I've titled my remarks, Making The Best of Crises. There is a widely-held belief that an organization can't implement a TQM process during periods of great instability or uncertainty. This is felt to be true because implementing TQM requires systemic, fundamental change. And fundamental change is something that's easy to put off, especially when there is great uncertainty. When you're hanging by your fingertips, don't stop to scratch your backside.

My experience at Control Data Corporation has shown that exactly the opposite is possible. When times are bad and the need for improvement is urgent, change is much more rapidly absorbed at the grassroots level. Crises can, indeed, lead to positive change.

The period since the mid-1980's has been an increasingly tumultuous one in the computer industry. In terms of basic economic forces, competitive structure and basic technology, the industry has never seen greater change.

No company -- at least no surviving company -- has felt the impact of this change more than Control Data. The Company's situation was further exacerbated by over-expansion in the number and scope of the businesses in which it was engaged. By 1985 the decision already had been made that Control Data's central future strategy must be more narrowly focused and should center on computer services. Still, much of the Company's business was hardware -- a substantial OEM magnetic disk-drive business, as well as a mainframe computer business. Moreover, severe liquidity problems beset the Company to the extent that many questioned its ability to survive. There had to be a significant restructuring and downsizing of the Company. And, as is often the case in such situations, there was a great deal of change in the executive and management ranks as well.
To say the least, that's an environment of uncertainty. What this produced, however, was also an environment in which TQM could be more readily accepted. As M. Diderot has said, "Nothing heightens a man's senses as the prospect of being hanged in the morning." Fortunately, because of previous experience with various quality tools and processes, we had matured in our understanding of quality to the point that we were able to readily articulate and adopt the concept of TQM.

The results were evident more rapidly than we had anticipated. One example of the kind of progress made is Control Data's experiences in the OEM disk-drive business.

By 1989 when Control Data sold this business -- then known as Imprimis -- to Seagate Technology, it was successful, vibrant and one of the industry leaders in both profitability and quality.

But four years earlier Control Data's OEM disk-drive business was in deep trouble. In an industry considered one of the most competitive in high technology, most observers had virtually written off Control Data as a viable supplier. In 1985 alone, the OEM disk-drive business lost nearly 300 million U.S. dollars.

Quality issues -- cost, as well as timely market introduction of new products -- were linked directly to the precipitous drop in the organization's market share from about 50 percent in 1981 to less than 20 percent by 1985.

The market share loss the business suffered was not just that the overall market grew in segments where it did not have product offerings. The business also lost share in traditional strongholds such as products for minicomputers and mainframes. These markets were under attack by Japanese manufacturers. And one of the key assault weapons was quality.

In the computer business, there have been two long-standing measures of quality. First, customer acceptance rates -- how many of the computers or disk drives shipped pass the customer's acceptance tests. Second, long-term reliability expressed in Mean Time Between Failure (MTBF).
Customer acceptance rates for Control Data drives in 1985 were only about 85 percent. Japanese competitors had acceptance rates in the high 90s. Control Data was specifying products with a MTBF of 4,000-to-6,000 hours. Japanese competitors were at 10,000-to-12,000 hours. That was a two-year difference in reliability for many uses of these products.

There was no choice. Quality had to improve if the Company was to have a viable disk-drive business. And, improve it did.

Acceptance rates reached 99 percent, or higher, for all products in 1987. The MTBF surpassed 40,000 hours. And, most important, the effects on profitability were equally dramatic and within two years this business was back in the black on an operating basis. By 1988 the Small Disk Drive Division was selected as a finalist for the United States' first Malcolm Baldrige National Quality Award. More significantly, when Control Data sold Imprimis, its products were going head-to-head on quality with drives made by any manufacturer. And Imprimis was winning -- both in terms of initial customer acceptance and in long-term reliability.

THE ROOTS OF QUALITY AT CONTROL DATA

How did this change come about and success stories like the Small Disk Drive Division become possible? It is instructive to trace TQM back to its roots, for the history of quality at Control Data is not atypical of most U.S. industry.

The first formal quality effort started the same year the Control Data was founded (and, I might add, the year Malay Federation became an independent nation) -- 1957. It was a requirement of a contract the Company had with the U.S. Navy.

The early quality efforts were characterized largely by inspection and rework to assure compliance. Quality was tested into products, sometimes at great cost and penalties to schedules. There was only a hint of the prevention mentality that is now understood as being a basic tenet of quality.
In the early 1970s, a central staff function for quality was established. Out of this came a product-oriented quality life cycle that evolved into a phase review system. Quality considerations became part of product definition, design and development cycles.

At the same time, quality issues began to get more executive attention. This, among other things, was an indication of the first signs of maturation in the industry. As computers assumed more and more vital roles, customers became more vocal when they were dissatisfied -- and this in a business context rather than just a technical context.

