic estimates for decimal trading in securities with penny MPVs may have been subject to greater error because they relied on the opinions of market participants as the primary input to the models used for these projections. However, neither SRI nor we could identify other reasonable sources of such information. SEC officials noted during the time that the market participants provided input to the SRI study, trading volumes in securities markets were rapidly increasing and thus would have made estimating future volumes even more difficult. Nevertheless, they said that these participants would have been the best sources for such estimates. For example, an SRI official told us that historical data could not be used to estimate trading behavior for penny MPVs because securities on U.S. or foreign markets do not generally trade in such increments.

Recognizing the potential impact of decimal trading on the industry's system capacities, as previously discussed, the second phase of the industry's implementation plan is expected to include a pilot program, in which selected securities would be quoted with penny MPVs. Such a pilot should help the market participants and SEC to evaluate the potential effects of smaller trading increments on capacity and trading behavior.

Options Exchanges Are Most Challenged in Addressing Likely Message Traffic Increases

Based on the SRI projections, the transition to decimal trading in U.S. securities markets could have the greatest impact on message traffic volumes for options. The OPRA system is used to disseminate trade and price quote messages for equity and index options industrywide. OPRA officials told us that upgrading their systems to handle the increase in options traffic expected from decimal trading is a major challenge. One OPRA official said that increasing the system's capacity to handle the projected decimal trading volumes would "require enough telephone lines to support a small city." Furthermore, OPRA representatives noted that some of the message traffic projections for options are so high that traders would have difficulty interpreting and acting on such rapidly changing information.

To be able to process the current and projected message traffic volumes, OPRA intends to begin increasing the capacity of the system. According to OPRA officials, they expect to increase the OPRA system's processing capacity during 2000 from its current maximum of 3,000 messages per second to 12,000 messages per second by December 2000.

However, this additional capacity will not be adequate to accommodate the SRI projections. OPRA has begun taking several steps to reduce quotation traffic because the current message volumes are already approaching industry capacity limits. For example, each of the options exchanges has agreed to internally prioritize its own quote and trade report message volume so that the amount of traffic submitted to OPRA does not exceed specified percentage allocation of the OPRA system's total capacity.

The participants in the OPRA systems have also been working with SRI to prepare additional strategies to further reduce this system's message traffic. For example, they are considering discontinuing price quotes for options with low trading volumes. In addition, they have discussed establishing MPVs for options quotations of 5 cents or a 10 cents as another way of limiting message traffic after decimal trading begins. According to an SIA official, such steps are necessary to reduce the expected message volume to levels below the maximum capacity of the options systems. Because of potential market impacts, SEC plans to review the mitigation strategies proposed by the exchanges and must approve any resulting changes to exchange rules, including any restrictions on the level of options quotation MPVs.

Decimal Trading Also Poses Capacity Challenges For the Nasdaq Market

As the SRI study indicated, trading in decimals will also increase message traffic for the equities markets, but to a lesser degree than for the options markets. According to SIA officials, the exchanges offering listed securities likely have adequate capacity to absorb the likely increase in quotation message traffic expected to result from decimal trading. However, as shown previously, SRI's latest projections indicated that trading in penny MPVs may increase Nasdaq quotation message traffic by 700 percent between December 1998 and December 2001.

According to Nasdaq officials, their market is already experiencing processing strains because of unprecedented increases in trading volumes. For example, they provided us with data that indicated that their average daily share volume since the beginning of 2000 is almost 1.7 billion shares, which represents a 61 percent increase over their average daily volume in 1999.

Because of their need to expand their ability to process these volumes, Nasdaq officials have informed SEC that their market would not be ready until the first quarter of 2001 to accommodate their own lower estimates of the increased message traffic expected from decimal trading with penny increments. Nasdaq has not factored into its planning the increased estimates from SRI. In addition, Nasdaq will not be able to participate in the first two industrywide decimal trading tests scheduled for April and May 2000, but intends to participate in the June test.

Decimal Implementation Progress Has Been Slowed in Other Areas

In addition to addressing capacity issues, the timely implementation of trading with decimal prices in U.S. securities markets will also require other efforts to be completed in a coordinated manner across the securities industry. These include finalizing standards for market operations and practices, revising exchange and market regulations, and readying the systems of the exchanges, broker-dealers, and other market participants for decimal prices. Cooperation among market participants in a key area has been hampered in part by antitrust concerns. However, the SEC order issued in January 2000 may help address many of these concerns that have slowed industry progress by clearly stating that such cooperation is in the public interest.

Development of Market Standards Has Been Delayed by Antitrust Concerns

For the conversion to decimal trading to be successful, various standards, practices, and implementation procedures have to be agreed to by the exchanges, markets, and other market participants. An example of the types of issues requiring agreement among the participants is the methodology for converting prices in pending orders that have yet to be executed when the markets transition from fractional to decimal prices. Another issue involves determining how orders will be routed and processed by the markets if different exchanges establish different MPVs.

However, we observed and officials confirmed that progress among the various SIA committees and subcommittees working on these decimals-related issues has been slowed by antitrust concerns. Currently, the U.S. Department of Justice is conducting an investigation of antitrust issues in the options markets and various private entities have filed lawsuits alleging anticompetitive behavior by the options markets. Market participants told us that, as a result, joint discussions of decimal trading issues could be viewed as having anticompetitive implications. Because of these concerns, some SIA committee meetings on decimal issues were postponed or were not attended by all relevant officials. SIA officials acknowledged that these antitrust concerns have slowed the various decimal committees' work to complete the necessary standards and implementation procedures.

SEC and others have attempted to mitigate the effect of antitrust concerns on the progress of the decimal trading implementation. On September 8, 1999, SEC issued an order that directed certain stock and options exchanges, SIAC, and OPRA to work cooperatively on options quote

message traffic issues expected to arise as a result of decimals-related issues. The SEC order noted that such cooperation was unlikely to have adverse impacts on competition and would be in the public interest. In a letter dated September 23, 1999, the Department of Justice approved the SIA's proposed plan for exchanging information among market participants relating to decimal implementation. SIA's plan outlined specifically how information would be aggregated and disclosed and set limitations on the type of information that would be shared among participants. According to the business review letter, as long as the information exchanges were of the nature SIA proposed and were conducted according to the practices it outlined, the Department would not consider such activities to be anticompetitive.

Despite these actions, cooperation among the industry participants working on the decimal implementation continued to be hampered by antitrust concerns. For example, at a December 1999, SIA steering committee meeting held after the release of SEC's order and the Department of Justice letter, certain industry participants left the meeting when the discussion turned to how MPVs would be processed because of their continuing concerns over the antitrust implications. According to SIA officials, other delays continued to occur because of these concerns.

SEC expects that its January 2000 order will remove any further unwillingness among industry participants to work together on decimal implementation arising from the antitrust concerns. The order cites SEC's authority under the Securities Exchange Act of 1934 to require joint activity by the self-regulatory organizations that could otherwise be asserted to have an impact on competition where such activity serves the public interest and the interests of investors. The order states that decimal pricing could benefit investors and increase market efficiency and fair competition. Because information in the securities markets is processed and shared among various entities, the SEC order indicates that "it is imperative that all market participants convert to decimals in a coordinated manner." The order states, therefore, that having these participants work jointly in discussing, developing, and implementing decimal trading furthers the public interest.

Exchange and Market Rules Also Have to Be Revised

The conversion from trading in fractional to trading in decimal prices will also require changes to various self-regulatory organization's rules, but the industry has not yet completed or submitted to SEC a full set of proposed rule changes. For example, SEC officials said that rules that refer to fractional increments would have to be revised to reflect comparable decimal increments. In summer of 1999, SEC staff asked the exchanges and NASD to submit listings of the rules they anticipated would need revision as the result of implementing decimals. According to SEC officials, they received lists of rules that primarily addressed technical and administrative changes. However, they told us that changes to other types of rules may be required as a result of decimal trading. For example, some officials have indicated that the rules regarding short selling,[7] which require that such trades be executed only after an upward movement in the security's price, may have to change if decimal trading results in very low MPVs, such as pennies. With smaller MPVs, market officials said that manipulating the market to ensure that a higher priced trade occurs before selling short would be less costly and possibly easier to accomplish. However, not all of the markets' initial submissions to SEC addressed these types of rules. A New York Stock Exchange official told us that his exchange wanted to wait to see exactly how decimal pricing affected trading before they propose changes to rules that govern trading practices.

In the fall of 1999, SEC again asked the exchanges and NASD to submit final proposed rule changes by January 3, 2000. However, as of January 28, 2000, SEC had not yet received all such proposals in final form.

Exchanges and Other Market Participants Must Ready Their Systems for Decimal Securities Prices

In addition to the industrywide efforts, each individual market participant, including the exchanges, broker-dealers, information vendors, and others, must also make changes to their processing and communication systems to accommodate decimal prices. As of July 1999, an SIA survey of firm readiness indicated that little progress had been made because firms were focusing on ensuring that their systems would correctly process date information in 2000. Now that most of that work has been completed, we would expect that market participants could turn their attention to readying their systems for decimals. According to a SEC official, SEC has begun conducting examinations to assess firm readiness and will be coordinating with the examination staff of the various exchanges and NASD to ensure that similar reviews are conducted of other market participants.

GAO Efforts Going Forward

As part of the continuing effort to monitor the industry's progress toward implementing decimal trading that you have asked us to perform, we intend to conduct various activities over the coming months. We plan to continue monitoring SEC's and the industry's progress in preparing for decimal trading in various areas, including

- The approval process for market rule changes,
- The assessments made by regulators of broker-dealers' efforts to ready their systems for decimals, and
- The results of testing among exchanges and member firms.

In addition, we will continue to participate as observers on the industry committees currently preparing market standards and implementation procedures.

Mr. Chairman, Members of the Subcommittee, this concludes my prepared remarks. We would be happy to answer any questions you have at this time.

Contact and Acknowledgements

For further information regarding this testimony, please contact Davi M. D'Agostino at (202) 512-5431. Individuals making key contributions to this testimony included Cody J. Goebel, Michael A. Burnett, Jean-Paul Rey-Veyoso, Carl M. Ramirez, Sindy R. Udell, and Katherine M. Raheb.

Securities Pricing: Actions Needed for Conversion to Decimals (GAO/T-GGD-98-121, May 8, 1998).

Order Directing the Exchanges and the National Association of Securities Dealers, Inc. To Submit a Decimalization Implementation Plan Pursuant to Section 11A(a)(1)(B), Exchange Act Release No. 42360, 65 Fed. Reg. 3443 (Jan. 26, 2000).

Named as "Participants" in the order were the American Stock Exchange, LLC, the Boston Stock Exchange, Inc., the Chicago Board Options Exchange, Inc., the Chicago Stock Exchange, Inc., the Cincinnati Stock Exchange, Inc., NASD, the New York Stock Exchange, Inc., the Pacific Exchange, Inc., and the Philadelphia Stock Exchange, Inc.

The order also directs the exchanges and NASD (the Participants) to discuss the implementation of decimal trading with certain interested market participants (the "Interested Parties"). These Interested Parties include the International Securities Exchange, LLC, the National Securities Clearing Corporation, the Depository Trust Company, the Options Clearing Corporation, SIAC, the Intermarket Trading System Operating Committee (ITSOC), the Consolidated Tape Association, and the Consolidated Quote Operating Committee.

In its January 26, 2000 order, SEC directs that such a pilot is to be conducted if the decimals implementation plan submitted by the market participants includes a phased-in approach in which a minimum increment greater than a penny is used.

"Approval and Order Pursuant to Section 11A(a)(1)(B)," Exchange Act Release Rel. No. 34-41361, 64 Fed. Reg. 50,261 (Sept. 9, 1999). The order specifically applied to the American Stock Exchange, LLC, the Chicago Board Options Exchange, Inc., the Pacific Exchange, Inc., the Philadelphia Stock Exchange, Inc., the International Securities Exchange, and OPRA.

Short selling occurs when investors borrow shares of a stock that they do not currently own from other investors and then sell those shares. Such investors profit when the stock's price declines and they are able to repurchase the shares at a lower price to replace the ones they borrowed.

Mr. OXLEY. Thank you very much, Ms. D'Agostino and the Chair would recognize himself for 5 minutes for questions.

Addressing the challenges that you pointed out, I take it that the clearly overriding challenge is on the capacity issue; is that correct?

Ms. D'AGOSTINO. That's our assessment, yes. That seems to be the most difficult challenge ahead, I think.

Mr. OXLEY. Now, there have been some, including myself, that have tried to draw a similarity between the conversion to Y2K and conversion to decimals. And I know the GAO had been involved—maybe not you personally, but obviously in that issue. Are there some parallels here, are some of the fears that were there with Y2K that proved not to be the case also perhaps the same kind of fears that are addressed with the conversion to decimals?

Ms. D'AGOSTINO. I think it's a little bit of a different problem because it mixes the actual physical change to decimal pricing which isn't all that difficult a problem with the record volumes that the industry is experiencing even without decimals and that compounded with the expected increases in trading from moving to decimals as the spreads narrow. So its capacity.

Mr. OXLEY. Now the demonstration you have in front of us here indicating the phases of converting to decimals, this is the industry draft as opposed to what the SEC had proposed; is that correct?

Ms. D'AGOSTINO. It's actually right in alignment with what the SEC order lays out. The question is, what happens in the middle there? The beginning date is the same, and I think the end date is the same, the question is, how long it takes to actually convert, how long the pilot is, and the increments at which each of the markets and which stocks would trade. And I think the order gives the industry that wiggle room in the middle to do what it thinks is prudent.

Mr. OXLEY. And as I understand it from the SEC, based on a meeting we had with Mr. Fossella last week, in New York, that the SEC is also still seeking comment and suggestions that they appear to be flexible in trying to make this work to everybody's satisfaction to get to the goal, but to get to the goal the right way.

The capacity issue even if we didn't have decimals would be, according to your testimony, a problem anyway; is that correct?

Ms. D'AGOSTINO. Right now, yes, that's true, Mr. Chairman.

Mr. OXLEY. And is this a—aside from what's going on out there, is this basically a technological problem? The capacity issue in and of itself appears to be a challenge technically; is that correct?

Ms. D'AGOSTINO. Yes, it is. In fact, Mr. Rhodes, would you like to respond to that?

Mr. OXLEY. Would you identify yourself, again, for the record, please?

Mr. RHODES. My name is Keith Rhodes and I'm the Chief Scientist of the General Accounting Office. And, yes, it is, it's a technical issue in that if you look at how the message traffic is being moved, what you are trying to do is take a ten-inch fire hose and hook it up to a soda straw. And what you have to do is make certain that the soda straw is as large as the ten-inch fire hose. And whether the stock market or whether the markets in general go to decimals, as we've seen, there are already capacity problems that

exist and these will just be compounded. But it is purely a technology problem.

Mr. OXLEY. Ms. D'Agostino, could you give us an idea as to who you talk to, market participants and the like, not specifically individuals, but I mean, in your study who did you talk to and was in fact the capacity issue the No. 1 concern at least in the markets?

Ms. D'AGOSTINO. The team has basically attended or sat in on otherwise telephonically every single SIA meeting that's occurred on this matter, and has also been in contact with the exchanges and Nasdaq. They've gotten some information from Nasdaq that indicates and actually even raised our concerns about the capacity issue to some extent very recently. The options markets have raised this concern in OPRA to us, I mean, in front of us and it's been an issue all along the way in the discussions at SIA.

Mr. OXLEY. Thank you. My time has expired, let me now recognize the ranking member, the gentleman from New York.

Mr. TOWNS. Thank you very much, Mr. Chairman. Your testimony indicates that the OPRA system for disseminating options trade and price quote messages has a current capacity of 3,000 messages per second. And that OPRA officials intend to increase the capacity to 12,000 messages per second by the end of the year.

Ms. D'AGOSTINO. Right.

Mr. TOWNS. Your testimony goes on to say, "however, this additional capacity will not be adequate to accommodate the SRI projections" for quotation traffic. The options markets have been taking a number of steps and propose to take a number of steps to reduce traffic, but they also are not enough and will have an adverse effect on the transparency of our options market.

I am concerned that we have a problem—well, a disaster, actually, in the making. What does GAO recommend that SEC and the options markets can do to head off this serious problem as I see it?

Ms. D'AGOSTINO. Well, Mr. Towns, we actually just received a copy of the proposal that OPRA submitted to the SEC. I think SEC is just starting to take a look at it themselves. This proposal lays out a whole number of options of opportunities or ideas to reduce the message traffic volume. Some of these ideas are ideas that are clearly not going to have a bad impact on transparency. For example, if they delist inactive options, that's not going to hurt transparency.

Some of the other ones, however, might cause concern about transparency and that's why SEC, I think is going to take a really hard look at each one of the strategies that OPRA has proposed and consider it in terms of what might be needed in terms of rule changes down the road if they do approve the strategy.

Mr. TOWNS. Mr. Chairman, I would like to request that GAO submit that for the record.

Mr. OXLEY. Without objection.

Mr. TOWNS. Thank you very much.

[The information referred to follows:]

Mitigating Options Message Traffic

Executive Summary Presentation to the Securities and Exchange Commission

December 14, 1999

SIAC

SRI CONSULTING

Subsidiary of SRI International

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Contents

- Project objectives and recommendations
- Current capacity situation and issues
- Mitigation ideas and forecasts
- Next steps
- Appendix

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Options Message Traffic Mitigation Study Objectives

KEY PROJECT OBJECTIVES

Recommend viable short-term fixes and long-term solutions to exponential growth in options message traffic

Short-Term Goal for OPRA: 10,000 MPS, with a maximum of 12,000 MPS

Reduce message traffic burden across distribution chain (from origin to end user)

Create effective triage strategies for extreme situations that minimize impact for both the market and individual participants

Provide accurate and timely options quote and trade data to end users

Develop mitigation methodologies that do not disadvantage either investors or market makers

Provide a stable market, where quote data is reliable and executable for trading

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The Steering Committee Recommends the Following Actions Be Taken to Mitigate Options Message Traffic

Recommendations to the Options Industry

Short-term (as soon as possible)

- ✓ Aggressively delist inactive options products to reduce quoting rates
- ✓ Change product listing requirements to limit products
- ✓ Establish options premium breakpoints to minimize "quote flicker" and peak MPS rates
- ✓ Implement triage procedures to ration capacity during peak times to protect system integrity

Longer-term (6-18 months)

- ✓ Continue beneficial short-term mitigation ideas that reduce capacity requirements
- ✓ Develop "cabinet" and/or "request for quote" mechanisms for additional traffic mitigation

Over the last six months 24 mitigation ideas were evaluated. These recommendations represent the most feasible and acceptable ways to reduce projected options message traffic growth.

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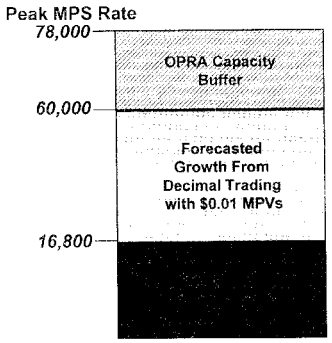
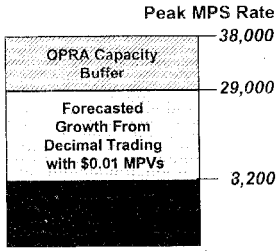
Drivers for This Study Include Accelerated Growth in Options Message Traffic Compounded by Future Events

Original Year-End 2001 OPRA Capacity Forecast
(as of August 1999)



Revised Year-End 2001 OPRA Capacity Forecast
(as of November 1999)



* Including multiple listings and one new exchange. Forecast assumes equities markets convert to $0.01 MPV

Key Options Statistics

- 3,255+ listed options underlyings
- 140,000+ individual options series
- 2.4 MM+ average daily contracts traded
- ~46% of options classes trade < 50 contracts/day
- 20%~30% of options series have zero open interest
- 1360+ multiply listed options (trading at 2+ exchanges)
- 20MM+ average options quotes per day

Drivers of OPRA Capacity Forecast Changes

OPRA capacity forecasts were updated by options exchanges to reflect the current environment. Key changes:

- 2.5 point strike price program is not planned to be increased
- Options premium price breakpoint of $3 is not planned to be increased to $100 for trading in 1/16ths
- Actual impact of multiple trading of options is less than originally anticipated

Source: OCC, OPRA Capacity Plan, SIAC, SRIC analysis

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These Changes May Create an Environment Where OPRA's Capacity Cannot Meet Peak Requirements

		Y/E 2000	Y/E 2001
OPRA System Capacity	OPRA Capacity: 3,000 MPS (peak occurred on 11/16/99)	OPRA Capacity: 12,000 MPS	OPRA Capacity: 12,000 MPS
Environment	• Current aggregated historical exchange input peaks: 2,905 MPS (97% of current OPRA capacity) • Data recipients cannot handle more than 3,000 MPS without upgrading to T-3 lines • Retail branches may not even be able to handle more than 2,000 MPS • Market makers have incentive to increase quoting activity to "advertise for business"	• SIAC system upgrade to 8,000-12,000 MPS by March 2000; Full 12,000 will require system and network upgrades • Data recipient upgrades to handle above 3,000 MPS will occur by the end of 2nd Quarter 2000 • ISE to begin operations in March 2000 (phased-in trading of top-600 equity options over 8-9 months) • Vendors may be forced to make triage decisions and selectively disseminate data at peak times and some end users may stop receiving options data on less actively traded options	

Source: OPRA, SIAC, SRIC analysis

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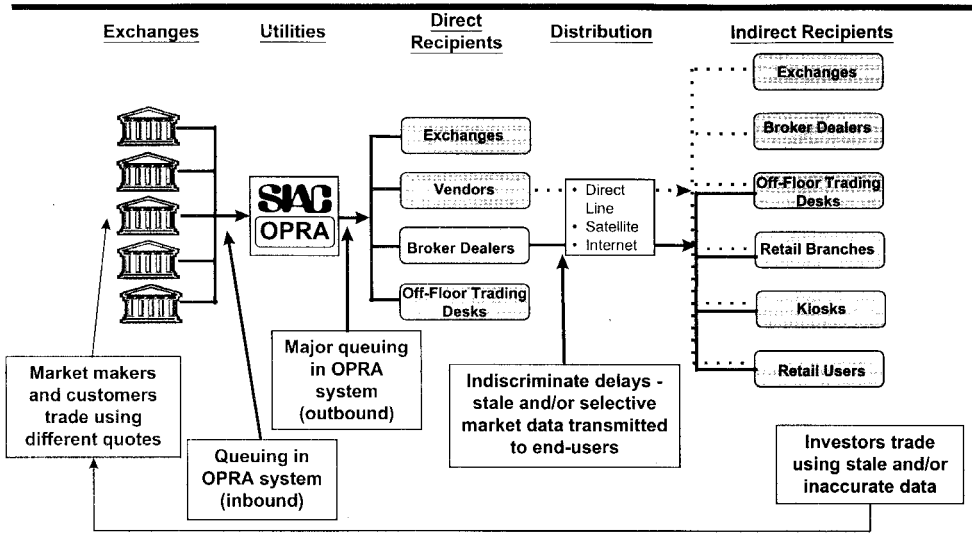
What Will Happen If Peak Quoting Rates Exceed OPRA System Capacity?



Significant capacity shortages would adversely impact options trading

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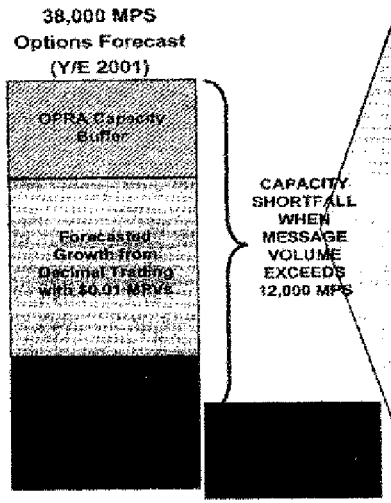
Four Key Capacity Problems Can Result If Volumes Exceed System Capacity



Capacity Problems Resulting from Peak Rate Increases

Continuous Problem	**Message volume for the industry continuously exceeds sustainable capacity limits**
Isolated Event	**Message volume for the industry exceeds capacity only on intermittent peak days**
Element Event*	**Individual link in the options market data distribution chain has a capacity problem**
Segment Problem*	**End-user segment(s) cannot or will not support increased message volume levels**

Options message traffic must be reduced by 26,000 MPS or 68% by 2001 to achieve the project goal of 12,000 MPS and prevent or alleviate these issues

* These problems were identified but not addressed by the Steering Committee as they are outside project scope

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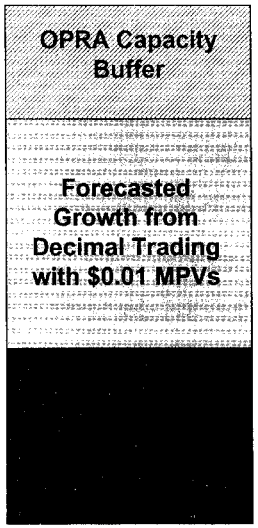
Given Current Quoting Practices, Three Basic Options Quote Mitigation Levers Are Available To Prevent Queuing

Growth above the line due to MPV changes is a multiplier of baseline growth

Reducing the baseline will have the largest impact



- Reduce Number of Quoted Options Products
- Reduce Quoting on Options Products
- Use Incentives to Influence Quoting Behaviors

Triage mechanisms can also be used to control peak quoting rates

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We Identified 24 Quote Mitigation Ideas and Analyzed Nine of the Most Viable Ideas For Primary Consideration

[redacted]

Reduce Number of Quoted Options Products

Delist Inactive Products

Change Product Listing Requirements

Cabinet or Request for Quote (RFQ) Status for Less Active Options

Reduce Quoting on Options Products

Establish Breakpoints and MPV Regimes

Reduce Autoquote Recalculations

Output Rounding

Change Incentives to Quote

Allocate OPRA Capacity

Pay for Quotes Generated

Filter/Sort Data

Separate OPRA Stream Into Two Lines Based on Activity

Passed initial screening for:
Acceptability, Feasibility, Mitigation Impact

√ Separate OPRA Revenues and Costs

Change Options Terms and Conditions

Filter Autoquote Input

Generate Quotes at Fixed Intervals

Selective Dissemination: Series Properties

Selective Dissemination: Auto-Ex Systems

Selective Dissemination: Fixed Intervals

Scrub Duplicate Quotes

Share CTA Feed

Stagger Options Openings

√ Compress Data

√ Revise Message Formats

Determine & Disseminate Primary Market Quotes

Autoquote Downstream

Compute and Disseminate NBBO*

None of these ideas independently solves the problem - combinations are necessary

√ *Referred to OPRA*

** Out of scope, NBBO quote impact depends on final linkage arrangements*

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EXECUTIVE SUMMARY

Primary Mitigation Idea Definitions and Estimates of Potential Options Traffic Mitigation Impact

[illegible]	Strategies to Reduce Number of Options [illegible]	[illegible]
Delist Inactive Products	Delist or don't quote products with little or no customer interest as measured by trading activity or open interest (OI): • Options series put-call pairs with zero OI (All options) • Options classes that trade less than a minimum number of contracts per month (i.e. < 500 contracts/month)	~5% ~6-8%
Change Product Listing Requirements	Reduce number of new options series: • Reduce number of allowed expiration months (i.e. eliminate 4th month for all equity options and all but the top index options) • Reduce number of strike price intervals (i.e. drop 5 point intervals on underlyings >$100 for all equity options and all but the top index options) • Control addition of strikes to LEAPS (Establish rules)	~15% ~8% ~1%-3%
Cabinet or Request for Quote (RFQ) Status for Less Active Options	Develop a new "cabinet" category for "inactive" options. Cabinet option quotes are not automatically disseminated but would be available on request through an RFQ mechanism. • Cabinet/RFQ inactive options classes/underlyings that are not delisted (Both equity and index options) • Cabinet/RFQ all but the Top 600 options classes by trading activity - other options products would be available real-time on a request for quote basis	~10% ~25%

*Impact forecasts represent scenario recommended by Steering Committee - other implementation scenarios exist with varying degrees of impact

All Mitigation Impacts Represent Industry-wide Implementation

Source: OPRA, SIAC, SRIC analysis

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EXECUTIVE SUMMARY

Primary Mitigation Idea Definitions and Estimates of Potential Options Traffic Mitigation Impact (Cont.)

Establish Options Premium Breakpoints and MPV Regimes	Establish an MPV breakpoint that aligns tick size with options premiums to improve price stability and minimize quote flickering (i.e. $3.00 breakpoint): • $0.01 MPV with no breakpoints (~257% increase in peak MPS rates) • $0.05 MPV with no breakpoints (~108% increase in peak MPS rates) • • $0.01/$0.05 MPV breakpoint (~135% increase in peak MPS rates) • $0.05/$0.10 MPV breakpoint (~81% increase in peak MPS rates) • $0.0625/$0.125 MPV breakpoint (~56% increase in peak MPS rates)	~0% ~42% ~34% ~49% ~56%
Reduce Autoquote Recalculations**	Set a minimum underlying price change to trigger option price recalculations: • No reduction done (~257% increase in peak MPS rates) • Enlist autoquote reductions to reduce excessive quoting (~77%-257% increase in peak MPS rates)	~0% ~0%-70%

Output Rounding**	Require calculated options price to change by certain value or percentage before sending a new quote:
	• No reduction done (~257% increase in peak MPS rates)
	• Implement output rounding
	  • for Index Options (~0%-149% increase in peak MPS rates)
	  • for Equity Options (~57%-284% increase in peak MPS rates)
	  • for All Options (~46%-257% increase in peak MPS rates)
		~0%-100%
		~0%-80%
		~0%-82%

* Estimated mitigation impacts assume no reduction in forecasted baseline from other mitigation ideas. Implementation of other ideas that reduce baseline forecasts would subsequently reduce the magnitude of these quote reduction ideas

** These ideas are voluntary - some exchanges are currently using these strategies to control peak quote rates

All Mitigation Impacts Represent Industry-wide Implementation

Source: OPRA, SIAC, SRIC analysis

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Primary Mitigation Idea Definitions and Estimates of Potential Options Traffic Mitigation Impact (Cont.)

Allocate OPRA Capacity	Set peak quote capacity allocations for all exchanges (for industry wide implementation) or for market makers (exchange-specific implementation). Each party would be responsible for staying within its allocation. Idea caps the peak message rate to the industry - particular exchanges/market makers determine how to stay within allocations.	Establishes Peak OPRA MPS Ceiling (~12,000 MPS)
Pay for Quotes Generated	Options exchanges charge individual market makers a fee based on the number of quotes generated and/or OPRA charges each exchange a fee based on peak quoting rates. Impact of idea depends on price elasticity of individual exchanges and/or market makers.	Impact will vary based on pricing structure and incentives
Separate OPRA Stream into Two Lines Based on Activity	Divide the current stream of OPRA data into two lines: the first, OPRA A, carrying the most active options, and the second, OPRA B, carrying less active options. Triage schemes could queue B-lines, freeing up capacity for A-line traffic. Potential benefits to OPRA A-only line recipients or for triage purposes: • OPRA A w/ Top 600 Options • OPRA A w/ Top 1200 Options	*Note: Mitigation impact felt only by those customers receiving abridged feed* ~25% ~14%

All Mitigation Impacts Represent Industry-wide Implementation

Source: OPRA, SIAC, SRIC analysis

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EXECUTIVE SUMMARY

These Ideas Formed the Basis of An Options Traffic Mitigation Framework to Address Peak Capacity Issues

- **Reduce the Number of Options Products**

  Reducing the product set eliminates quotes on all delisted products.

- **Reduce Quoting on Remaining Options Products**

  Quote reduction techniques are used today to reduce the number of quotes, preventing excessive "quote flicker."

- **Apply Incentives to Influence Peak Quoting Behavior**

  Controls and allocations can be used to motivate more judicious generation of quotes. Can also be used when quotes exceed maximum thresholds.

- **Implement Triage Mechanisms During Peak Capacity Situations**

  If other efforts do not provide enough relief, triage mechanisms would be implemented to protect the integrity of the system and to prevent significant queues.

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The Committee Recommends the Following Mitigation Ideas Be Applied To Reduce Capacity Requirements

- *Reduce Number of Options Products*

[redacted]

Estimated Mitigation Impact

~31% (not including cabinet/RFQ)

~35% (including cabinet/RFQ)

- *Reduce Quoting on Options Products*

[redacted]

~24%-34% (not including voluntary reductions)

If recommended ideas are implemented, message traffic could be reduced by up to 69%

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Recommended Options Mitigation Ideas and Estimated Impact on OPRA Capacity

Impact Focus	Short-Term Mitigation Ideas	Estimated Individual Impact	Estimated Combined Impact
Baseline Impact	**Delist Inactive Products**		
	Series Put/Call Pairs with Zero Open Interest (all options)	~5%	~5%
	Classes Trading < Minimum Number of Contracts/Month	~6%-8%	~6%*
	Change Product Listing Requirements (Limit Products)		
	Reduce Expiration Months (Eliminate 4th expiration month except on top index options)	~15%	~13%*
	Reduce Strike Price Intervals (Drop 5 point strike price intervals > $100 except on top index options)	~8%	~6%*
	Curtail adding strikes to LEAPS (develop rules to control)	~1%-3%	~1%*
		COMBINED REDUCTION	**~31%**
Decimalization Impact	**Breakpoints and MPV Regimes**		
	Option 1 - Breakpoint with $0.05/$0.10 MPV	~49%	~34%
	Option 2 - Breakpoint with $0.01/$0.05 MPV	~34%	~24%
	Option 3 - $0.05 MPV with no breakpoint	~42%	~29%
		COMBINED REDUCTION	**~55%-65%**

Impact Focus	Longer-Term Mitigation Ideas	Estimated Individual Impact	Estimated Combined Impact
Baseline Impact	**Cabinet/Request for Quote Status for Less Active Options**		
	Cabinet/RFQ Options Classes Trading < Minimum Contracts/Month	~10%	~4%
		COMBINED REDUCTION	**~59%-69%**

** Percentages were adjusted from individual impact numbers to avoid double counting mitigation benefits*

Source: SRIC analysis

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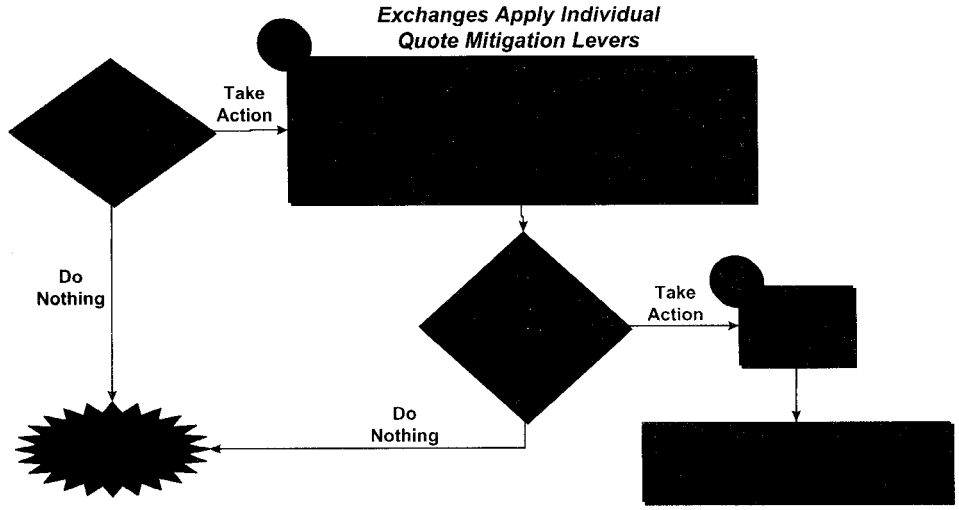
If Mitigation Measures Are Not Adequate, The Industry Will Implement Triage Procedures to Protect the System



Triage procedures will "cap" OPRA output to 12,000 MPS for data recipients

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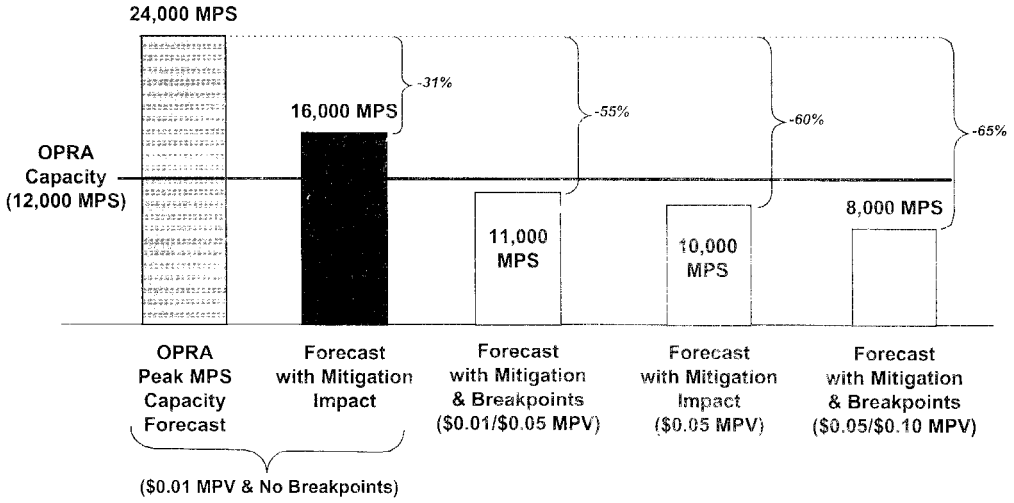
Application of Recommended Mitigation Ideas May Allow OPRA to Meet Its Goal of 12,000 MPS in 2000

OPRA Peak MPS Forecast for Year-End 2000 + Mitigation Impact*



* Forecast assumes equities markets convert to $0.01 MPV

Source: SRIC analysis

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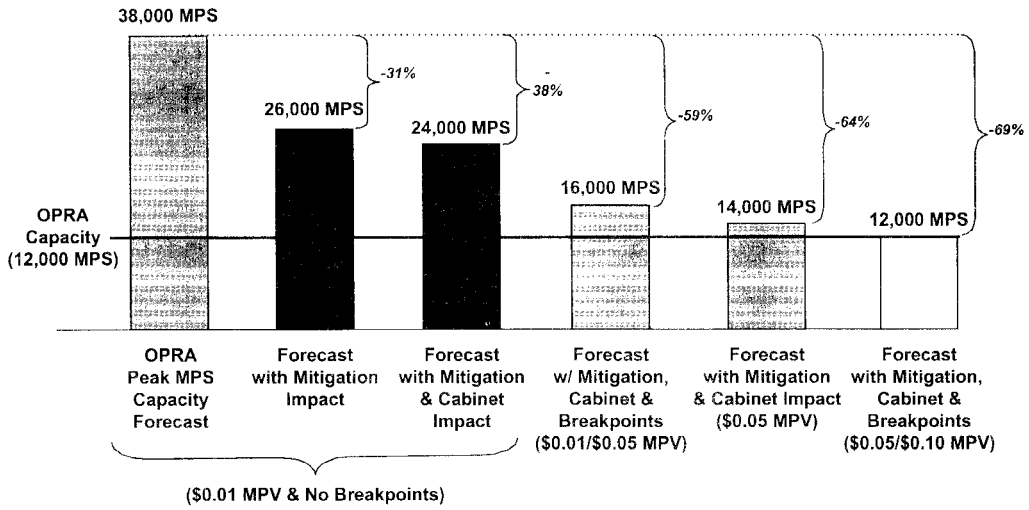
Additional Mitigation Strategies Are Necessary to Control Traffic Growth in 2001 Given OPRA's 12,000 MPS Capacity

OPRA Peak MPS Forecast for Year-End 2001 + Mitigation Impact*



* Forecast assumes equities markets convert to $0.01 MPV

Source: SRIC analysis

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A Long-term Sustained Message Volume Strategy Would Include The Development of a Cabinet/RFQ System

- **Year-end 2001**
  - Cabinet comes on-line during 2001
  - Estimated additional 10% decrease in message traffic
- **This should handle current anticipated growth**

  ...But ...
- **Other contingencies exist**
  - Additional options exchanges have been or may be announced
  - Quoting with size is anticipated
  - The new options linkage could have capacity impacts
  - Calculation of an NBBO by OPRA will impact system capacity
- **If mitigation measures are not sufficient, there are other alternatives**
  - Individual exchange actions
  - 14 remaining mitigation ideas are still available and might be workable as secondary strategies with further analysis
  - Triage measures could be used continuously

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Recommendations - A Recap

Industrywide Implementation

Short-term (as soon as possible)

- Aggressively delist inactive options products to reduce quoting rates
- Change product listing and de-listing requirements to limit products
- Establish options premium breakpoints to minimize "quote flicker" and peak MPS rates
- Implement OPRA triage procedures to ration capacity during peak times to protect system integrity
  - Triage mechanisms to throttle OPRA system during peak times is in place
  - The options exchanges are in the process of developing policies to guide triage and capacity allocation procedures
  - OPRA policy committee will determine ultimate capacity allocations for triage purposes

Longer-term (6-18 months)

- Continue beneficial short-term mitigation ideas that reduce capacity requirements
- Develop cabinet and/or request for quote mechanisms for additional traffic mitigation

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Next Steps

	Timing
■ Exchanges review report with their boards and member firms ■ Present report to SIA options committee ■ OPRA presents report to market data vendor community	*Jan '00*
■ The steering committee, in conjunction with OPRA, develops implementation plans for recommended mitigation ideas ■ Options exchanges develop specific rule filings to implement selected mitigation ideas ■ SEC considers recommended mitigation strategies for approval and rules changes ■ Any rejected ideas will have to be replaced by equally effective alternative ideas to maintain OPRA capacity at 12,000 MPS	*Prior to Decimal Conversion (Jul '00)*