A key event with quality occurred in 1981 when Dr. W. Edwards Deming addressed a group of some 700 Control Data managers and technical people. He bluntly said that they knew so little about quality that they couldn't even ask the right questions. After recovering from the shock of Dr. Deming's comments, Control Data began to examine a fundamental problem: how to integrate, not impose, quality into every aspect of the business.

FOCUSING THE DRIVE FOR QUALITY

The seeds planted by Dr. Deming's visit led to the development in 1983 of the basic concepts of a TQM system for Control Data. It was called Total Quality Management Process -- TQMP. Although implementation of TQMP began at that point, the crises years of '84-85 were the turning point.

For me personally, the thing that crystallized TQMP was the realization that quality is more than tools and techniques, more than MTBF or Mean Time To Repair (MTTR) in products, more fundamental than Statistical Quality Control (SQC).

Total quality is a way of managing--an approach to the process of managing resources, particularly human resources. While quality can only be made reality from below, unleashing the quality potential of people in an organization can only come from management. Quality is then, above all, a management responsibility. This belief was articulated as the first of three TQMP principles: Quality can and must be managed.
The second TQMP principle is: Everyone has a customer. Every employee has a work product. Those who receive that product have the right that it conforms to expectation. They are the customer. If the work product that one employee provides another has defects or is highly variable, that internal customer’s output will carry forward or amplify those same problems. Ultimately, of course, it is the external customer whose expectations are not met.

The third TQMP principle is: Processes are the problem, not people. A process is defined as a series of steps in any work environment: administrative, technical, managerial and operational. Studies indicate that 80-85 percent of the defects in products and services come from the systems or processes that produced them.

THE COMMITMENT OF THE CEO

Even though the basic principles were explicit, TQM had to evolve. We had to find a way to fit broad principles to the specifics of the Company. How was this done? We studied the teachings of Dr. Deming and other quality experts. We examined what other companies were doing. And, then, we combined what we learned with the pockets of expertise that already existed within the Company in statistical control methodology, process flow analysis, and so on.

But what about that first principle -- the commitment and involvement of management?

Well, I have to say that TQM did not start at the top of the Company. In fact, the top did not even know that it was not starting there. Like everyone else, I had been talking quality for years. But ultimately through personal involvement, I was able to internalize TQM -- make it a living reality for me. This is neither as easy nor as straightforward as it may seem. The daily work processes of an executive, especially a CEO, are quite different from those of the manufacturing supervisor, the development engineer or programmer. Each person, each executive, and especially the CEO, must be involved if TQM is to take root in any company.

The most effective way for a CEO is personal involvement in TQM projects and processes. I know this from personal experience.
Initially, I considered choosing an executive office procedure as my first TQM project. However, it occurred to me that because of the difficulty of bringing TQM into the creative processes of a company, such as development, it would be better to choose something as close to that type of thing as possible. What I selected as reasonably analogous was speechwriting. At the time, I was giving as many as five speeches a month. And I was spending hours preparing each speech. A review of the speechwriting process revealed a major flaw -- I was spending most of my time on the back end of the process instead of the front end. Instead of spending more time with my communications people early in the process to determine the content, or "design specs", of a speech, I was mostly waiting until there was a "prototype" -- the first draft of a speech. This was producing speeches that were unacceptable and required as many as 15 iterations to get a speech the way I wanted it. Needless to say, I began spending more time on the "design specs" of a speech. The result? Only 2-3 iterations per speech.

For my second TQM project, I took a systematic look at how I was allocating my time. What was the process involved? Was I spending my time on the things I considered most important?

Obviously the way a CEO spends time is highly leveraged in terms of an organization's success. Time allocation tends toward the ad hoc or intuitive. It is subject to personal emotions and bias -- not to mention one's health and stress level.

I took my key priorities and every day for four months I went through the tedious process of recording on a time sheet what I had done. It was not easy. At the end of one particularly long day I found the time sheet at the bottom of my "To Do" file and started to complete it. After a few minutes, I stopped and asked myself: "What is going on here? I have worked almost my entire life and here I am filling out a time card again!"
But it demonstrated in a powerful way the criticality of measurement to effective TQM. In general, gathering data and measuring processes is hard work. This is especially true in "soft" processes. There are not obvious or traditional guides as in manufacturing. Some useless data will be gathered. You may discover that you are using inappropriate measures. But you also will gain a lot of insight into more effective data collection processes themselves...into the work processes of your group...into your own management style.

The time study confirmed what I suspected: the majority of my time was being spent in meetings requested by other people. And usually people were coming to me with problems. So, I was reacting to their problems. The bottomline was: my calendar was controlling me and I was up to my eyeballs in crisis management.

As a result of the study, I established time management goals based on four strategies I had prioritized. I was better able to control my time and direct my efforts to where I wanted the Company to go strategically. And, finally, I was able to empower those people who had been coming to me with their problems to deal with them differently.