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Next Steps - Other Considerations

- **This study addresses capacity planning for the exchanges, OPRA and SIAC**
- **Several other issues were raised during this study that need to be addressed explicitly**
  - Are there sufficient high-capacity network circuits in the timeframe available? (i.e. Physical availability of T-3 lines for data recipients)
  - What if data recipients are not ready to handle 12,000 MPS rates by July 2000?
  - What happens if a single entity has a problem?
    - Vendors would like to have guidance
    - Users want to be assured of uniform policies
  - What happens if a segment of users cannot handle even the reduced volume?
    - Branch offices and internet users
    - Splitting the feed
      - Most active issues
      - An NBBO
  - How are triage events declared, managed and terminated?
  - How are users notified if the data they are monitoring becomes "subject"? (i.e., Declaration of a "fast market")
- **The industry must pursue further review of these issues**

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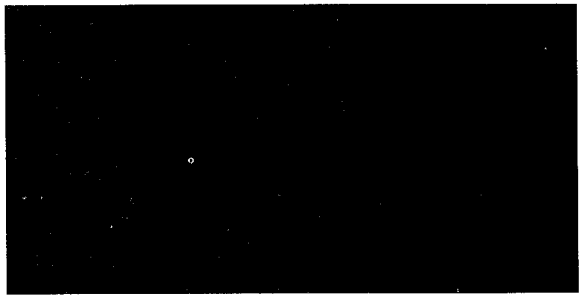
EXECUTIVE SUMMARY



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Calculations of Estimated Impacts of Recommended Options Traffic Mitigation Recommendations

Analysis of Options Baseline Forecasts, Mitigation and Decimalization Impacts

Short-Term Mitigation Strategy

Baseline Calculations	%	Y/E 2000	Y/E 2001	% Mitigation
OPRA Forecast		5,100	8,200	
$0.01 MPV w/o Breakpoints	257%	13,107	21,074	
Subtotal		*18,207*	*29,274*	
Capacity Buffer	30%	5,462	8,782	
Total		**23,669**	**38,056**	**0%**
Recommended Mitigation w/o Breakpoints				
OPRA Forecast		5,100	8,200	
Recommended Mitigation	-31%	-1,581	-2,542	
New OPRA Forecast		3,519	5,658	
$0.01 MPV w/o Breakpoints	257%	9,044	14,541	
Subtotal		*12,563*	*20,199*	
Capacity Buffer	30%	3,768	6,060	
Total		**16,332**	**26,259**	**-31%**
Recommended Mitigation w/ $0.01/$0.05 Breakpoints				
OPRA Forecast		5,100	8,200	
Recommended Mitigation	-31%	-1,581	-2,542	
New OPRA Forecast		3,519	5,658	
$0.01/$0.05 MPV Breakpoints	135%	4,751	7,638	
Subtotal		*8,270*	*13,296*	
Capacity Buffer	30%	2,481	3,989	
Total		**10,751**	**17,285**	**-55%**
Recommended Mitigation w/ $0.05 MPVs				
OPRA Forecast		5,100	8,200	
Recommended Mitigation	-31%	-1,581	-2,542	
New OPRA Forecast		3,519	5,658	
$0.05 MPV w/o Breakpoints	108%	3,801	6,111	
Subtotal		*7,320*	*11,769*	
Capacity Buffer	30%	2,196	3,531	
Total		**9,515**	**15,299**	**-60%**
Recommended Mitigation w/ $0.05/$0.10 Breakpoints				
OPRA Forecast		5,100	8,200	
Recommended Mitigation	-31%	-1,581	-2,542	
New OPRA Forecast		3,519	5,658	
$0.05/$0.10 MPV Breakpoints	81%	2,850	4,583	
Subtotal		*6,369*	*10,241*	
Capacity Buffer	30%	1,911	3,072	
Total		**8,280**	**13,313**	**-65%**

Long-Term Mitigation Strategy

Baseline Calculations	%	Y/E 2001	% Mitigation
OPRA Forecast		8,200	
$0.01 MPV w/o Breakpoints	257%	21,074	
Subtotal		*29,274*	
Capacity Buffer	30%	8,782	
Total		**38,056**	**0%**
Recommended Mitigation w/o Breakpoints			
OPRA Forecast		8,200	
Recommended Mitigation	-31%	-2,542	
New OPRA Forecast		5,658	
$0.01 MPV w/o Breakpoints	257%	14,541	
Subtotal		*20,199*	
Capacity Buffer	30%	6,060	
Total		**26,259**	**-31%**
Recommended Mitigation & Cabinet w/o Breakpoints			
OPRA Forecast		8,200	
Recommended Mitigation	-31%	2,542	
New OPRA Forecast		5,658	
Cabinet/RFQ system	-10%	-566	
Projected Forecast		5,092	
$0.01 MPV w/o Breakpoints	257%	13,087	
Subtotal		*18,179*	
Capacity Buffer	30%	5,454	
Total		**23,633**	**-38%**
Recommended Mitigation & Cabinet w/ $0.01/$0.05 Breakpoints			
OPRA Forecast		8,200	
Recommended Mitigation	-31%	-2,542	
New OPRA Forecast		5,658	
Cabinet/RFQ system	10%	-566	
Projected Forecast		5,092	
$0.01/$0.05 MPV Breakpoints	135%	8,874	
Subtotal		*11,957*	
Capacity Buffer	30%	3,590	
Total		**15,557**	**-59%**
Recommended Mitigation w/ $0.05 MPVs			
OPRA Forecast		8,200	
Recommended Mitigation	31%	2,542	
New OPRA Forecast		5,658	
Cabinet/RFQ system	-10%	-566	
Projected Forecast		5,092	
$0.05 MPV w/o Breakpoints	108%	5,500	
Subtotal		*10,592*	
Capacity Buffer	30%	*3,178*	
Total		**13,769**	**-64%**
Recommended Mitigation & Cabinet w/ $0.05/$0.10 Breakpoints			
OPRA Forecast		8,200	
Recommended Mitigation	31%	2,542	
New OPRA Forecast		5,658	
Cabinet/RFQ system	-10%	-566	
Projected Forecast		5,092	
$0.05/$0.10 MPV Breakpoints	81%	4,125	
Subtotal		*9,217*	
Capacity Buffer	30%	2,765	
Total		**11,982**	**-68%**

Source: SRIC analysis

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Primary Mitigation Ideas: Full-Time Strategies

Strategies to Reduce Number of Quoted Options Products (Baseline Reduction Only)

Delist Inactive Products	Delist or don't quote products with little or no customer interest (OI). • Put-Call Pair Series with zero OI • Options classes with <500 OI • Options classes trading <500 contracts per month • Only Quote Top OI Classes**	~5% ~5-6% ~6-8% ~22%**	• Lost trades, if any, occur in less important part of trading spectrum • Does not force any uneconomic behavior • Reduces number of series without adversely impacting trading activities • Easy to implement (rules not systems changes required)	• May disadvantage certain traders who use non-traditional trading strategies • How handle any intraday trading interests if there are no quotes on those series? • Nearly impossible to delist series if put-call pair does not have zero OI • Would result in some lost business • Require new "rapid relisting" procedures
Change Product Listing Requirements	Reduce number of new options series: • Reduce number of allowed expiration months (i.e. eliminate 4th month except for top index options) • Reduce strike price intervals (e.g. 10 point strikes for underlyings >$100 except for top index options) • Control addition of strikes to LEAPS	~15% ~8% ~1%-3%	• Operates at the source of quotes • Changes to listing program are easy to implement and can be accomplished in a short time period • Reduction in product set helps alleviate decimal trading impacts • Easy to implement	• May disadvantage certain traders who use non-traditional trading strategies • Need industry consensus or could confuse investors • Potential for lost trades if not shifted to other options series. Substantial volume in some index products • Requires SEC approval
Cabinet or RFQ Status for Less Active Options	Develop a new "cabinet" category for "inactive" options. Cabinet option quotes are not automatically disseminated but available on request. • Cabinet/RFQ inactive options classes that are not delisted (trade < 50 contracts/day) • Cabinet all but the Top 600 options classes	~10% ~25%	• Lessens opposition of market makers to complete delisting • Operates at the source of quotes • Reduces classes and quoting on series with little trading or open interest • Can be adjusted based on market and capacity conditions • Similar to selective quoting mechanisms used by some foreign exchanges	• May reduce market visibility and transparency for "cabinet" products • Expensive, complex and lengthy system development • Industry coordination issues present challenges • Longer-term idea - more difficult to implement than delisting • May be confusing to investors and SEC may require all options to be quoted at the open

*Impact forecasts represent most aggressive scenario suggested by Steering Committee

** Top OI Classes include the top 600 equity and to 20 index options ranked by open interest (accounts for 95% of all OI) - This idea may not be acceptable to all industry participants

All Mitigation Impacts Represent Industry-wide Implementation

Source: SRIC analysis

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Primary Mitigation Ideas: Full-Time Strategies (Cont.)

Strategies to Reduce Quoting on Options Products

Options Premium Breakpoints and MPV Regimes	Establish a series of MPV breakpoints that align tick size with options premiums. • $0.01 MPV with no breakpoints • $0.05 MPV with no breakpoint • $0.01/$0.05 MPV breakpoint • $0.05/$0.10 MPV breakpoint • $0.0625/$0.125 MPV breakpoint	*% Increase in MPS from decimals** ~257% ~108% ~135% ~81% ~56%	• Very easy to implement • Reduces quote flickering • An extension of something already being done today • Creates price stability and mitigates impact of underlying quote flickering due to $0.01 MPVs	• Needs to be coordinated at an industry level due to competitive factors • Impact reduced by other mitigation ideas • May only provide short-term solution until capacity can be upgraded (phased-out over time) • Implementation of this idea may require regulatory approval
Reduce Autoquote Recalculations	Set a minimum underlying price change to trigger option price recalculations: • No reduction done • Enlist autoquote reductions to limit excessive quoting	*% Increase in MPS from decimals** ~257% ~77%-257%	• Quotes track significant price movements in the underlying, not penny movements • Reduces quote flickering • Can also be applied to index option quote recalculations even though indices are already calculated in decimals • Currently utilized by some exchanges	• More of an impact on equity options than index options • May disadvantage some market makers if competition doesn't also reduce autoquote recalculations • Independent implementation reduces mitigation impact
Output Rounding	Require calculated options price to change by X before sending a new quote: • No reduction done • Implement output rounding	*% Increase in MPS from decimals** Equity Options / Index Options ~284% / ~149% ~57-284% / 0-149%	• Currently utilized by some exchanges • Reduces impact of quote flickering • Dampens impact of "penny quoting" • Improves price stability	• Competitive issues • May result in wider spreads, raising costs for end users • Independent implementation reduces mitigation impact • May create arbitrage opportunities

*Decimal impact on MPS is ~0.93 times impact on total daily options message traffic

Source: SRIC analysis

All Mitigation Impacts Represent Industry-wide Implementation

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Primary Mitigation Ideas: Incentive and Triage Strategies

Strategies for Addressing Incentives and Triage Situations

Allocate OPRA Capacity	Set peak quote capacity allocations for all exchanges (for industry wide implementation) or for market makers (exchange-specific implementation). Each party would be responsible for staying within its allocation.	Establishes Peak OPRA MPS Ceiling (~12,000 MPS)	• Resembles inbound throttles • Gives quote generators flexibility • Sets a firm cap on message rates • Caps total peak traffic sent to SIAC/End-users • Can develop both economic and technical governors on peak quoting rates	• Political and competitive issues with allocating capacity • Finding an equitable allocation methodology • How handle new entrants/competition • Ceilings might stifle growth • System peaks will cause queues and result in stale quotes unless capacity is capped
Pay for Quotes Generated	Options exchanges charge individual market makers a fee based on the number of quotes generated and/or OPRA charges each exchange a fee based on peak quoting rates.	Impact will vary based on "pay for quotes" pricing structure and incentives	• Easy to implement • Free market solution • Gives quote generators flexibility • Similar to systems in use at European exchanges • Efficient to expect large quote generators of OPRA to pay their fair share	• Significantly changes economic model for market makers • May hurt market makers who generate many quotes and few trades • What pricing model is adequate and who determines it? • More than one exchange objected to this idea
Separate OPRA Stream into Two Lines Based on Activity	Divide the current stream of OPRA data into two lines: the first, OPRA A, carrying the most active options, and the second, OPRA B, carrying less active options. Potential benefits to OPRA A-only line recipients or for triage purposes • OPRA A w/ Top 600 Options • OPRA A w/ Top 1200 Options	Impact felt only by those customers receiving abridged feed ~25% ~14%	• Standardizes information sorting currently done by vendors • Improves ability for end users and vendors to receive and process most important options data • Allows market makers and exchanges to prioritize most important data during triage situations • Allows for more intensive mitigation on OPRA B data	• Does not mitigate any traffic to those users who require all data • May hurt business in options on OPRA B

All Mitigation Impacts Represent Industry-wide Implementation

Source: SRIC analysis

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SRIC Used the Following Definitions for Commonly Used Options Terms

Class:	Options contracts of the same type (call or put) and style (American or European) that cover the same underlying equity
Contract:	The indivisible unit of trading which specifies the amount of the underlying covered in that unit. Typically options contracts are for 100 shares of underlying stocks
Open Interest:	Number of contracts written or held with open interest (OI)
Series:	Options of the same class that also have the same exercise price and maturity month. For instance, all XYZ October 80 calls are a series, as are all ABC July 100 puts
Symbol:	Underlying index or equity symbol including variations: - Wraps (when number of strike price intervals > 26) - Long-term Equity Anticipation Securities (LEAPs) - Splits (underlying stock splits result in new symbols)
Trade:	An agreement made in a securities market that calls for the exchange of some number of lots of one security. Hence a trade of 25 stock option contracts is an agreement to exchange 25 option contacts, each of which typically is an option on 100 shares of the underlying stock at a certain price
Type:	The classification of an option contract as a put or call
Underlying:	The security subject to being purchased or sold upon exercise of the option

Monthly OPRA Reports (1/97-11/99):
- Daily total and peak message traffic data on an exchange and systemwide basis
- Historical peak message rates
- Capacity and system upgrades and queuing events

OCC Open Interest File (8/30/99, 10/5/99):
- Option Type, Symbol, Open Interest, Exchange Listing

OCC/CBOE Symbol Guides (9/30/99):
- Underlying and option symbols

1999 OPRA Daily Message Files:
- Full OPRA data files with all messages on a particular day
- Typical messages include quote, trade, admin messages
- Data for 8/27, 8/30, 9/2, 9/3, 10/5, 10/13-10/14

CBOE Daily Summary Data Files
- Summary of quotes, trades and contracts traded by options symbol by exchange
- Data for various days from 9/97 to 11/99

Sources: *CBOE Options Glossary, Dictionary of Financial Terms*, SRIC

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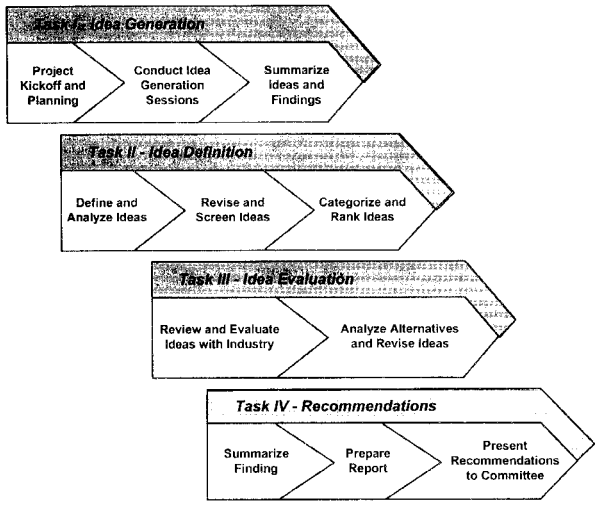
The Project Approach Included Four Primary Tasks



Key Outputs

List of Potential Options Traffic Mitigation Strategies

Definition and Ranking of Potential Strategies

Analysis of Select Mitigation Strategies

Identification of Feasible and Acceptable Mitigation Strategies for Implementation

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All Five Options Industry Segments Have Participated In This Study Through Interviews, Meetings, and Surveys

Interview Subjects

Options Market Makers & Specialists	*Options Exchanges*	*Industry Utilities & Groups*	*Market Data Vendors*	*Options Data End-Users*
Cambridge Options	AMEX	COOP	ADP	ABN*AMRO
Casey Securities	CBOE	FIF	Bridge	A.G. Edwards
CIBC Oppenheimer	ISE	OCC	Bloomberg	Ameritrade
Hull Trading	PCX	OPRA	Data Broadcasting	Charles Schwab
LETCO	PHLX	SEC	ILX	DLJ Pershing
LIT Clearing		SIAC	PC Quote	Merrill Lynch
NTJ Securities		SIA Options Committee	Reuters	Mesirow Financial
Portia Partners			S&P Comstock	Morgan Stanley D.W.
Spear, Leeds, Kellogg			Star Data	PaineWebber, Inc.
Stafford Trading				Raymond James
Timber Hill				Salomon Smith Barney
				S.G. Cowen
11	**5**	**7**	**9**	**12**

Interview Summary
Number of Firms: 44
Number of People: 85

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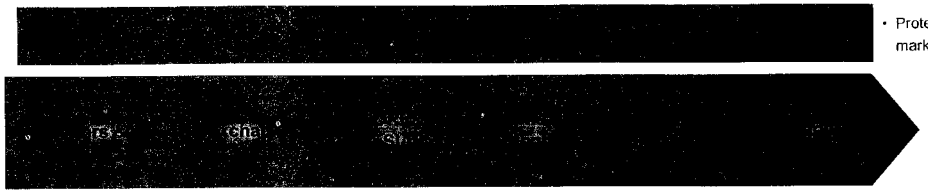
The Effect of Increased Options Quoting Rates Will Be Different for Each Market Segment



- Protect integrity of markets

Business Motivation	• Protect principal investment against loss • Make a 2-sided market • Advertise prices	• Attract order flow • Generate revenues • Satisfy members	• Provide services to the exchanges and the industry • Transmit data promptly and accurately • Allocate revenues	• Supply widest range of value added data products for profit •	• Make order routing decisions • Attract new customers • Satisfy customers	• Make trades using reliable and current quote data • Price portfolio • Monitor competition
Effects of Growing Quote Stream	• Liability from delayed quotes	• Cost and difficulty of managing floor systems • Active product data may be delayed by inactive product data	• Constant capacity and bandwidth upgrades	• Enhanced infrastructure to receive, process and transmit data • No new revenue with upgrade cost • Selective dissemination of data to customers who cannot afford entire quote stream	• Enhanced infrastructure to receive, process and transmit data • Selective dissemination • Order routing system difficulties • Subject to vendor dissemination decisions	• Quote flickering obscures ability to read data • Increased likelihood of trading on stale quotes • Costly systems upgrades to receive data (based on end-user location and type) • Subject to vendor dissemination decisions • Difficulty distributing full service data to Broker branch offices

** End users include retail and professional/institutional traders*

Source: Industry Interviews, SRIC analysis

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Mr. TOWNS. Is there a commercially available system that can handle the options volume anticipated under decimal trading?

Ms. D'AGOSTINO. Keith?

Mr. RHODES. The standard systems that are being used, yes, it's not a matter of a system has to be invented to handle this. It's a matter of taking existing systems, and in the discussions that we've had, it's a matter of adding additional processors and additional computer systems in place and additional capacity in terms of communications, new switches and things like that. Nothing has to be invented to make this increased capacity. It's a matter of something has to be bought, has to be put i place, and it has to be tested. So there's no—it's not that you can go to an off-the-shelf system that says, here's a computer that will handle 32,000 options of 32,000 messages per second for options traffic at its ultimate peak, it's a matter of going in and taking several computers or several processors and putting them together and getting multiples of faster switched in place. So there's nothing that has to be invented to solve this problem, it's a matter of taking existing technology and putting it in place.

Mr. TOWNS. So we have to be careful about these timetables?

Mr. RHODES. Yes, we do.

Mr. TOWNS. As you know, the SEC recently approved the application of the International Stock Exchange to operate as the first electronic options exchange. Does the SRI study include its volume projections? Would its operation further raise capacity concerns or not?

Mr. RHODES. I don't believe that the SRI numbers that we include in our testimony include the ISC projections. But the numbers that OPRA has been working with that are very similar to the same level that SRI is projecting do include the impact of the ISC with an additional buffer that they always try to build in to have some excess capacity. But from what we could see, the numbers were very comparable.

Mr. TOWNS. Do you want to add something to that? No.

All right. Let me thank you very much, Mr. Chairman. I think that it's important that we continue this dialog because I have some reservations, I must admit, you know, in fact, I guess a better term, I'm a little nervous about it because there's still a lot of uncertainties. And I think that we need to be able to come up with some answers to some of these questions. And on that note I yield back.

Mr. OXLEY. The gentleman yields back. Let me inform the ranking member that this is a first of probably a series of hearings that we'll have on this important issue. We wanted to set the stage with the GAO report and we appreciate their testimony and the information that they're giving the committee. This is of utmost importance for the markets and we want to make certain that everything works smoothly. And this is, again, the first step in that effort.

Mr. TOWNS. That calms me a little. That calms me down a little bit. Thank you, Mr. Chairman.

Mr. OXLEY. And the gentle lady from Mexico.

Ms. WILSON. Thank you, Mr. Chairman. I'm glad that the ranking member is feeling comfortable.

Mr. OXLEY. He's chilling.

Ms. WILSON. Mr. Chairman, I really just had a number of kind of initial questions, and I have met with some of the folks who are running the markets and I'm very glad to see this change to decimals. I don't 6/18ths or 6/56ths and those kinds of things and I was interested to see your projected increases in volume.

I understand that there's also some research going on, and I don't know if you're familiar with it, but it's really kind of chaos theory research that has less to do with volume than it does with change of behavior. And I see Mr. Rhodes nodding his head, and I wonder if you could talk a little bit about what some of that modeling is telling us about how behavior might change in the stock market—and it's less relevant or probably less significant when they go to dimes or nickels, but there's some interesting questions about when they go to pennies. And I wonder if you could share what you know?

Mr. RHODES. If you're referring to the work out of the Santa Fe Institute? Right. The idea is that you would take the spread and you establish what are called "strange attractors" inside the structure of message traffic and show that there are two directions that the volume can go. One is that you have tremendous peaks, and then there are also views that the market volume will actually rise higher or the volume—the domestic traffic volume will rise higher than even the SRI projections. So the concern there is that if you follow not just historical data and not just estimates on the load, but you look at how people operate and decisions that people make and the kinds of decisions that they collect to, then you get this—you get these series of spikes and it's not that overall you have 32,000 messages per second, it's that at any given point in time you can have hundreds of thousands of messages at a peak and 32,000 becomes sort of a gradual curve.

And, in a way, that follows some of the discussion that we heard with the broker dealers because there were discussions about, well, you know, nobody will trade at a nickel. You know, everything will stay at a nickel and no one will go lower. And then there were other traders who said, a nickel won't last till lunchtime. So from the Santa Fe perspective, they're figuring out how honest and true and reliable a nickel would be versus a penny. And some of their theories are that it will go to pennies immediately. And, therefore, the volume would rise tremendously immediately.

Ms. WILSON. Is it a question of just volume or does behavior change too? I mean, for example, how does that affect—I don't know if I've got the right question or not——

Mr. GOEBEL. One of the things that the SRI study did when it was estimating what the impact of nickels was, they could draw on historical data because we've had experience in the U.S. markets with the move from 8ths to 16ths, but the move from there down to pennies was basically unprecedented for our markets and literally for markets around the world even in other exchanges. Overseas they trade usually in higher increments than pennies. So what they did to try to estimate how behavior—trading behavior would change was they went to all of the range of various market participants—dealers, upstairs traders, mutual fund, trading desk managers, that kind of thing—to try to find out what those people would do in a penny environment.

And in general the expectation is that whereas in the current environment where someone may offer, say, 5,000 shares to trade at a nickel, now if there's more price points, they might offer a thousand at a penny, 2,000 at three cents, so the volume that previously traded at one price might be spread over a number of price points. And that's what creates this additional quotation volume and additional trading. And that experience is borne out on the markets, for instance, Toronto.

Ms. WILSON. Have they asked questions in these same kind of studies and groups in the different players about whether behavior is likely to change at a point of crisis or at a point of rapid change in the stock market, or is that just really a volume question?

Mr. GOEBEL. Yeah, I don't believe the SRI study took into account analysis sort of market events occurring. And I think they—as a matter of fact, they even qualified that their day may not necessarily speak to what could occur in situations like that.

Ms. WILSON. Okay. Thank you very much. Thank you, Mr. Chairman.

Mr. OXLEY. That time is expired. We turn to the gentle lady from California, Ms. Capps.

Ms. CAPPS. Thank you, Mr. Chairman. I'm very pleased that you called this hearing today, because obviously this is a very important issue. And I appreciate the testimony that you have given, Ms. D'Agostino, and for your colleagues being here, as well updating us on the markets' conversion to decimals. Ensuring that our stock markets are able to handle a decimal conversion efficiently and smoothly is of great concern to all Americans, whether or not they realize it. Once done, of course, the goal is going to be terrific, saving consumers billions of dollars, increasing liquidity in the markets, encouraging investments. This is all to the good.

I'm still—I share Mr. Towns' nervousness, I guess. I'm still concerned about the problems that you've pointed out and I appreciate that you've addressed with the previous questioner the studies themselves and the kind of confidence that GAO has in the estimates that have been given, really, by the industry itself.

If I could bring up one other issue for your comment—the average daily trading volume on Nasdaq has increased 61 percent over the last year and that due to that Nasdaq is experiencing processing strains. How does this strain manifest itself? Is this something that is generally appreciated and perceived by the trading public?

Mr. GOEBEL. Yeah, we didn't do a lot of research on exactly how those things were playing out for Nasdaq. From what we understand some of their internal systems may be experiencing queuing beyond those of the other systems, but they provided us with some information indicating what plans they intend to take to address the individual systems that as a group make up their entire sort of trading infrastructure. And in some cases it includes adding additional message switches and things like that to take those bottlenecks out of the various components.

Ms. CAPPS. So they already have a system in place? For as the smaller parts of this come to their attention that they can pull into place?

Mr. GOEBEL. From their response, they're attempting to increase capacities and processing capabilities in all the various parts, but as a whole, they still face a challenge in meeting some of the estimates that we discuss in our testimony——

Ms. CAPPS. I see.

Mr. GOEBEL. [continuing] because trading volumes have been so high lately that they'll just continue to go up further.

Ms. CAPPS. Does an investor perceive this, or what's their reaction, then—the public?

Mr. GOEBEL. It's probably not something that investors are individually aware of unless they experience just slowness in getting an order executed.

Ms. CAPPS. I see.

Mr. GOEBEL. So it's sort of that behind-the-scenes effect.

Ms. CAPPS. Okay. So it's being handled, at least to a degree that you feel somewhat comfortable with. Of course, this is the current status, not what we're anticipating?

Mr. GOEBEL. Yes, I mean, I guess as Davi pointed out, we know they're taking steps, but there still remains a gap in meeting the kinds of projections that are expected to arise in the next couple of years.

Ms. CAPPS. And then one sort of related issue which is troubling to me is the fact that Nasdaq will not be participating in the first two industry-wide tests, which are scheduled I believe for April and May, and that they haven't factored into their planning the increased estimates from SRI. Are you concerned about this and is one test run in June going to be enough for this huge issue with Nasdaq in your opinion?

Ms. D'AGOSTINO. That's a very good question. We haven't even thought about whether or not one test would be adequate. But we can say that actually the June test date was added for the Nasdaq because it wouldn't be able to make the two that were originally scheduled. And actually over the period of doing this work we were initially very highly concerned about the risk posed to the options, and now in recent weeks with what we've learned about Nasdaq's capacity and their plans, we're more concerned about the Nasdaq——

Ms. CAPPS. Well, what happened——

Ms. D'AGOSTINO. [continuing] for the longer hall without taking some serious due diligence and action to enhance their capacity.

Ms. CAPPS. Yes, well, have you developed scenarios for a response, say, should the test not be what you want to see in June? I mean, the results could be all over the map, right?

Ms. D'AGOSTINO. They could be.

Mr. GOEBEL. It might be worth pointing out that the tests that the industry has designed, the three tests that Nasdaq will participate in the June one are essentially designed to test the processing changes, can they actually accurately trade in decimals, and they don't include a capacity element. So it's very expected that the processing changes that the exchanges and Nasdaq have made will likely work out. They're going to run scripted trades and things to make sure that the messages that are appropriate to send come back and forth.

The testing of capacity will more or less come out of the pilot that they run during the second phase of implementation where they're going to take a selection of hopefully representative securities—stocks and options—and see how they actually trade, what kind of volumes are experienced in those securities during that pilot, and that will really give them some indication of the actual impact of decimals on capacities of systems.

Ms. CAPPS. I guess I would say, I hope we can stay in touch with you on this issue.

Mr. OXLEY. They're our lifeline, we'll keep communication open.

Ms. CAPPS. Thank you very much.

Mr. OXLEY. The gentle lady's time is expired.

The gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman. Mr. Chairman, I would like to yield back my time and listen to the next question if someone else has one before I ask.

Mr. OXLEY. Okay. I owe you one.

Mr. SHIMKUS. You owe me more than one.

Mr. OXLEY. The gentleman from New York, Mr. Engel.

Mr. ENGEL. Thank you, Mr. Chairman. I too have a lot of trepidation about this. In fact, when the committee was first looking at this, I was cautioning and saying, why do we not let the market regulate itself. And then I said I thought I sounded too much like a republican.

Mr. OXLEY. Fat chance.

Mr. ENGEL. Don't worry, Mr. Chairman, you were at the stock exchange that is week, but I was there a few hours after you, so I got the full report.

We know that the timeframe is troubling. I wish you would just talk about that a little bit. The questions here have been—people have asked about the increase in trade and quotation traffic, there's a fear that the computer capability won't be able to cope with it. I thought we were rushing into this, can you just talk a little bit about what you've seen and your impressions of the computer capability and the timeframe and some of the fears that you mention in this report? Wouldn't we be better off to just kind of slow this down a little bit?

Ms. D'AGOSTINO. Well, I think that industry is putting together a plan that is very well thought out and involves phasing in to allow for time to the members who aren't ready to catch up. But it will require them to due diligence and upgrade the systems that need upgrading to meet the scheduled date. It's not clear that adding more months to the schedule is necessarily going to solve the capacity issue. What will solve the capacity issue is investing in capacity upgrades.

Mr. ENGEL. Well, for instance, the question Ms. Capps asked about Nasdaq, you answered Nasdaq couldn't make the first two, so——

Ms. D'AGOSTINO. Right.

Mr. ENGEL. [continuing] really only having one, and you were unsure about whether or not that would be adequate. If we had more time and perhaps there could be more than one, wouldn't that just be better.

Ms. D'AGOSTINO. Yes, they certainly could schedule additional tests including capacity tests which was an idea that we sort of shared amongst ourselves, but didn't fully develop to be honest with you. Even during the phase-in period to March 2001. There are a lot of things that can be done concurrently during this schedule and since the participants seem to have differing states of readiness in terms of capacity, I mean, that's really incumbent on them to bring themselves up to speed for the schedule.

Mr. ENGEL. Let me ask you this, a public/private partnership was created between the Securities Industry Association and the Securities and Exchange Commission to help implement the conversion to decimals. Can you comment on how that partnership has been functioning as we're moving toward implementation?

Ms. D'AGOSTINO. SEC has been monitoring and even maybe participating in a lot of the SIA—well, actually all of the SIA committee meetings. They've been helpful, like, for example, in the SRI study. They provided assistance in that regard. They've really been staying on top of this and I think working closely with all of the players to try to make sure the solutions that they come to are collaborative as opposed to directive from the SEC to the industry.

Mr. GOEBEL. It's probably worth pointing out that the SRI gained a lot of experience from spearheading the year 2000 efforts for the industry because it was one of the things that definitely affected every participant in the securities markets and they established a committee structure and timeframes and testing schedules that obviously worked very well for Y2K. They've in essence transferred that sort of thinking and infrastructure to the decimals issue and it seems to have helped it move along as fast as it has. And SEC has been working and interacting with all these players throughout. So, it appears to be successful.

Mr. ENGEL. If you see the testimony and some of the trepidation that some of us had in previous committee hearings it was the Y2K problem was foremost in our minds in terms of worrying about that, and on top of that worrying about decimalization. Obviously we still have a long way to go.

I want to also thank the Chairman for these hearings and I look forward to continuing to ask these questions because, you know, again, we do have concerns. Obviously I represent New York and it's a very important industry to our City, and to our State and the country, and I just worry that we may be rushing too quickly into this.

Mr. TOWNS. Would the gentleman yield?

Mr. ENGEL. Yes, I would certainly yield.

Mr. TOWNS. I would like to associate myself with that part of your question.

Mr. OXLEY. I would say to my good friends from New York, I think it's probably in the water up there that you're nervous about anything anyway. And we'll deal with that as time goes by.

The gentleman from Maryland.

Mr. EHRLICH. I apologize for the lateness—my lateness. I am particularly interested in cost conversion compared to investor savings, projections, numbers, I'm sure you all have talked about this, but for my edification, with apologies to room, could I hear a quick synopsis with respect to that issue?

Ms. D'AGOSTINO. Are you asking—I just want to clarify, are you asking what this effort is going to cost the industry——

Mr. EHRLICH. Yes.

Ms. D'AGOSTINO. [continuing] versus what the expected savings to investors?

Mr. EHRLICH. Yes, ma'am.

Ms. D'AGOSTINO. Okay. Basically the only cost estimates we've seen is a final draft study by the Tower Group that was done for the SIA, and they estimate that decimals will cost the industry $907 million—I'm sorry, yes, million dollars. And it's a one-time cost.

Mr. EHRLICH. Right.

Ms. D'AGOSTINO. Some of the studies that we've seen, and they have a range of estimates going from $300 million up to $2 plus billion and there are a lot of, you know, questions about some of those estimates. But in any case, these are annual savings expected to accrue to investors from moving to decimals.

So it's a one-time sunk cost of $907 million against annual savings of anywhere from $300 million to $2 plus billion.

Mr. EHRLICH. On the savings side, what accounts for the wild disparities in the numbers?

Ms. D'AGOSTINO. They include and exclude various factors. For example, some of the studies might not be accounting for the fact that a lot of trades aren't made on spreads and various other things. But that's basically——

Mr. EHRLICH. Thank you. I yield back, Mr. Chairman.

Mr. OXLEY. The gentleman yields back.

The gentleman from Minnesota, Mr. Luther.

Mr. LUTHER. Thank you, Mr. Chairman. Just one quick question. One of the areas where there's been some concern on behalf of consumers is this whole area of principal trades where underwriters are making markets themselves and the profits that are involved in that. How will this impact? What impact will this have in that area of principal trades?

Mr. GOEBEL. In our previous testimony last year, we did speak with all the folks we tried to talk to about the impact on dealers and we also tried to look at what impact it had had on dealers and principal traders in the other markets. And I think what came out of that was that it was a mixed effect. As spreads decline, they may actually make less in trading profits, but there are generally more trades that occur and the data that was available at that time showed that it was a neutral impact on trading profits. For example, in Toronto, there was no change in the profits of the dealers. Some of the other work we did found that some market makers withdrew from making markets and securities for economic reasons, but Nasdaq reported to us after the moving sixteenths that reduced spread similarly, additional market makers entered the market and they saw no net effect as a result. So it seems to be a mixed unclear impact.

Mr. LUTHER. Yield back.

Mr. OXLEY. The gentleman yields back. The Chair is now pleased to recognize one of the leaders in this effort and another nervous New Yorker, a gentleman from Staten Island.

Mr. FOSSELLA. I'm calm, Mr. Chairman.

Thank you, Mr. Chairman, I'll be very brief. I know there's been a lot of attention on the options market and there seems to be a sort of geometric problem associated with the increase in the number, at least in capacity, but what about the equities markets, No. 1; to what degree is there a problem there? And second, there seems to be a level of concern with the current conversion to decimal trading, at least as the time tables allow the number of—do you have any other suggestions or solutions to address that concern that you've raised, and others here have raised?

Ms. D'AGOSTINO. I guess, let me start with the first part of your question. And how are the equities markets bearing or how do they look right now at this snapshot? Right now the New York Stock Exchange, for example, appears to be less of a risk toward successfully handling decimals trading by 2001 based on the SRI projections. But the Nasdaq, on the other hand, does not pose such a low risk. The updated estimates from the SRI projections have caused additional concern on the part of the Nasdaq based on our discussions just 2 days ago. So that's where we think we see some risk on being able to handle the capacity demands posed by this move.

But, again, I think we also said earlier that they're having trouble processing their current demands without decimal trading. So, there are things that the Nasdaq are going to have to do to ready itself for decimals and also prepare itself for the increased volumes they're likely to experience in the coming months without decimals.

Mr. FOSSELLA. Thanks. But, if I may, there is a timetable set for the conversion to decimals. There seems to be a risk associated with that. I don't know to what degree you're posing there's a risk. Are there any—if you had your druthers at this point, what would you recommend with respect to the current conversion to decimals timetable?

Ms. D'AGOSTINO. We don't have any issues with the current timetable. To be honest with you, I think it was set jointly with the industry. I mean, the industry basically came up with this timetable. And to the extent that different market participants are at different states of readiness, I think that the schedule should suggest to the participants what they need to do in the coming months to ready themselves.

Mr. FOSSELLA. Is that possible? Can everybody step up to the plate in your estimate? In your opinion can everybody step up to the plate given the current timetable?

Mr. GOEBEL. The timetable that we reflect in the chart is already a different timetable than just several months ago. Originally some of the later phases were going to start as soon as October for unrestricted trading in decimals. So there's already been an adjustment and some additional time added because of the developing capacity concerns particularly on the Nasdaq which is, you know, setting record volumes almost daily.

The schedule also embodies various points where they're going to be assessing what's going on after the initial trading in nickels, the pilot for pennies will also provide data that will allow the SEC and the industry participants to formulate the plan for the next step, I think. And in January they're—the SEC order directs the markets to either jointly submit a proposal for what the MPV should be for the market, or allow the individual exchanges to set that.

But I'm sure they'll take that into account with what their capacities are at that point.

Mr. FOSSELLA. I'll conclude, Mr. Chairman, thank you.

Mr. OXLEY. The gentleman yields back.

Mr. SHIMKUS. Mr. Chairman, if I may?

Mr. OXLEY. The gentleman from Illinois.

Mr. SHIMKUS. Just briefly. I'm really excited about this. I think that the players who might be lagging behind had better catch up or they'll lose their business base. I am excited about these projections of increase, I'm excited about the smaller margin for the traders, and more involvement by the consumer. But I understand the concerns, we want the system to succeed and I can appreciate that.

The only question I have is—and I apologize too, I was in a meeting up here. Mr. Rhodes' name is not on this witness list, can you tell me who are you representing and why are you at this table?

Mr. RHODES. I'm with the General Accounting Office.

Mr. SHIMKUS. Okay. You're just——

Mr. RHODES. I'm their chief scientist.

Mr. SHIMKUS. Okay. Thank you very much. That's all I have, Mr. Chairman.

Mr. OXLEY. Thank you. And the gentleman yields back.

Let me indicate to the members that this is an historic occasion in that the markets are going to decimals. We will now join the rest of the world in decimals, in large part because of what this committee was able to do, and we stand ready to work with the GAO and with the SEC and all interested parties to make certain that this transition, just like the transition in the Y2K is seamless and reasonably painless.

I think the gentleman from Illinois pointed out some of the real benefits here of going to decimals. Obviously the markets at the end of the day will be able to handle this kind of capacity and it will be of good news for them because that's a lot of traffic and ultimately that's a lot of money. At the same time the consumer is going to benefit by the narrower spreads and by functionally illiterate people like myself who don't understand fractions to better understand the market and I think have more confidence in the marketplace as well. So at the end of the day working with the SEC, with GAO, and with everybody involved, I would say to my friends from New York, that this will be a very historic occasion and one I think we'll look back on with a great deal of pride in changing how these markets work.

So we look forward to working with all of you and we will, as I indicated earlier, have another hearing, at least one other hearing as we move toward that July date of converting to decimals for the first time in our history.

The Chair would ask unanimous consent that all members' opening statements be made part of the record, and so ordered. And with that, the committee stands adjourned.

[Whereupon, at 10:58 a.m., the subcommittee was adjourned.]

[Additional material submitted for the record follows:]

ONE HUNDRED SIXTH CONGRESS

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JAMES E. DERDERIAN, CHIEF OF STAFF

U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515–6115

March 2, 2000

The Honorable Michael G. Oxley
Chairman
Subcommittee on Finance and Hazardous Materials
Committee on Commerce
2125 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

Due to the conflicting Oversight and Investigations Subcommittee hearing on public access to the national practitioner data bank, I was unable to attend the Finance Subcommittee hearing on the securities industry's progress on conversion to decimal trading. I understand that you held the record open for inclusion of Members' statements. I respectfully request that, in lieu of a statement, the enclosed follow-up letters to the Nasdaq Stock Market and to the nation's options exchanges, as well as the responses thereto, be included in the hearing record.

Mike, I want to commend you for holding this hearing and for asking GAO to monitor and report on the decimal-transition challenges facing the SEC and the industry and their progress in addressing these matters. Then Finance Ranking Member Manton and I raised a number of concerns in 1997 that some proponents of decimal legislation labeled as "red herrings" and tried to block our efforts to get answers and information out of the SEC. GAO's May 1998 and March 2000 testimony vindicate our concerns. In that regard, I commend your diligence and trust that it remains tempered by patience so that this important pro-investor effort is guided by the all-important principle that we first do no harm.

Sincerely,

JOHN D. DINGELL
RANKING MEMBER

Enclosures

cc: The Honorable Edolphus Towns
The Honorable Tom Bliley
Members, Subcommittee on Finance and Hazardous Materials

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LOIS CAPPS, CALIFORNIA

JAMES E. DERDERIAN, CHIEF OF STAFF

U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515-6115

March 2, 2000

Mr. Alfred R. Berkeley III
President
The Nasdaq Stock Market, Inc.
1735 K Street, N.W.
Washington, D.C. 20006-1500

Dear Mr. Berkeley:

Yesterday the Subcommittee on Finance and Hazardous Materials held a hearing on the General Accounting Office's (GAO) assessment of the securities industry's progress toward implementing decimal trading. A copy of GAO's written statement is enclosed. The testimony's general conclusion is: "Although securities market participants have made progress in preparing for decimal trading, some key challenges remain for the industry to successfully implement decimal trading. ... The options markets and the Nasdaq Stock Market, Inc. (Nasdaq) face the greatest difficulty in preparing for the increased message traffic from decimal trading." (GAO testimony p. 1.)

With respect to Nasdaq, the GAO testimony raises serious doubts that Nasdaq will have sufficient capacity to absorb the increases in quotation message traffic expected to result from decimal trading. (GAO testimony p. 9.) According to GAO, the latest projections indicate that trading in penny minimum price variations may increase Nasdaq quotation message traffic by 700 percent between December 1998 and December 2001. Nasdaq officials informed GAO that Nasdaq is already experiencing processing strains because of unprecedented increases in trading volumes. For example, average daily share volume since the beginning of 2000 is almost 1.7 billion shares, which represents a 61 percent increase over average daily volume in 1999. GAO also notes the troubling fact that Nasdaq has not factored into its planning the latest increased message traffic projections, and further that Nasdaq officials have informed SEC that Nasdaq will not be ready until the first quarter of 2001 to accommodate Nasdaq's own lower estimates. Finally, GAO reports that Nasdaq will not be able to participate in the first two industry wide decimal trading tests scheduled for April and May 2000. A June test has been added to the schedule for Nasdaq; Nasdaq does intend to participate in that test.

Mr. Alfred R. Berkeley III
Page 2

Please provide your response to this GAO report for the record by the close of business on Friday, March 31, 2000. Please indicate whether this bleak picture is accurate, and, if so, what steps you are taking or intend to take to ameliorate it. Given the significance of your market, what impact will its absence have on the credibility of the April and May 2000 "industrywide" tests? Can the industry proceed with decimal trading on the current schedule if you are not ready? If so, what will be the effect on Nasdaq systems and on investors? How have your current "processing strains" evidenced themselves? What has been their effect on the operation of your market and investors? Have they been reported to the SEC? What steps are you taking or do you intend to take to address these problems?

Thank you for your cooperation and attention to this request.

Sincerely,

JOHN D. DINGELL
RANKING MEMBER

Enclosure

cc: The Honorable Michael Oxley
The Honorable Edolphus Towns
The Honorable Tom Bliley

ONE HUNDRED SIXTH CONGRESS

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JAMES E. DERDERIAN, CHIEF OF STAFF

U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515–6115

March 2, 2000

Mr. William J. Brodsky
Chairman and CEO
Chicago Board Options Exchange
LaSalle at Van Buren
Chicago, Illinois 60605

Mr. Salvatore F. Sodano
Chairman and CEO
American Stock Exchange
86 Trinity Place
New York, New York 10006

Mr. Philip D. DeFeo
Chairman and CEO
Pacific Exchange
301 Pine Street
San Francisco, California 94104

Mr. David Krell
President and CEO
International Securities Exchange
60 Broad Street
New York, New York 10004

Mr. Meyer S. Frucher
Chairman and CEO
Philadelphia Stock Exchange
1900 Market Street
Philadelphia, Pennsylvania 19103

Gentlemen:

Yesterday the Subcommittee on Finance and Hazardous Materials held a hearing on the General Accounting Office's (GAO) assessment of the securities industry's progress toward implementing decimal trading. A copy of GAO's written statement is enclosed. The testimony's general conclusion is: "Although securities market participants have made progress in preparing for decimal trading, some key challenges remain for the industry to successfully implement decimal trading. ... The options markets and the Nasdaq Stock Market, Inc. (Nasdaq) face the greatest difficulty in preparing for the increased message traffic from decimal trading." (GAO testimony p. 1.)

With respect to the options markets, the GAO testimony opines that the transition to decimal trading may have the "greatest impact" on message traffic volume for options. (GAO testimony p. 8.) Options Price Reporting Authority (OPRA) officials told GAO that upgrading

their systems to handle the increase in options traffic is a "major challenge" that will "require enough telephone lines to support a small city" and that traders will have difficulty interpreting and acting on the rapidly changing information.

GAO reports that OPRA intends to increase the system's processing capacity from the current 3,000 messages per second to 12,000 messages per second by December 2000. However, according to GAO, this additional capacity will not be adequate. The current message volumes are already at industry capacity limits and have not surpassed the 3,000 mps limit only because the options markets have taken a number of steps at the direction of the SEC to artificially limit reported message volume. GAO reports that you are considering a number of other steps including delisting inactive options or discontinuing price quotes for options with low trading volumes or establishing 5 cent or 10 cent price variations for options quotations as ways of limiting message traffic after decimal trading begins. I am concerned that this state of affairs poses a threat to the public interest, the maintenance of fair and orderly markets, the integrity and transparency of these markets, and the protection of investors.

Please provide your response to the GAO report for the record by the close of business on Friday, March 31, 2000. In addition to the specific points raised by GAO, your response should address the following:

1. Last year the options exchanges began multiple listing and trading of options previously listed and traded on a single exchange. What was the impetus for this transition and what effect has it had on your operations, the quality of your markets, the processing capacity of your systems and the OPRA system, and on investors? Please be specific about any problems and your recommendations for addressing them. How have recent increases in multiple trading affected systems capacity and your efforts to prepare for decimal trading?

2. Last week the SEC approved the International Securities Exchange's (ISE) application to become a registered exchange. The ISE, which will be the first all-electronic U.S. options exchange, is due to begin operations on May 26 and must become a member of OPRA. What impact will ISE have on OPRA system capacity both before and after the transition to decimals? What steps are being taken to address this?

3. To what extent will the options markets be participating in the industrywide tests planned for April and May 2000?

4. In October 1999, the SEC issued an order directing options exchanges to submit an inter-market linkage plan. What progress have you made in developing that plan? To what extent will your plan minimize market fragmentation and

maximize the kind of competition that will provide investors with the best available order execution and price? What impact, if any, will this have on the transition to decimals and the benefits expected to flow therefrom?

Thank you for your cooperation and attention to this request.

Sincerely,

JOHN D. DINGELL
RANKING MEMBER

Enclosure

cc: The Honorable Michael Oxley
The Honorable Edolphus Towns
The Honorable Tom Bliley

Alfred R. Berkeley III
President

The Nasdaq Stock Market, Inc.
1735 K Street, NW
Washington, DC 20006-1500
202 728 8282
Fax 202 728 8075

March 31, 2000

Honorable John D. Dingell
Ranking Member
House Commerce Committee
Room 2125 Rayburn House Office Building
Washington, D.C. 20515-6115

Dear Congressmen Dingell:

This letter responds to your March 2 letter on implementation of decimal pricing in the securities markets. Your letter was based on the GAO's assessment of decimal readiness, and asked for our response to a number of questions regarding decimal implementation.

Below, I have addressed your specific questions on converting to decimals, including NASD steps, ECN readiness, capacity, rule changes, and converting the listed markets by July. I thought it would be useful first to reiterate the NASD's position on decimals and the July timeframe and to provide you with an overview of Nasdaq technologies and capabilities.

NASD Supports Decimalization – As you are aware, the NASD appreciated and supported the Commerce Committee's decimalization efforts – even before other markets did – beginning with our testimony before the Subcommittee on Finance and Hazardous Materials on April 16, 1997. Our position on converting our markets to decimals has not changed. On August 7, 1997, the NASD Board voted to begin operating Nasdaq systems using decimals. In a May 7, 1998 letter to Congressmen Tom Bliley, Michael Oxley, and Edward Markey we underscored our commitment to decimal pricing, but cautioned that the implementation date should be set for September 2000 to allow time to deal with the Year 2000 problem.

We remain a strong proponent of the shift to decimals because they will make the markets even more accessible to investors and can potentially reduce transaction costs. In fact, Nasdaq is the first and only US market whose systems support trading of decimals today. While we do not yet provide decimal quotation services, Nasdaq's trade reporting

systems fully support decimals and allow participants to trade and report trades in decimals now.

We are concerned that because of the challenges that we have recently acknowledged in moving to decimals by the July 3 readiness date specified by the SEC, we have contributed to the erroneous view that the Nasdaq Stock Market is other than a leader in stock market technology. We are also concerned about the inaccurate suggestions by some parties in recent days that Nasdaq has diverted resources from technology capacity enhancements and decimalization implementation to support our international initiatives or marketing. To correct that view, I would like to make several points about the NASD's technology and its dedicated decimalization resources.

Technology Overview

The NASD is strongly committed to developing technology systems that provide state-of-the-art markets and regulation. We have to do this as a matter of public policy, and we have to do this to stay competitive. One third of NASD staff – and over half of its budget – are dedicated to technology. The scale of the NASD's commitment is demonstrated by the 57 mainframe computers it operates, the 50 terabytes of disk storage space it utilizes, the 18 million lines of code it manages, and the more than $300 million that will be spent this year on Nasdaq technology expenses.

Nasdaq Facilities – Nasdaq's trading operations run in our state-of-the-art Nasdaq Technology Center in Trumbull, Connecticut. The Center includes about 600 staff, who run the Nasdaq Stock Market and constantly upgrade it with the fastest hardware and the newest software available. Since the core operations of the Nasdaq system are unique, Trumbull staff must write and implement much of the software to ensure Nasdaq's reliable operation. The facility in Trumbull includes the most advanced infrastructure available in computer operations today, including connection to two separate electrical power feeds, its own power generation, and sophisticated systems that oversee and protect against failure situations. In addition, Nasdaq is the only market in the world that we know of that not only maintains a completely separate full-capacity backup operations center, but that actually operates the market out of this center on a periodic basis.

Nasdaq Network – Nasdaq's Enterprise Wide Network 2 (EWN2) network is one of the largest private trading networks in the world. EWN2 is expandable to support a capacity of over eight billion shares per day, and will be configured for a four billion share per day capacity by the year 2001. EWN2's design contains multiple protections against network failure. The network provides each access point with dual T1 circuits, further enhancing reliability and providing significant expansion.

Nasdaq Execution Systems – Nasdaq's SelectNet, SOES, ACT and other execution and post-trade related activities operate on a parallel architecture on Tandem computers. Tandem technology is highly reliable and highly scalable. Systems capacity

is a function of the number of work paths that can be created in parallel – by adding a module or machine one can continue to scale up to capacities many times larger than our current capabilities. In addition, all capacity issues related to the performance of our SelectNet execution reports from last year have been corrected. Current SelectNet confirmation delay is less than 2 seconds at most.

Nasdaq Quotation System – The current quotation system is, within the limits of a single computer, highly scalable and highly reliable. It operates in an entirely separate environment from the Tandem system, on Unisys computers. It has, since its inception in 1972, dependably absorbed 19,701% capacity growth, 77% of that growth in the past 5 months alone. While limited to a single machine, the system uses only about 62% of its processing capacity, and will shortly transact over 700 quotations per second, about twice what our current average peak demand is at the market's opening.

We believe that this legacy system will continue to meet our growing needs for the next twelve months. However, because of the need to implement new features such as decimal trading and to sustain continued previously projected growth, we have planned to retire this application through the implementation of the Integrated Quote Management System (IQMS) and the follow-on multi-parallel architecture project.

In summary, Nasdaq's current systems are highly reliable, state-of-the-art systems that are not only capable of handling today's trading demands, but will continue to expand to support future capacity needs. Over the past several months, during unprecedented trading volume growth, Nasdaq's systems absorbed almost twice the projected capacities while virtually eliminating all systems delays.

Capacity

Nasdaq has acted quickly and aggressively to respond to the explosive growth it has experienced.

Unprecedented Growth – The longest bull market in U.S. history and the enthusiastic adoption of on-line trading by individual investors have resulted in unprecedented increases in share volume and system message traffic. Nasdaq average volume in shares per day has risen from 790 million in 1998 to 1.75 billion in the first two months of this year, and accelerated to over 2.2 billion in the beginning of March. This growth produces disproportionate demand on our market systems; during the same period, quote message traffic has nearly *tripled*, and SelectNet average transaction volume has *quintupled*. While other major markets have also experienced growth during this time, none have experienced it at the rate Nasdaq has been absorbing.

Our planning was predicated on the peaks and valleys of volume that we had historically experienced in our markets. As can be seen from the chart in Enclosure 1, the experience since the end of the fourth quarter of 1998, when Nasdaq trade volume was roughly the same as the New York Stock Exchange (NYSE), has diverged from historical

patterns. Nasdaq trade volume have far outpaced NYSE trade volume since that time. and show three peaks of a quarter to half a million trades per day in the first three quarters of 1999, before falling back to lower levels. The chart also shows that demand in the last quarter of 1999 and the beginning of 2000, rather than reaching a peak and sinking back, increased by *three* times the size of the previous peaks, and has not peaked yet. This recent sharp break from previous patterns has made planning for capacity unusually difficult.

Dedicated Decimalization Resources

We are aware of allegations that decimalization has not received our full attention because resources have been diverted to other Nasdaq initiatives. NASD's other initiatives have not drawn resources from the decimalization effort or slowed its implementation. In fact, the overall decimalization program for the NASD would be ready as planned were it not for the dramatic rise in recent volumes.

It was our February 26 test of our decimalization system that showed our capacity constraints. The decimalization software worked, but consumed 95% of our computer capacity. This did not leave the additional capacity needed for safe handling of volume surges. We are now rearchitecting our system to handle surges in volume.

Nasdaq's resources for decimalization, and more specifically for the IQMS and legacy environments, are dedicated resources. The only conflicting influence is that of testing and implementing new capacity upgrades.

All of the NASD's international development efforts have been out-sourced to separate and distinct teams, with only two individuals coming from existing NASD staff – neither of whom were involved in any related Nasdaq market systems. All systems development for the international markets is being performed by a joint venture company and has no impact on domestic Nasdaq development or resources. All NASD and NASD Regulation activities have been out sourced to EDS – which relieves the Nasdaq team of any billing or administrative technology burdens. Amex systems development is managed by a fully independent team and is now out sourced to SIAC. Multi-Parallel Architecture and SuperMontage development is also a fully independent team dedicated to our Tandem-based execution systems. Finally, the legacy system is also managed by a fully independent dedicated team that supports the quotation system.

Responses to Your Questions

Your letter requested responses to four question areas, including the GAO report and steps to address it, industry wide tests, industry wide impact, and capacity. Those questions and responses are given below.

Question – GAO Report and Steps to Address It

Question: Please indicate whether this bleak picture [in the GAO report] is accurate, and, if so, what steps you are taking or intend to take to ameliorate it.

Answer: The GAO report accurately reported our responses to their questions, which we sent to GAO on February 25, 2000. We are taking a number of steps to respond to those challenges.

Nasdaq is implementing decimal trading through a new quotation management system called the Integrated Quotation Management System (IQMS). IQMS is part of an overall transition that will take Nasdaq systems to a parallel architecture. It was designed in two phases. The first, originally scheduled for mid 2000, would put all quotation applications (National Market, listed, OTC Bulletin Board) on one computer. The second, originally scheduled for 2001, would split quotation services onto multiple computers for parallel processing. This splitting was designed to allow significantly larger capacities through continued division into multiple separate machines. In 1999, the NASD planned the first phase to handle 2 billion shares per day peak volume. Given the unprecedented growth described above, the *current* volume alone now requires 2.5 to 3 billion shares per day capacity.

IQMS is a currently operating system and is decimal ready. In June 1999 the OTC Bulletin Board employed it, and it is reliably operating at a level approaching a billion shares per day. Given this experience, final code is being written to use IQMS for the Nasdaq National Market system. The July 1999 projections of first quarter volume for 2000 confirmed the two-phase (one machine/parallel machines) plan was feasible. A number of tests were run over the past six months, with performance improvements in each test. The third formal stress test was held on February 26 of this year. It showed that IQMS performance on a single machine could not match the explosive market growth since the fourth quarter 1999 with sufficient capacity to handle load spikes reliably. Simply stated, Nasdaq volume increased beyond our plans. As soon as the analysis of this test was completed, the NASD notified Congress and the SEC of its problems with meeting the July 3 target for decimalization.

The NASD has responded to this challenge in a number of ways. The first step it has taken is to accelerate the second phase of IQMS to split it into parallel systems and to complete it in the first quarter 2001. Nasdaq's new multi-parallel architecture is highly reliable and dramatically scalable. It will eliminate all single-stream bottlenecks to provide many times the current capacity using current technology.

While Nasdaq's current systems are fully capable of handling the projected volumes without decimals, we are actively working to meet the decimalization challenge through the design initiatives described below to ensure decimal readiness at the earliest feasible time.

IQMS Phasing

The first design initiative to speed up decimalization involves adding two phases to the IQMS implementation.

Phase I Decimal Implementation of Listed Equities

Nasdaq will make every effort to permit decimal trading on exchange listed securities to proceed as soon as possible. Phase I would implement listed quotes in IQMS on an accelerated basis, during the third quarter 2000, although not by the July 3 readiness date. The new schedule will no longer meet the July 3 date in that the new plan requires support for both the legacy and new systems simultaneously and requires additional software changes to permit this to occur. To support the industry's move to decimalization, this alternative accelerates the decimal quoting and trading of listed equities. Because listed trade volume on Nasdaq is a relatively small 6% of total Nasdaq trade volume, IQMS has more than adequate capacity to deliver this solution. This will prevent the IQMS capacity constraints on Nasdaq from becoming a reason to inhibit the listed market from moving to decimals, if Congress and the SEC determine that a disparate implementation schedule is desirable.

Phase II Dual Processing of Indexes and Last Sale

Phase II will accelerate the IQMS effort to process using into multiple systems. The first split-off would move index and last sale processing to a new separate machine. This will give IQMS 30% additional processing headroom for quote management. If capacity needs warrant further capability, individual groups of issues could be split onto additional separate machines.

The Legacy Quote System

To ensure Nasdaq's decimal readiness and commitment to the industry, we have now established a dedicated team to not only maintain the legacy system and improve its performance, but also to potentially provide decimal quoting through the legacy approach. Since the legacy system is limited in its ability to meet longer-term demands, this effort is only a temporary back-up solution to ensure our decimal conversion schedule against any delays in the implementation of our long-term architectural strategies.

Question – Industry Wide Tests

Question: Given the significance of your market, what impact will its absence have on the credibility of the April and May 2000 "industry wide" tests?

Answer: Our understanding from other markets and market participants regarding the April and May tests is that a majority of the projected participants have not yet registered to participate in them. In addition, the April test is now being termed a beta test, rather than a fully attended point to point test as originally planned. Given the fact that July 3 is still the officially targeted date for decimal readiness – although that is

under evaluation -- the industry continues to move collectively to that end. Should the SEC decide to move the July 3 target date to a later time, the April and May dates may have to be re-evaluated.

Question – Industry Wide Impact

Question: Can the industry proceed with decimal trading on the current schedule if you are not ready? If so, what will be the effect on Nasdaq systems and on investors?

Answer: Parts of the industry – such as the exchange listed market – could potentially proceed with decimal trading on the current schedule without Nasdaq participation. The effect on NASD members would include the expense and difficulty of having to convert their systems once for listed securities and a second time for Nasdaq securities. The effect on investors could include confusion and being denied projected savings from potentially narrowed spreads. Savings from narrowed spreads would be minimal in the initial phases of decimalization, however, when the markets would shift to nickels as the minimum pricing variation. This phase would increase the number of price points from the 16 per dollar today to 20 per dollar with nickels.

Nasdaq does not want to be an impediment to full decimalization of the exchange-listed market. From a technical standpoint, it appears possible for exchange-listed securities to be traded in decimals while Nasdaq trades in fractions, as discussed above under "IQMS Phasing." This transition will not pose the system problems that full Nasdaq implementation of decimals would entail, because the exchange listed securities are a small fraction of Nasdaq volume and exchange volume is growing much slower than Nasdaq. NASD exchange listed trade volumes in the Consolidated Quotation System are only 6% of Nasdaq 2.2 million trades per day. Moreover, the lagging growth in exchange listed volume can be seen in the chart in Enclosure 1. That chart shows the listed market average daily trade volume, although roughly equal to Nasdaq at the end of 1998, is now about only 40% of the Nasdaq volume.

At the same time, industry representatives from the SIA decimalization committees have raised concerns about the impact of trading decimals and fractions concurrently across markets. We therefore recommend that Congress seek the views of broker-dealers and other market participants as to the advisability of the early implementation of decimalization for listed securities.

We stated in our March 6 letter to the SEC requesting an extension of the decimalization target date, "[w]e do not have a high degree of confidence that all sectors of the financial markets will be able to make the transition to decimalization this summer without exposing investors to unnecessary risk." After writing that letter, our continuing discussions with other market participants have continued to raise concerns about the risks imposed on the industry by converting to decimals in July. In fact, in their press release of March 7th, the SIA states that the SIA Decimalization Steering Committee "fully supports the NASD's and Nasdaq's decision to delay the start of trading in

decimals in order to ensure the integrity of the markets." We would strongly recommend the Congress further evaluate industry readiness."

Question – Capacity

Question: How have your current "processing strains" evidenced themselves? What has been their effect on the operation of your market and investors? Have they been reported to the SEC? What steps are you taking or do you intend to take to address these problems?

Answer: The NASD aggressively manages its capacity to predict and prevent "processing strains" with a dedicated staff that monitors it on a daily basis. This team conducts stress tests and recommends system performance improvements and, working with the NASD Economic Research Department, forecasts demand. The team works with a capacity planning committee, chaired by a senior Nasdaq officer, that every two weeks identifies and sets priorities for capacity issues and schedules their remediation. Nasdaq relies not only on in-house staff, but also uses external expertise to validate our methodology and suggest ways to improve our process as well, and is currently in the process of updating an evaluation of our capacity planning.

Due to the extraordinary growth of market activity beginning in August 1999, we have experienced a number of "processing strains" that can affect the market, the major occurrences of which have been reported to the SEC, and all of which have been addressed or shortly will be. In addition, there is a process where the SEC routinely reviews our capacity capability as part of their Automation Review Policy process. The most recent such review was last Fall.

Some of the recent actions taken to respond to capacity issues include: upgrading to the fastest Unisys mainframe to give 50% more capacity, upgrading to the fastest Tandem computers to eliminate execution delays, increasing broadcast message capacity to eliminate SelectNet execution report delays, upgrading the network to EWN2 to provide the future capability to expand to six times the previous capacity, and upgrading the memory management on the Unisys mainframe to eliminate delayed quotes to the Small Order Execution System. A more complete list of capacity issues, their effect, and our solutions to them are contained in Enclosure 2, "1999 - 2000 Nasdaq Capacity Enhancements."

One of the more significant issues on this list involved the delay in delivery of SelectNet orders. In August 1999, SelectNet orders averaged 500,000 per day. This figure more than doubled to over a million in late 1999, causing some delays in the delivery of trade reports. These problems were related to a bottleneck through a single network switch. This switch has been upgraded to several parallel switches, eliminating the problem and allowing additional capacity enhancements to continue by the simple addition of more switches. Current SelectNet confirmation delay is less than 2 seconds at most. See the chart in Enclosure 3.

In addition to the issues described in Enclosure 2, we have experienced a delay in the provision of last sale information that is distributed to the Nasdaq work station during the market opening, from about 9:30 to 9:45 a.m. This delay occurs because we prioritize the processing of quote updates that absolutely must be timely if the market is to operate efficiently. The impact of this delay is minimal, because the market data vendor lines that most market participants use for last sale and index information are not delayed. We have implemented several enhancements that have reduced the delay currently to a maximum of 60 seconds for the first 10 to 15 minutes of the trading day. An additional enhancement, which will eliminate the delay altogether, is being developed and will be implemented by the end of April.

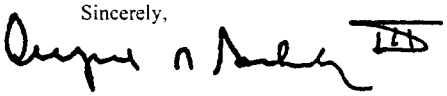
Through our active management of our capacity issues we are confident that the current Nasdaq system has sufficient capacity to handle even the current explosive market growth for the next 12 months.

Conclusion

We want to assure you that we have committed – and will continue to commit – every available resource to respond to the need for decimalization and increased capacity. Nevertheless, our concerns regarding overall industry readiness and our own need to implement additional technology changes led us to request that the SEC continue to work with the industry and the markets to determine an appropriate time frame that will not impose unnecessary risks on investors.

Thank you for soliciting our views on implementing decimals. We would be pleased to answer any additional questions you may have. We look forward to working with you and your staff on this very important issue.

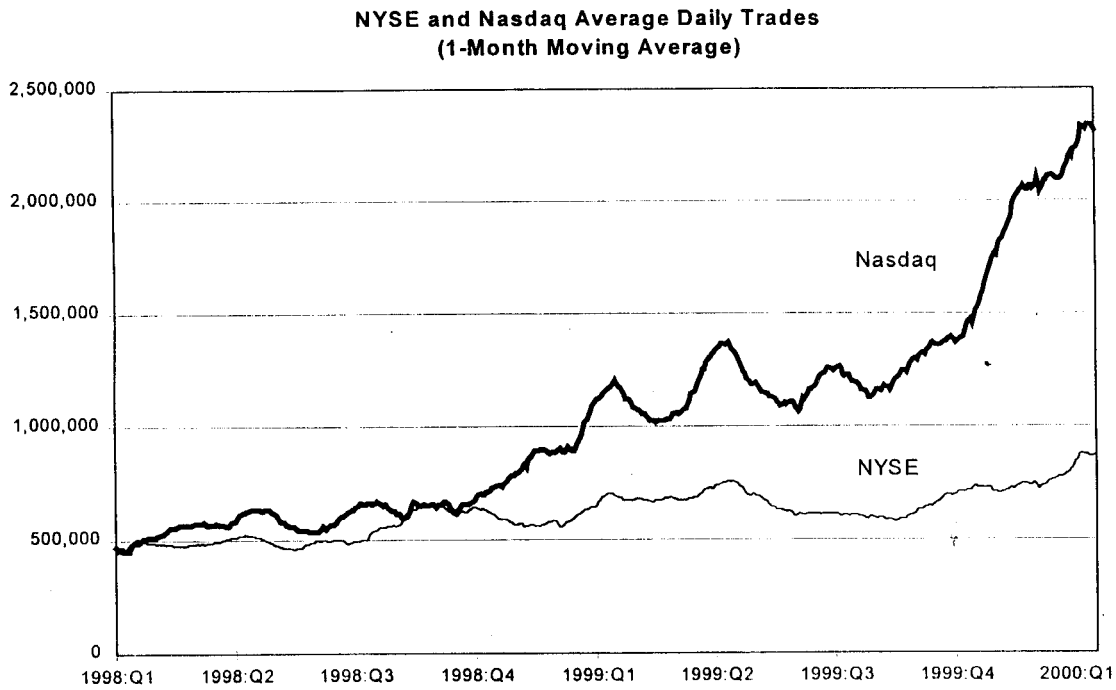
Sincerely,



Alfred R. Berkeley III

Enclosures

US Equities Average Daily Trade Volume



Enclosure 2

NASDAQ
An NASD Company

1999 - 2000 Nasdaq Capacity Enhancements

1. *Capacity Category:* *Tandem Switch*

Capacity Issue	**Delays exist in the Switch application in passing data from the Tandem to subscribers. Message Switch is saturated.**
Remediation(s)	**Remediation #1** - Optimize caching in current Switch application.
Estimated Benefit	Approximately 20% decrease in messaging across FOX.
Production/Implementation Date	**3/15/99 Complete**

2. *Capacity Category:* *Selectnet*

Capacity Issue	**Selectnet Report Trigger file is causing file contention and delays in passing data to the Message Switch.**
Remediation(s)	Segregate system processes between multiple nodes (machines).
Estimated Benefit	15 - 20% CPU increase by segregating application processes.
Production/Implementation Date	**3/29/99 Complete**

3. *Capacity Category:* *Broadcast Services*

Capacity Issue	**The broadcast rate will exceed capacity of EWN I prior to the full rollout of EWN II in June 1999.**
Remediation(s)	Optimize SECID/MMID (security and market maker) tables in order to reduce broadcast traffic.
Estimated Benefit	Approximately 15% reduction in network bandwidth usage.
Production/Implementation Date	**4/22/99 Complete**

4. *Capacity Category:* *Service Delivery Platform (SDP)*

Capacity Issue	**The single thread design of the SDP is unable to handle today's traffic levels.**
Remediation(s)	Optimize existing code in current and new server releases.
Estimated Benefit	25% improved SDP throughput over current production.
Production/Implementation Date	**4/26/99 Complete**

5. *Capacity Category:* *Tandem Switch*

Capacity Issue	**Delays exist in the Switch application in passing data from the Tandem to subscribers. Message Switch is saturated.**
Remediation(s)	**Remediation #2** - Bump TUMS parameter up from 10 to 15 (then 20) to increase TUMS (unsolicited message) throughput. First on 1 DCP pair and then all DCP's.
Estimated Benefit	Faster delivery of messages out of the Message Switch.

Production/Implementation Date **4/29/99 Complete**

6. *Capacity Category:* *Tandem FOX Gateway*

Capacity Issue	**ServerNet has degraded capacity as a result of original Tandem Fiber Optics Exchange (FOX) Gateway boards.**
Remediation(s)	**Remediation #1** - Enhanced firmware to be released by Tandem April 1
Estimated Benefit	Firmware changes and new Gateway hardware will completely remove the 50% degradation of Fiber Optics Exchange (FOX) throughput.
Production/Implementation Date	**5/10/99 Complete**

7. *Capacity Category:* *Tandem Switch*

Capacity Issue	**Super Retrieval processing runs too long.**
Remediation(s)	**Remediation #3** - Optimize Super Retrieval application code.
Estimated Benefit	Retransmission's will be expedited (same day delivery).
Production/Implementation Date	**5/28/99 Complete**

8. *Capacity Category:* *Legacy On-line*

Capacity Issue	**Last Sale processing is delayed as a result of delays in transferring last sale data from the Tandem to the Unisys systems for broadcast (currently 1 - 72Kb line).**
Remediation(s)	**Remediation #1** - Optimize Block Writes to Tape to reduce I/O.
Estimated Benefit	Approximately 50% more tape writing efficiency. Will reduce chances of entering Tape Survivability.
Production/Implementation Date	**6/11/99 Complete**

9. *Capacity Category:* *Legacy On-line*

Capacity Issue	**Last Sale processing is delayed as a result of delays in transferring last sale data from the Tandem to the Unisys systems for broadcast (currently 1 - 72Kb line).**
Remediation(s)	**Remediation #2** - Buffer the Tandem WarmSave file which passes data between systems.
Estimated Benefit	Potential 11% gain in throughput.
Production/Implementation Date	**6/25/99 Complete**

10. *Capacity Category:* *Tandem Switch*

Capacity Issue	**Delays exist in the Switch application in passing data from the Tandem to subscribers. Message Switch is saturated.**
Remediation(s)	**Remediation #4** - Bump TUMS application parameter up from 20 to 25 to increase TUMS (unsolicited message) throughput.
Estimated Benefit	More efficient message handling.
Production/Implementation Date	**6/30/99 Complete**

11. *Capacity Category:* ***Tandem FOX Gateway***

Capacity Issue	**ServerNet has degraded capacity as a result of original Tandem Fiber Optics Exchange (FOX) Gateway boards.**
Remediation(s)	**Remediation #2 -** Tandem is providing an interim upgrade to the existing Fiber Optics Exchange (FOX) Gateway board which will increase throughput by 5% until newer (2.0 version) boards arrive in August.
Estimated Benefit	Approximately 5% throughput improvement.
Production/Implementation Date	**7/15/99 Complete**

12. *Capacity Category:* ***Tandem Switch***

Capacity Issue	**Delays exist in the Switch application in passing data from the Tandem to subscribers. Message Switch is saturated.**
Remediation(s)	**Remediation #5 -** Add two additional Tandem nodes (machines) into the Message Switch configuration.
Estimated Benefit	75% increase in CPU overhead (6-month implementation schedule)
Production/Implementation Date	**9/16/99 Complete**

13. *Capacity Category:* ***Selectnet***

Capacity Issue	**Selectnet is experiencing excessive delays.**
Remediation(s)	Migrate the Selectnet applications to newer faster Tandem ServerNet platforms.
Estimated Benefit	100% CPU increase by migrating to new platform.
Production/Implementation Date	**10/12/99 Complete**

14. *Capacity Category:* ***Tandem FOX Gateway***

Capacity Issue	**ServerNet has degraded capacity as a result of older Tandem FiberOptics Exchange (FOX) Gateway boards.**
Remediation(s)	**Remediation #3** - Tandem to provide new Gateway board August 1999
Estimated Benefit	Doubles throughput in Fiber Optics Exchange (FOX) for ServerNet machines.
Production/Implementation Date	**11/1/99 Complete**

15. *Capacity Category:* ***Tandem Switch***

Capacity Issue	**Delays exist in the Switch application in passing data from the Tandem to subscribers. Message Switch is saturated.**
Remediation(s)	**Remediation #6** - Reduce Message File Read size (a gradual multi-part implementation).
Estimated Benefit	Estimated 70% increase in throughput in current Message Switch.
Production/Implementation Date	**11/1/99 Complete**

16. *Capacity Category:* ***Network***

Capacity Issue	**Selectnet delays are being experienced due to single thread TCP/IP processing within the communication processors (DCP's).**
Remediation(s)	Install re-entrant TCP/IP code which will expedite message distribution from all applications to/from firms.
Estimated Benefit	100% improvement in TCP throughput.
Production/Implementation Date	**11/5/99 Complete**

17. *Capacity Category:* ***New Unisys Platform***

Capacity Issue	**Current Unisys processor (IX5800) is slow compared to newer platform (IX6800) and cannot handle the expected increases in transaction volume.**
Remediation(s)	Upgrade to the newest hardware level IXX6800.
Estimated Benefit	Potential 50+% gain in overall processing power.
Production/Implementation Date	**11/15/99 Complete**

18. *Capacity Category:* ***Legacy On-line***

Capacity Issue	**Last Sale processing is delayed as a result of delays in transferring last sale data from the Tandem to the Unisys systems for broadcast (currently 1 - 72Kb line).**
Remediation(s)	**Remediation #3** - Migrate Legacy Online Quotation System to the National Trade Dissemination System (NTDS). Unisys release U985.
Estimated Benefit	Will provide the capability for real-time outgoing Vendor data feeds.
Production/Implementation Date	**11/29/99 Complete**

19. *Capacity Category:* ***Tandem Switch***

Capacity Issue	**Tandem QMAN (Queuing manager) processes are max'd out which causes excessive queuing.**
Remediation(s)	**Remediation #7** - Increase line handler queues (QMAN process). Solution: Multiple Switches. 9 month project.
Estimated Benefit	Doubles throughput. Provides "Quantum Leap" in Switch capacity.
Production/Implementation Date	**1/18/00 Complete**

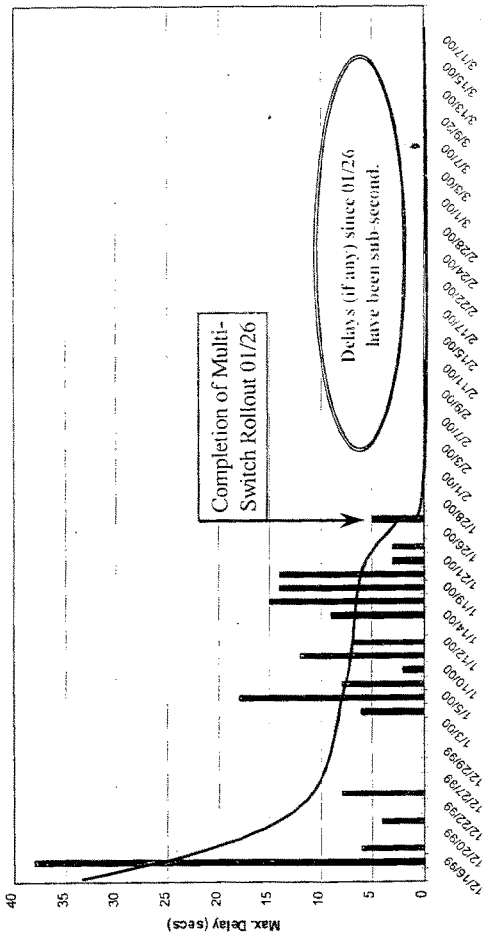
20. *Capacity Category:* ***Market Data Feeds NQDS, NTDS, LVL1***

Capacity Issue	**These Vendor feeds are currently adequate as bi-synch transmissions, but will be saturated shortly.**
Remediation(s)	Convert Vendor lines to IP Multicast.
Estimated Benefit	Will make vendor data feeds real-time.
Production/Implementation Date	**4/1/00 Complete** (was actually available to Vendors 8/99)

Enclosure 3

SelectNet Delays

Selectnet Execution Report Delays



William J. Brodsky
Chairman and
Chief Executive Officer

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March 30, 2000

The Honorable John Dingell
U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, D.C. 20515-6115

Dear Representative Dingell:

Thank you for your letter of March 2, 2000. On behalf of the Chicago Board Options Exchange, Inc. ("CBOE"), I am pleased to respond to your questions concerning CBOE's decimalization efforts. In response to your questions, CBOE answers as follows:

1. *Last year the options exchanges began multiple listing and trading of options previously listed on a single exchange. What was the impetus for this transition and what effect has it had on your operations, the quality of your markets, the processing capacity of your systems and the OPRA system, and on investors? Please be specific about any problems and your recommendations for addressing them. How have recent increases in multiple trading affected systems capacity and your efforts to prepare for decimal trading?*

Multiple listing of options is not new. For example, multiple listing has taken place with regard to over-the-counter securities since the mid 1980s, and with regard to equities since the SEC ended its Allocation Plan in 1990. In August 1999, CBOE expanded its listing strategy by multiple listing many options classes that had previously been listed on only one exchange. There are a number of single-listed options, of course, that CBOE did not choose to multiple-list.

CBOE's strategy to expand its multiple listing was part of a broader strategy to maintain CBOE's competitiveness in the face of a new market paradigm that likely will be created by electronic-based exchanges. One such exchange, the International Securities Exchange ("ISE"), announced in November 1998 its intention to begin trading the top 600 option classes in January 2000. In response to this potential shift in the way options forums will operate in the future, CBOE developed a new strategic plan that included, among other things, listing a much larger number of options, including those targeted for trading by ISE. Over the course of the next eight months, CBOE

implemented a number of steps needed to effect its new listing strategy, including increasing its systems capacity to accommodate the increased quote message traffic that was expected to result from expanded multiple listing, and changing its rules to allow more members to serve as Designated Primary Market-Makers ("DPMs"), which customers have said they prefer when trading options that are multiple-listed.

In August 1999, CBOE began to implement its plan to list a significant number of additional option classes by certifying its intention to list options on Dell Computer Corporation. Later, CBOE listed other options that previously had been single-listed on other exchanges. Other exchanges did the same.

It is not clear what impact this expansion of multiple listing has had on investors and on the quality of markets at CBOE. For example, at the time of the expansion of multiple listing, there were short-term shifts in trading volume in certain option classes, but little change in others. Much of that short-term volume shifting appears to have settled, with CBOE retaining most of the trading volume in the option classes previously listed only at CBOE. It will likely take some time before the effects of expanded multiple listing on investors and quality of markets can be fully evaluated. Nonetheless, CBOE felt is was necessary to undertake this expanded listing initiative in order to maintain a competitive position in the emerging market of electronic-based exchanges.

As CBOE expected, the expansion of multiple listing dramatically increased the quote message traffic volume handled by CBOE's computer systems. In May 1999, for example, CBOE's highest quote rate was 742 quotes per second, and its peak volume was 14 million quotes per day. As of March 17, 2000, CBOE's highest quote rate was 1529 quotes per second, and its peak volume was 26 million quotes per day. This increase in quote volume was greater than CBOE anticipated, and CBOE has taken steps to mitigate its quote traffic, and to further increase its own systems capacity.

The expansion of multiple listing by all the options exchanges has also affected OPRA's ability to process message traffic. In May 1999, OPRA's highest quote rate was 1409 quotes per second, and its peak volume was 30 million quotes per day. As of March 17, 2000, OPRA's highest quote rate was 3549 quotes per second, and its peak volume was 66 million quotes per day. OPRA has attempted to increase its capacity to handle the increased traffic stemming from not only the expansion of multiple listing, but also from increased options demand by customers, the entry of new electronic exchanges, and decimalization. The exchanges, as ordered by the SEC, have also hired a consulting firm to study message traffic mitigation strategies. That work is on-going.

Unfortunately, since January 2000, OPRA's capacity has been insufficient to meet demand. As a result, and at the direction of the SEC, the exchanges have operated under a restrictive capacity allocation system. Under that system, because CBOE has mitigated its quote traffic, CBOE has been allocated a small amount of OPRA capacity relative to the large volume of actual transactions that are handled by CBOE.

Decimalization is expected to require a large increase in systems capacity. CBOE has increased its systems capacity to accommodate expanded multiple listing and has continued to increase capacity to try to meet the anticipated requirements of decimalization. Both the expansion of multiple listing and Y2K testing impacted

CBOE's ability to increase its capacity in preparation for decimalization, and impacted CBOE's testing and implementation time. As such, many of the software changes required for decimalization could not be implemented during 1999. Moreover, the additional capacity upgrades required for decimals are also competing for testing time with software implementations required for decimal trading.

2. *Last week the SEC approved the International Securities Exchange's (ISE) application to become a registered exchange. The ISE, which will be the first all-electronic U.S. options exchange, is due to begin operations on May 26 and must become a member of OPRA. What impact will ISE have on OPRA system capacity both before and after the transition to decimals? What steps are being taken to address this?*

OPRA has included the expected entry of ISE into its capacity plans. Thus, after independently obtaining the exchange's and ISE's projected capacity needs, OPRA has made capacity decisions in accordance with the planning process developed with, and approved by, the SEC. OPRA has attempted to work these projections into its capacity planning process, but the increased message traffic expected to occur with the entry of ISE will likely aggravate the capacity problems OPRA is currently facing and is expected to experience with the implementation of decimal trading.

3. *To what extent will the options markets be participating in the industrywide tests planned for April and May 2000?*

On January 28, 2000, the SEC issued an order requiring the exchanges and the NASD to act jointly to submit a plan to the SEC for the implementation of decimal trading. In accordance with the SEC-directed industry plan, CBOE plans to participate in decimal testing in April and May 2000. CBOE will not have all systems loaded in production at that time but will be able to set up the environment with the appropriate decimal systems.

4. *In October 1999, the SEC issued an order directing the options exchanges to submit an inter-market linkage plan. What progress have you made in developing that plan? To what extent will your plan minimize market fragmentation and maximize the kind of competition that will provide investors with the best available order execution and price? What impact, if any, will this have on the transition to decimals and the benefits expected to flow therefrom?*

Following the issuance of the SEC order to develop and submit an options market linkage plan, the four existing options exchanges and the ISE (which had filed to become

a securities exchange but had not yet been approved by the SEC) began an intensive effort to develop a linkage plan within the 90 day time frame set forth in the order. Each of the exchanges submitted market linkage plans on January 19, 2000 in accordance with the SEC order.

The CBOE and the American Stock Exchange (AMEX) submitted identical linkage plans. The ISE, which was unable to formally file a plan because the SEC had not yet approved their application to become an exchange, filed a letter with the SEC supporting the CBOE and AMEX linkage plans. The Pacific Exchange (PCX) and the Philadelphia Stock Exchange (PHLX) each submitted separate, and different, linkage plans.

CBOE believes that the plan submitted by CBOE and AMEX, and supported by ISE, will minimize market fragmentation by providing a highly automated means for trading floor professionals to access the best prices on any exchange floor for immediate execution, reducing or eliminating trade-throughs and ensuring best execution of customer orders. Allowing real-time access to the prices at any exchange will also maximize competition on the floors of each exchange. In addition, however, the plan supported by CBOE, AMEX and ISE maximizes the non-price competition between the exchanges that is crucially important to the firms representing customer orders. Under the plan supported by CBOE, AMEX and ISE, customers retain the right to choose the exchange to which their order is sent, allowing customers to favor exchanges with, for example, better computer systems that allow for faster and more certain execution of orders. Under this plan, of course, best price execution is guaranteed, but other important forms of competition are also preserved. Indeed, for this reason, brokerage firms such as Charles Schwab have written to the SEC in support of the type of linkage plan advocated by CBOE, AMEX and ISE.

By contrast, the linkage plans submitted by the PCX and PHLX, which call for a mandatory routing switch to the first exchange offering the best price, would significantly reduce competition between exchanges and would undermine brokerage firms' efforts to secure best execution for their customers.

CBOE believes that the linkage plan advocated by CBOE, AMEX and ISE would provide greater access to prices among markets, and would have positive effects on investors. Any market linkage plan will have a direct impact on CBOE's readiness for decimal trading, however, as systems designed to accommodate customer order flow will have to share resources with the decimalization effort. Reprioritizing work required to create an inter-market linkage system could have a negative impact on implementing the changes needed for decimal trading. Moreover, linkage may require quote messages to be transmitted with order size information. This change will increase the size of the messages transmitted by the system, using up greater systems capacity. These increased systems requirements will necessarily compete for systems capacity with the needs of decimal trading.

CBOE shares the Committee's interest in ensuring that decimal trading be implemented in a manner that maintains fair and orderly markets, the integrity and transparency of the options markets, and the protection of investors.

Sincerely,

William J. Brodsky

PHILIP D. DEFEO
CHAIRMAN
CHIEF EXECUTIVE OFFICER

Via Federal Express

April 10, 2000

The Honorable John D. Dingell
Ranking Member
Committee on Commerce
U.S. House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515-6115

Dear Congressman Dingell:

For more than a decade, the Pacific Exchange (PCX) has shared your concerns about the implications of more widespread multiple trading of options, and the need for effective linkage systems that will integrate competing markets to ensure investors receive the full benefits of enhanced competition. We were therefore pleased to receive your letter of March 2, 2000, and to respond to the questions raised therein.

1. ***Last year the options exchanges began multiple listing and trading of options previously listed and traded on a single exchange. What was the impetus for this transition and what effect has it had on your operations, the quality of your markets, the processing capacity of your systems and the OPRA system, and on investors? Please be specific about any problems and your recommendations for addressing them. How have recent increases in multiple trading affected systems capacity and your efforts to prepare for decimal trading?***

Prior to August 1999, the PCX traded numerous issues that were solely listed on the Exchange, but which were available for listing on any other registered options exchange. In addition, we were in competition on many other issues that were traded on at least one other options exchange. In early August, the Chicago Board Options Exchange (CBOE) announced the listing of options that had previously been traded exclusively on the PCX. The American Stock Exchange and the Philadelphia Stock Exchange took similar action shortly thereafter. Subsequently, PCX members listed options traded by other exchanges.

These additional listings raised the number of options series traded on the PCX from approximately 25,000 to more than 60,000. They also generated higher rates of inbound and outbound quotation traffic: PCX members were making markets in more issues, and monitoring more markets in those issues. Our average daily quote traffic rose from 3 million messages to more than 5 million, shortly after multiple trading became more

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233 SOUTH BEAUDRY AVENUE, LOS ANGELES, CALIFORNIA 90012 213 977-4567

widespread. Over the next six months, we increased and enhanced systems capacity to both handle and generate more quotes. Currently, on an average day, we handle more than 10 million messages; on a day of extreme market volatility, we exceed 14 million messages.

All of the exchanges have experienced the same, explosive growth in quote traffic and collectively, we often exceed the current capacity of OPRA systems. All of the exchanges, therefore, are actively participating in the planning, development, and implementation of systems that will accommodate the message traffic growth in our industry, including enhancements to OPRA systems that gather and distribute quotes to the investing public.

OPRA currently can process approximately 3,500 messages per second (mps). The options exchanges and market information vendors are in the process of upgrading their communication lines from T1 to T3 lines. By the middle of this year, these scheduled hardware upgrades will increase OPRA's capacity to 8,000 mps, and additional enhancements will raise it to 12,000 mps by yearend.

Again, within the existing environment, the options exchanges collectively can produce more messages per second than the OPRA hardware can process. As such, until these capacity upgrades are in place, there will be an allocation among the exchanges of the current OPRA bandwidth, through an algorithm that monitors and queues an exchange's data stream when it exceeds that market's bandwidth allocation. However, when the market is volatile, OPRA capacity has been exceeded by all of the exchanges. This causes a queuing of information from all the exchanges to all of the vendors, and, subsequently, to the investing public.

Furthermore, this situation may not improve when all planned OPRA capacity enhancements are in place, even if those upgrades could be expedited, as the information vendors may not be prepared to handle the amount of information that OPRA is preparing to disseminate.

After evaluating current message traffic and future traffic projections, the SEC suggested that the options exchanges aggressively pursue ideas and solutions to curtail this growth and mitigate quote traffic to keep within the bounds of OPRA system constraints. The capacity added to OPRA later this year, which will allow the exchanges to generate up to 8,000 mps, is expected to be fully utilized immediately upon implementation, while the exchanges are still quoting in fractions. The introduction of decimalization (currently slated to begin on July 3, 2000) will exacerbate the potential problems of the industry's

clogged information arteries. There may be little practical benefit to delivering potentially tighter quotations (in decimals) to an investing public, if that information is stale or useless because of message queues unable to navigate a saturated communications infrastructure.

2. ***Last week the SEC approved the International Securities Exchange's (ISE) application to become a registered exchange. The ISE, which will be the first all-electronic U.S. options exchange, is due to begin operations on May 26 and must become a member of OPRA. What impact will ISE have on OPRA system capacity both before and after the transition to decimals? What steps are being taken to address this?***

The ISE must be a participant in the OPRA Plan, and therefore must use the facilities of OPRA which already is experiencing problems with the message traffic of current participants. ISE officials have stated that they anticipate generating 50 mps through the OPRA system when their new market is launched, and project an additional 50 mps per month through the end of 2000. This additional traffic, albeit low in comparison to the existing options exchanges' traffic, introduces additional burdens on an already strained system. Although ISE has indicated that their OPRA needs are nominal to start, and their growth rate modest, their business model of competing market makers, each supplying their own data feed into the ISE, has severe implications for message traffic. This model lends itself to the production of an enormous amount of message traffic, if ISE does not effectively sort the data and publish every change in its best bids and offers.

As previously stated, the OPRA capacity upgrades are approved and anticipated to be delivered within the timetable outlined. No additional provisions for the introduction of ISE have been planned or contemplated. However, OPRA can and will plan for the doubling of its anticipated capacity to 24,000 mps, if the participating exchanges approve such additional upgrades. Such additional upgrades, although feasible, may not be practical. Many vendors of options information are struggling with the existing plans to upgrade their systems to handle OPRA's current upgrade plans to 8,000 mps and then 12,000 mps.

The planned OPRA upgrades did take into account ISE's traffic estimates and the initiation of decimal trading. Decimalization is expected to significantly increase quotation traffic: The initial estimates were as high as 38,000 mps. To address this potential, the options exchanges, in conjunction with the ISE and SEC staff, commissioned SRI Consulting to assist in identifying quote mitigation strategies that could be implemented before the introduction of decimalization. These efforts are

ongoing and focused on staying within the current 12,000 mps threshold planned by OPRA for this year.

In short, the launch of the ISE will have an undetermined effect on quote and message volumes. Even if ISE's message volume is low, it must be sent to each exchange, added to the calculated national best bid and offer, and will cause growth in responding quotes from the other markets. Even if OPRA can meet these capacity requirements, data vendors may not be able to. Public access to current quotes could be delayed.

3. ***To what extent will the options markets be participating in the industrywide tests planned for April and May 2000?***

The PCX and the other options exchanges have made a concerted effort to prepare for the initial phase of decimalization. Please note that there is a dramatic contrast, however, between this effort and that undertaken by the industry to prepare for Y2K.

The coordinated securities industry effort to be fully organized, tested, and ready for Y2K ran from January 1998 through September 1999. It included Beta testing for Y2K in July 1998, which required five months of planning, pre-testing, and organizing to conduct. This test involved selected major brokerage firms, plus all of the exchanges and clearing and settlement agencies. The Y2K Beta Test included a multi-day cycle to cove. all aspects of clearing and settlement. Beta testing was essential to the success of the Extended Point to Point (EPTP) and Industry Cycle tests that took place over the ensuing year. No such test of a similar scope, coordination, or organization is planned for decimalization.

The EPTP tests were conducted from September 1998 through October 1999, and included exchanges, additional firms, and clearing and depository agencies on selected dates. This round of tests ensured that smaller firms were organized, tested, and ready to participate in the Industry Cycle Test. The EPTP tests were limited, one-day tests, without the multiple day clearing cycle being involved. The Industry Cycle was a series of tests simulating the rollover from one century to the next, including all settlement-related processing. The tests included all agencies, exchanges, and a very large contingent of member firms.

For the introduction of decimal trading we are going directly to EPTP testing, ignoring an Industry Cycle Test. There is no multi-day testing to cover the clearance and settlement cycle, as was done with Y2K. The conversion schedule simply does not allow for the same degree of planning, preparation, and testing utilized for Y2K, though a similar,

comprehensive effort is clearly desirable and justified. The conversion to decimals is at least as complicated a project (if not more so), yet the industry is attempting to coordinate and implement the conversion in just six months.

The Exchange has coded its systems to accept inbound quote data in both decimals and fractions, as some stocks will continue to be quoted in fractions as the conversion process progresses. The Exchange has not planned to support a dual environment for the same symbol (i.e., XYZ stock can be quoted in decimals or fractions, but not both), however, and at this late date could not make such a change. Although not completed, the Exchange has already prepared many of its systems for decimal trading, and has AutoQuote, quotation displays, and other systems ready to receive and disseminate decimal and fraction information during the simultaneous trading period.

As you know, the Pacific Exchange was the only market in the country that testified in favor of decimalization, when it was the subject of a legislative hearing before the Commerce Committee. Our support for the conversion remains strong: Decimals are easier for investors to understand, particularly as trading increments become smaller; they are the standard increment used by all other exchanges in the world; and they create the potential for narrower spreads and reduced transaction costs. But, as we advised Congress originally, no one should consider the conversion a trivial exercise. If it is not undertaken with the same level of thoughtful, coordinated planning that made Y2K a non-event, we risk turning public investors into the victims rather than the beneficiaries of decimalization.

4. ***In October 1999, the SEC issued an order directing options exchanges to submit an inter-market linkage plan. What progress have you made in developing that plan? To what extent will your plan minimize market fragmentation and maximize the kind of competitions that will provide investors with the best available order execution and price? What impact, if any will this have on the transition to decimals and the benefits expected to flow therefrom?***

In October 1999, the PCX initiated a series of face-to-face meetings with the other options exchanges, the ISE, and SEC staff. The meetings addressed a wide array of issues necessary for an inter-market linkage to be both practical and effective. Although the exchanges collectively discussed, negotiated, and compromised on many significant issues, in the end several potentially critical components of an inter-market linkage remained unresolved. As such, on January 19, 2000, the options exchanges filed three different inter-market linkage plans. One plan essentially represents the views of the Chicago Board Options Exchange, the American Stock Exchange, and the International

Securities Exchange. That plan favors the matching of better markets away, and restricts access to markets by competing market centers. A second submitted by the Philadelphia Stock Exchange favors strict price-time priority with no access limitations whatsoever.

The PCX plan is intended to encourage aggressive quote competition, based on price-time principles, though those principles need not be strictly followed as Philadelphia has proposed. We would consider an interim evaluation period that allowed the use of price-time priority for the execution of orders in certain circumstances, as well as the matching of better markets away under other circumstances. The PCX would strongly object to any provisions in the options market linkage that would restrict, or otherwise impose a burden on, inter-market competition by limiting access to one exchange by any or all other exchanges.

We continue to believe -- as we have for more than a decade -- that an options linkage system is critical to the future of the industry, and to the promotion and protection of public investors' interests. We have informed the SEC that we are prepared to continue working to resolve the remaining issues involved in the design and development of the linkage, and to do so with the objective of bringing it to fruition as soon as possible.

In our comment letter on the linkage plans, which was submitted to the SEC this past week, we wrote:

> We believe that an options linkage -in *any* form- must advance the interests of retail customers. It must guarantee the best price available, every time a customer enters an order, regardless of the market center to which it was directed. It must provide real incentives for traders to quote aggressively and reward them accordingly, enhance the quality of the markets, and foster a competitive arena that promotes price improvement for retail orders. Such an integrated environment could only strengthen the national market system for options.

Our proposal for the options linkage best meets these objectives.

Decimalization will have a dramatic impact on the options markets. It makes the expeditious development of an options linkage system even more important, and also more complex. Crossed markets in individual options, for example, are a frequent, recurring problem today, with fractions and under "stable" market conditions. When the overall market (or the market for a single security), is volatile, the problem is exacerbated. That situation may grow worse with decimals, depending on the minimum increment established for options trading, as well as any minimum price variations used

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to define best execution and price improvement. These conditions will necessitate an inordinate amount of inter-market coordination to resolve, which an effective linkage system can facilitate, and may severely degrade the liquidity at each market center due to technological imbalances between the broad array of market users.

Consider, for example, the exchanges' automated execution systems, which are designed to provide retail investors fair and fast order execution for orders of 10 to 20 contracts: These systems are increasingly used by arbitrageurs to take advantage of crossed markets, i.e., to send and execute an order on one exchange when a different quote is disseminated by another. (Such pricing disparities often reflect a market maker's ability to recalculate and disseminate updated quotations, not a difference in perceived fundamental values. This problem can be compounded by delays in message processing by OPRA, which we noted earlier.) If this problem continues -and if it worsens with decimals- bid/offer spreads may widen and automatic execution quantity commitments may diminish.

We would be pleased to elaborate on any of these answers and appreciate the opportunity to respond to your inquiry. Again, thank you for your continuing interest in matters of vital importance to investors and our markets.

Sincerely,

Philip D. DeFeo
Chairman and Chief Executive Officer

Salvatore F. Sodano
Chairman and Chief Executive Officer

March 31, 2000

The Honorable John D. Dingell
Ranking Member
U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515-6115

Dear Representative Dingell:

Thank you for requesting the American Stock Exchange's ("Amex") input on the securities industry's transition to decimal pricing. The Amex fully supports an orderly transition of the entire industry to decimal pricing. We believe this transition represents a fundamental change to our market structure that, if not properly implemented, could seriously undermine investors' confidence in our capital markets. As such, we appreciate your giving this matter the time and attention needed to ensure its success.

Questions and Answers

What was the impetus for the Amex's transition to multiply listing and trading of options and what affect has it had on your operations, the quality of your markets, the processing capacity of your systems and the OPRA system, and on investors?

During 1999, the Amex greatly expanded the number of options we multiply listed in response to a rapidly changing business environment. Multiple listing, coupled with record-breaking increases in the volatility and trading of the underlying securities, has caused options message traffic (bid, ask, and trade data) generated by and received at the Amex to skyrocket. For example, in March 1999, the average daily message traffic generated by the Amex was approximately 3 million quotes per day. Year to date, it is approximately 13 million quotes per day, and climbing. In addition, the Amex receives an average of 3½ to 4 times as many quotes per day from the other options exchanges than we generate.

To keep pace in 1999 we exhausted systems capacity reserves and spent $3.5 million over budgeted amounts on capacity enhancements. For 2000 we budgeted an additional $8 million to implement the capacity enhancements and systems

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upgrades needed to accommodate the transition to decimal pricing in the midst of a highly active, volatile market.

Because we have successfully kept pace with these increased demands, we believe we have clearly maintained the quality of the markets made at the Amex. However, one aspect of multiple listing has caused some confusion for investors—namely, the addition of intra-day strike prices for a multiply listed option by one exchange and not the others. For example, if one of the other exchanges were to add during the trading day a new strike price for an option that also trades on the other options exchanges, these other exchanges often remain unaware of this addition because there is no effective procedure by which they are notified. Investors and their brokers learn of the new strike price but do not always know which exchange added it. If an investor's order for this new strike price is routed anywhere but the exchange that added it, the order will be rejected for reentry, thus delaying the execution of the investor's order. We suggest developing an effective practice whereby each exchange that adds an intra-day strike price for any option must promptly notify all the other exchanges that also list that option. This will help ensure the timely, efficient execution of investors' orders.

While the Amex successfully met the demands for increased capacity in 1999 and anticipates being able to continue on this course—even with a transition to decimal pricing—we are concerned about the industry's state of readiness, especially with respect to quote vendors and to OPRA. First, we believe SRI's projection of a 779% increase by December 2001 without decimal pricing will itself pose technological challenges for the industry.[1] Although we expect technological advances in trading systems will be sufficient to meet this challenge, greater than anticipated increases in volatility and trade volume—as we experienced in 1999—and the addition of new options exchanges would likely increase demands for capacity to unachievable levels in the short term.

Further, as you know, the SRI projected in its study that options message traffic is expected to increase by over three-thousand percent by December 2001 assuming decimal trading in penny increments and sustained, robust volume.[2] It is certain that trading technology will not be advanced enough to handle increased volume of this

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1 See General Accounting Office Testimony Before the Subcommittee on Finance and Hazardous Materials, House Committee on Commerce, "Securities Pricing, Progress and Challenges in Converting to Decimals" (March 1, 2000), page 7.

2 Id.

magnitude by December 2001. In addition, it is doubtful that quote vendors will be able to process and accurately disseminate such high quote volume to investors. Also, we agree with the OPRA representatives' observation that "some of the message traffic projections are so high that traders would have difficulty interpreting and acting on such rapidly changing information."[3] Market participants' access to current, accurate information is fundamental to the structure of our capital markets. Should we reach the SRI's projected volume by December 2001 we are concerned that the industry's technology may not yet be advanced enough to deliver this information to market participants in a meaningful format.

How have recent increases in multiple trading affected systems capacity and your efforts to prepare for decimal pricing?

As discussed above, the multiple trading of options, coupled with record-breaking increases in the volatility and trading of the underlying securities, has caused options message traffic to skyrocket, placing significant strains on trading systems capacity. Because the transition to decimal pricing strains the same systems, multiple listing has compounded the challenges the industry faces to prepare for decimal pricing.

What impact will ISE have on OPRA system capacity both before and after the transition to decimals? What steps are being taken to address this?

The ISE has submitted to OPRA its capacity needs for the foreseeable future and OPRA is taking them into account in its capacity-enhancement plans. However, given that the industry's trading systems will be unable to handle the transition to trading in penny increments for the existing options exchanges under the current implementation schedule, it is uncertain how the industry's technology experts will be able to accommodate the ISE.

As you noted in your letter, the existing options exchanges and the ISE have proposed a number of strategies to mitigate the capacity demands placed on trading systems, such as delisting inactive options, discontinuing price quotes for options with low trading volumes, or establishing 5 cent or 10 cent price variations for options quotations. These proposed strategies are intended to enable the options markets to continue functioning, albeit in a modified fashion, after the transition to decimal pricing. However, the exchanges are still trying to determine which strategies would work best for the options market and for investors.

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[3] Id. at page 8.

To what extent will the options markets be participating in the industry-wide tests planned for April and May 2000?

The Amex plans to and is prepared to participate in these tests. To the best of our knowledge, the remaining options exchanges also plan to participate.

What progress have you made in developing an inter-market linkage plan?

We have made substantial progress in developing an inter-market options linkage plan. In response to the SEC's October 17, 1999 order directing the options exchanges to submit an inter-market linkage plan, the Amex, the other options exchanges (the Chicago Board Options Exchange, Pacific Stock Exchange and Philadelphia Stock Exchange) and the International Securities Exchange ("ISE") met numerous times to address the issues raised by the development of such an inter-market linkage plan. Following months of lengthy meetings and drafting and review sessions, the Amex and the options exchanges filed their inter-market options linkage plans with the SEC. The Amex's plan is identical to those filed by the Chicago Board Options Exchange and the ISE. The Pacific Stock Exchange and the Philadelphia Stock Exchange submitted different plans.

On March 2, 2000, notice of the filing of the plans appeared in the Federal Register for public comment.[4] Public comment on the notice will expire April 3, 2000. We anticipate commenting favorably on the notice within or shortly following expiration of the public comment period.

Currently, we are in the process of meeting with the other options exchanges and the Commission to reach consensus on outstanding issues and to work toward implementing the agreed-upon elements of the plan. A meeting to discuss these issues and to develop a linkage request for proposal (RFP) to submit to potential vendors seeking to work with the exchanges in implementing the linkage plan is currently scheduled for April 4, 2000.

To what extent will the plan minimize market fragmentation and maximize the kind of competition that will provide investors with the best available order execution and price?

We do not believe market fragmentation will be minimized to a great extent through the adoption of an inter-market linkage plan. However, competition that provides investors with the best available order execution and price will be improved through linkage.

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4 See Securities Exchange Act Release No. 42456 (February 24, 2000), 65 FR 11402 (March 2, 2000).

As currently contemplated, our linkage plan provides for automatic execution of established execution size for customer orders at the best available bid or asked price displayed at any of the options exchanges. Further, our plan restricts any exchange from executing customer orders at prices that are inferior from those available on any competing options exchange. Unlike the markets for the trading of equities—which have one primary exchange per equity—there are four primary exchanges for any given options class. Upon implementation of our linkage plan, however, orders will be able to be executed against any bid or asked displayed at any options exchange. As a result, we believe this will help mitigate some of the negative effects of market fragmentation. Lastly, because our plan generally requires execution at the best available price, investors are provided greater assurance of receiving this price.

What impact, if any, will this have on the transition to decimals and the benefits expected to flow therefrom?

We believe that the implementation of our inter-market linkage plan will have minimal impact on the transition to decimals while realizing fully the potential benefits expected to flow therefrom. Aside from the resources necessary and constraints on resources available to focus on the transition to decimals while simultaneously developing our plan, we expect that our plan will be developed without significant impact with respect to the transition to decimals. We currently contemplate that a conditional term in the request for proposal will require that the plan be fully decimal compliant from inception. Because our linkage plan will be developed from its inception to accommodate trading in decimals, we believe the benefits expected to flow from the transition will be fully realized through it.

Thank you again for requesting our input on this key initiative. If you have any questions or would like additional information regarding the Amex's responses to your letter, please contact me at (212) 306-1100.

Sincerely,

Salvatore F. Sodano

INTERNATIONAL SECURITIES EXCHANGE

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March 30, 2000

The Honorable John D. Dingell
Ranking Member
United States House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, D.C. 20515-6115

Re: Options Capacity and Decimalization

Dear Congressman Dingell:

In a letter dated March 2, 2000, you requested the response of the International Securities Exchange LLC ("ISE") to the report of the General Accounting Office entitled "Securities Pricing: Progress and Challenges in Converting to Decimals" (the "GAO Report"). Specifically, you asked for our views regarding the conversion to decimal pricing and related capacity issues involving the options industry. We are pleased to respond to your letter.

As your letter indicates, we are a newly-registered national securities exchange that will begin trading on May 26th of this year. Upon phasing in our trading, we will offer a fully electronic agency-auction market for options on approximately 600 underlying securities.

Our trading system is fully decimal ready and we plan to be ready for decimal trading in accordance with the time schedule established by the Securities and Exchange Commission ("SEC").[1] Nevertheless, as we recently informed Chairman Levitt of the SEC, we believe that there are strong policy reasons to delay the start of decimal trading until the National Association of Securities Dealers, Inc. ("NASD") is prepared to participate in the decimalization phase-in process. A copy of our letter to Chairman Levitt is attached.

Your letter asks us to respond to certain issues in the GAO Report regarding options capacity. That report discusses challenges that the options exchanges face as they prepare to trade in decimals, especially if we trade in minimum price variations ("MPVs") of less than five and ten cents. You also asked us to respond to four specific questions. Below we respond to the GAO Report and to your questions.

[1] Exchange Act Release No. 34-42360 (January 28, 2000).

Response to the GAO Report

The GAO Report correctly describes the capacity issues facing the options markets. Indeed, absent significant action to address capacity concerns, it is likely that even the proposed increase in the processing capacity of the Options Price Reporting Authority ("OPRA") from 3,000 to 12,000 messages a second ("MPS") will not provide sufficient long term capacity. Indeed, it is likely that trading in MPVs of less than five and ten cent increments will increase quotation traffic well above the projected 12,000 MPS ceiling. That report also notes that, together with SRI Consulting, the exchanges have been working with the SEC to develop and implement "quotation mitigation" strategies to address this problem (the "SRI Study"). Thus, it is clear that there are significant capacity issues in the options market that impact not only decimalization, but the health and vitality of the industry as a whole.[2]

We first note that, even though we received our registration as a national securities exchange well after the commencement of the SRI Study, we have been an active participant in the quotation mitigation review process. Indeed, we contributed to the cost of the SRI Study along with the then-four exchanges, and we participated on the Steering Committee of that study. We believe that the SRI Study and subsequent discussions have identified a number of significant ways to address the capacity problem. We are frustrated that the options industry has not taken more definitive action to implement the recommendations of the study.

We believe that there is general consensus regarding the primary cause of the OPRA capacity problems: the options exchanges currently use the limited OPRA resources inefficiently. By far the largest source of OPRA message traffic are quotations in the numerous series of each listed options class. Quotations are constantly being updated during the day when the underlying stock price changes, even if the option trades infrequently, or not at all. Thus, SRI initially focused on ways to decrease quotation traffic for inactively-traded options.

The SRI Study made specific proposals regarding ways to use the limited resources of OPRA more efficiently in the short term, virtually all of which would have limited quotations for inactively-traded options. We understood there to have been general consensus on the following proposals: delist inactive option classes; eliminate the fourth (or most distant) month for most options; revise listing standards to decrease the number of new products; and increase the intervals between strike prices of certain options. The study also noted that not

[2] OPRA currently is beginning its next round of capacity planning. One issue likely to be considered is the possible increase in the MPS ceiling above 12,000. However, we note that 12,000 MPS already is straining industry resources and any increase above 12,000 MPS is problematic due to questions regarding the ability and willingness of the market data vendors and end-users of our data to accommodate such message traffic. It also is possible that a higher MPS rate could render quotations unreadable due to screen "flickering." Thus, there may well be practical limits on the potential increases in message traffic that OPRA can generate.

immediately moving to penny trading increments would help control the impending explosion in quotation traffic.

The study further raised for consideration more long-term approaches to quotation mitigation, such as establishing a "request for quotation" ("RFQ") system in which the exchanges would not quote an inactive option until there is trading interest in that option. There also was some discussion of establishing economic incentives to mitigate quotations, such as a "pay for quote" system. Finally, there was discussion about ways to allocate OPRA capacity if this became necessary because the exchanges were unwilling or unable to implement the other quote mitigation strategies.

Unfortunately, the consensus on almost all of the short-term quote mitigation strategies has evaporated. The only proposal still being seriously considered is the delisting of certain products. The reason for this retreat appears to be the unwillingness of some industry constituencies to accept the compromises that are inherent in each of the recommendations. Thus, rather than pursue the full range of the original proposals, the exchanges now are focusing primarily on the RFQ proposal. While this alternative is attractive because it would not eliminate options, it is unclear whether this would have a serious effect on limiting quotation traffic. The industry also must address significant policy and technical issues to implement an RFQ procedure. Accordingly, it does not appear that an RFQ mechanism will provide short-term quotation mitigation relief.

The ISE is committed to both the original short-term proposals in the SRI Study and the RFQ proposal. Indeed, we are willing to implement each and every one of the short-term proposals in the SRI Study. We also are willing to work with the other exchanges, OPRA, the market data vendors and the member firms to implement the RFQ proposal as quickly as possible.

Response to Specific Questions

Multiple Trading

You seek our views on various aspects of multiple trading of options. Because the ISE has yet to begin trading, this issue has not had a direct effect on us. As a general matter, we believe that investors have reaped significant benefits from multiple trading as spreads have narrowed and competition has increased. While multiple trading has increased quotation traffic in OPRA, we believe that this is the most efficient use of OPRA's scarce resources: enhancing quotation competition in actively-traded options. As noted, we believe that quotation traffic in less actively traded options should be curtailed to free up capacity for real quotation competition. As to the ISE's own capacity, we are developing internal systems that will handle the anticipated 12,000 MPS from OPRA, as well as the internal traffic in our own system that will result from this increase in quotation activity. Thus, we believe that, when resources are

properly focused, both the ISE and the industry in general can accommodate the capacity demands of multiple trading.

ISE's Entry Into the Market

The ISE is determined to become a participant in OPRA because we believe that consolidating options pricing information through a central resource such as OPRA has significant merit. We have been working closely with OPRA for over a year to make our participation a success, and thus we have been involved in the OPRA capacity planning process for two annual cycles. Indeed, OPRA has been aware of our potential impact on its capacity, and the SRI's analysis of OPRA capacity incorporates the increased capacity requirements of our participation.

While the ISE's participation in OPRA certainly is one factor influencing OPRA's capacity constraints, this is a relatively minor factor when compared to multiple trading and decimalization, particularly the move to smaller MPVs. Moreover, as discussed above, the ISE's participation in OPRA is, perhaps, the most positive use of OPRA's resources: the creation of additional quotation competition in the 600 most-actively traded options. This is precisely the type of competition the SEC long has sought in the options market.

Nevertheless, we do recognize that our entry into the market will result in further challenges in allocating OPRA capacity until OPRA increases its capacity to 12,000 MPS and the exchanges adopt the quote mitigation recommendations. Thus, we remain committed to working with our fellow exchanges and the SEC to implement a strategy that preserves our ability to compete in the market in a manner consistent with the sound operation and management of OPRA. Again, the key to this success will be the proper focus of OPRA's resources on enhancing, not limiting, competition.

Decimalization Testing

The ISE is able to report only on its plans to participate in industry-wide decimalization tests, not on the plans of any other exchange or market participants. We currently plan to begin trading in late May of this year. It is our current intention to participate in all industry decimalization tests once we begin trading.

Linkage

The ISE has been an active participant in the linkage discussions, and we have joined with the Chicago Board Options Exchange and the American Stock Exchange to file the only linkage plan that has garnered the support of more than one exchange (the "Joint Plan"). The Joint Plan provides for a an efficient linkage of the automatic execution systems of the options exchanges in a way that will minimize market fragmentation and will enhance the ability of broker-dealers to provide customers with best execution of their customer orders. At the

same time, the Joint Plan will encourage the continuation of the vigorous and multifaceted competition that has emerged in the options market.

As a general matter, we do not see the linkage, especially the Joint Plan, as having any material effect on the transfer to decimal pricing or on OPRA capacity. However, we are concerned that other possible plans, such as plans incorporating "price/time" priority or other concepts well beyond the dictates of the SEC's order mandating a linkage, could create artificial incentives to generate more quotations. We strongly have urged that any such concepts not be included in the linkage. Rather, we believe that any linkage should be focused solely on enhancing customer protection and best execution, leaving for further study proposals that raise more profound market structure issues.

* * *

We trust that this letter fully responds to the questions that you asked. If you have any questions on our response, please do not hesitate to contact me.

Sincerely,

David Krell
President and Chief Executive Officer

cc: The Honorable Michael Oxley
The Honorable Edolphus Towns
The Honorable Tom Bliley
The Honorable Arthur Levitt, Jr.

Attachment

INTERNATIONAL SECURITIES EXCHANGE

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March 21, 2000

The Honorable Arthur Levitt
Chairman
Securities and Exchange Commission
450 Fifth Street, NW
Washington, DC 20549

Re: Decimalization

Dear Chairman Levitt:

The International Securities Exchange LLC ("ISE") appreciates the opportunity to respond to your letter dated March 10, 2000 regarding decimal pricing in the securities industry. Your letter notes the recent announcement of the National Association of Securities Dealers, Inc. ("NASD") that it will not be ready to start trading in decimals this July. In light of that announcement, you asked for our response to certain questions regarding the transition to decimal pricing. We provide our responses to your questions below.

Trading Some Securities in Decimals and Other Securities in Fractions

We believe that it is critical for the industry to convert to decimal pricing in an efficient manner. To achieve this goal, we believe that the transition should be uniform for all securities, and that the transition process should be as short as possible. The longer that securities trade in two different structures, the greater the potential there is for investor confusion.

We also believe that all markets must trade the same security in the same pricing system. Indeed, from the standpoint of the current technical infrastructure, we question whether it is possible for the various markets trading the same security to use different pricing systems and to have those prices accurately reported to investors. In addition, having one market trade a security in fractions while another market trades the same security in decimals creates two related policy problems:

- First, there likely would be widespread market confusion. For example, it is difficult enough now to determine which is greater: 7/16 or 3/8. Asking investors to determine whether 7/16 is more or less than $.40 would exacerbate this confusion. Indeed, we are concerned that market professionals, with better access to sophisticated tools than individual

investors, would be able to take advantage of pricing inefficiencies at the expense of individual investors.

- Second, and closely related, is the issue of protecting customer orders. The confusion inherent in a dual pricing system would seriously complicate the ability of broker-dealers and market places to provide customers with best execution of their orders and protection against trade-throughs. Again, this only could result in harm to investors.

Applying this analysis to the issue of trading the same securities in both fractions and decimals, we note that the NASD, through the so-called "third market," is the second largest market for listed securities. Thus, even if the equity exchanges are able to trade in decimals this July, it means that there will be an extended period of time where listed securities trade in two different pricing systems. For the reasons discussed above, we believe that this is a situation the Commission should make every effort to avoid. Thus, we believe it would be inappropriate to move forward with the trading of listed securities in decimals until the NASD is prepared to join that effort.

Our analysis of whether it is feasible or advisable for listed securities to trade in decimals while Nasdaq securities trade in fractions is similar. This would result in exchanges trading listed securities in decimals while the NASD would trade both listed securities and Nasdaq securities in fractions. It is unclear in this scenario what pricing system exchanges that trade Nasdaq securities would use. In any event, this again would lead to investor confusion and would extend the timetable for full conversion to decimal pricing. We believe that it is much more prudent to delay the start of the conversion until all the major markets are ready, and then implement the full conversion as quickly as possible.

Effect on the Options Markets

Trading in decimals on exchanges and fractions on Nasdaq, including the third market, would lead to potential confusion and pricing inefficiency in the options market. It is possible that the options markets would continue to trade options in Nasdaq securities in fractions, while implementing decimal trading in options on listed securities. In such a case, we believe it would create massive confusion for investors to trade options on the same exchange in two different pricing structures for an extended basis.

On the other hand, it is possible that the options markets could implement trading in decimals for all securities, including the options on Nasdaq securities, although such securities would continue to trade in fractions for an extended period of time. This also would lead to investor confusion as market participants would need to correlate stock prices trading in fractions and option prices on the same stock that are trading in decimals.

We also emphasize that listed options are an important trading, investment and hedging tool for individual investors. Indeed, the mix between individual and institutional investors is more heavily skewed towards individuals in options than in the underlying equity market. Thus, our goal is to protect those investors by attempting to avoid any unnecessary complications in the options pricing and trading systems. Imposing an extended conversion process on the industry will work directly against that goal.

State of Industry Preparedness for Decimalization

We are not in a position to comment on the general state of the industry's readiness for decimalization. However, we can comment both on our own readiness and on certain challenges facing the options markets.

As to the ISE, our trading system currently is fully capable of trading in decimals. Our major technological challenge in preparing for a phased-in conversion process as currently envisioned is to implement the ability to trade some options in minimum price variations ("MPVs") based on decimal pricing, while trading other options in fraction-based MPVs. The complicating factor is the need to support both fractions and decimal pricing simultaneously. We currently plan to install, test and implement the necessary software changes to our trading system to accomplish this prior to our launch of trading on May 26, 2000. Thus, if there is no delay in the current July 3rd target date, we plan to be fully "decimal ready" at that time. Our current plans also are for us to be prepared to participate in all industry tests following our May 26th launch.

Despite our plans to be prepared for the July 3rd target date, I am sure that you can appreciate that the industry's move to decimal pricing six weeks after our launch of trading is not the best of timing for us. It will require us to stretch our resources to focus on both our trading launch and decimalization. It also will require us to enter into the testing process immediately after the start of our trading. While we are prepared to work diligently with our fellow exchanges and market participants to meet a July 3rd date, we would benefit from a delay in implementing decimalization to coincide with the NASD's timeframe.

As to the options market in general, you are aware of the capacity issues challenging our market. We currently are working with the other exchanges, the Commission, the vendor community and member firms to address these challenges in two ways:

- First, the Options Price Reporting Authority ("OPRA") is increasing its system capacity from just over 3,000 messages per second ("MPS") to 12,000 MPS. We understand that OPRA expects to accomplish this upgrade in two stages, with completion of the second stage scheduled to occur by the end of the year.

- Second, together with our fellow exchanges, we are working to implement a number of the "quote mitigation" strategies described in the recent report issued by SRI Consulting, Inc. The proposed strategy that holds the most promise for significantly reducing quotation traffic is the development of a "request for quote" ("RFQ") mechanism for less actively traded options. While the timetable for implementing the RFQ mechanism is still unclear, it likely will not be fully operational until some time next year.

Due to the significant efforts currently underway in the options markets to address capacity concerns, we believe that delaying the decimalization conversion process until early next year is both prudent and reasonable. Indeed, moving forward at this point, before OPRA increases its capacity and before we have an opportunity to implement the quote mitigation strategies, raises significant concerns for the options market. We are in the midst of an unparalleled growth of this market, and proceeding according to the current timetable could put the options markets, and the investors who trade in this market, at an unwarranted risk.

* * *

We thank you for the opportunity to address the issue of decimalization. As a general matter, while we believe that decimal trading will be a positive step in simplifying trading in the securities markets, we urge the Commission to move deliberately and cautiously in this area. Specifically, while we are committed to work towards implementing the July 3rd plan, we believe that it would be appropriate to delay the start of decimal trading until the first quarter of 2001.

If you have any questions on our letter, or if we can be of further assistance, please do not hesitate to contact me.

Very truly yours,

David Krell

David Krell
President and Chief Executive Officer

cc: Annette Nazareth
Robert Colby

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