THE COMMITMENT OF TOP MANAGEMENT

To unleash the quality potential of people in an organization obviously requires more than the CEO's commitment. Senior management needs to understand and be fully committed to quality methods as well. This is the essential beginning of any successful corporate-wide TQM system.

A recent survey of 12 major companies by consultant Brooks International found that workers and mid-level executives do not believe top management is driven by quality. Top managers at these dozen companies talk quality but their behavior is different from their words.

Getting senior management to both "walk" and talk quality is the most important -- and perhaps, the most difficult -- task in implementing TQM. At Control Data that task started by my taking all of the top executives through a three-day training class in SQC.
There were plenty of mutterings about "I'm too busy," "I have a crisis," "Is this really the best use of my time?" and "I know all that stuff." We did it anyway. It is essential that management learn and practice the analytical and statistical tools that are the technical underpinning of any drive for quality. It is essential that they practice TQM as a team as well as individually. It is essential that they practice TQM and not just preach it.

Another important aspect of implementing TQM was letting employees at all levels know that I was committed to TQM. This involved more than corporate pronouncements. It was demonstrated by making quality the theme of the communications meetings and focus group sessions that I had regularly with small groups of employees. Quality was also, of course, a part of every communication, written or spoken, that I had with larger groups of employees.

Finally, I emphasized the importance of TQM by becoming involved in quality efforts outside the Company. I helped organize and became a board member of the Minnesota Council for Quality. I co-chaired with the governor of Minnesota a committee that recognizes and rewards quality and innovation in government. By these and other means, employees saw that TQM was a way of life for me and I expected the same from everyone in the Company.

So, to actively focus an organization on TQM requires:

* The commitment and involvement of the person at the top.

* The commitment and involvement of the entire senior executive group who are knowledgeable and practice what they preach.

* Incessant communication to both small and large groups of employees with an easily identifiable theme.

* External involvement and visibility of top management in promoting quality.

[possible GSG insert - “Outcomes”]
MANAGING QUALITY IN A SERVICES COMPANY

As I mentioned at the onset, Control Data was not only making a transition across the troubled seas of the computer industry, but was transitioning and restructuring itself from a company primarily focused on hardware to one focused on computer and information services.

In regard to this last point, it was essential that TQM be implemented into the services businesses of the Company even though the earliest fruits of our efforts came from manufacturing businesses such as the Small Disk Drive Division that I described earlier in my remarks.

The wellspring of the quality movement, however, is manufacturing. This has shaped the worldwide approach to quality. Any services business must be prepared to do a lot of pioneering.

Consider quality training. The typical training materials use examples from manufacturing. These must be adapted to services. This involves overcoming a serious communications barrier. When services executives are first exposed, because of the terminology and examples used, they tend to reject quality management techniques as "inapplicable."

But devising relevant training was one of the easier obstacles to overcome. A service is, by definition, produced simultaneously with use. The sequence of steps that produces service frequently involve "soft" or subjective outcomes rather than distinct, measurable product specifications.

Compared with a manufacturing process where measurement is perhaps the easiest part of the quality management task, there is much to be learned about services measurement -- gathering adequate and appropriate statistical data.

The Business Management Services Division of Control Data (BMS), for example, provides automated payroll, financial and human resources management systems. In 1984, the year TQMP was introduced, BMS lost 1 million U.S. dollars. Today, it is highly profitable, with a compounded annual profit growth rate of 154 percent over the past five years.
BMS achieved an outstanding service record in 1989 by delivering more than 99.5 percent of the payroll checks and associated reports it processed on time and right the first time. This was accomplished even though the number of checks it processed increased more than 14 percent over 1988. Customer retention is up. Customer satisfaction is up. Employee satisfaction is up.

In business, there's only one relevant definition of quality: meeting customers' needs and expectations. Service is not quality service unless it satisfies the needs and expectations of the customer. This, of course, requires a clear, and continuous, understanding on the part of the provider.

To gain that understanding, BMS uses a "gap analysis" technique based on a service quality model developed by Valarie Zeithaml, Leonard Berry and A. Parasuraman, authors of the book, Delivering Quality Service. According to the model, customers develop a set of expectations against which they judge the service delivered. Those expectations result from a lot of things, such as word-of-mouth communications, a set of personal needs, and certainly, past experience. The job of a service supplier is to understand clearly any gaps between what the customer expects and what the customer perceives they are receiving.

Take, for example, payroll checks. If 98 percent of BMS' customers say the delivery of payroll checks on time is important and only 90 percent are satisfied that this is being done, there is a gap of eight percent that has to be addressed.

To further enhance quality and productivity, BMS has adopted a "gainsharing" approach. This involves employees in setting and measuring objectives. It rewards them financially for achieving them. Employees at the BMS tax filing center in Baltimore, Maryland, have identified the number of penalties they are assessed as one quality measurement. A key measurement of productivity is the number of hours, on average, it takes to do a tax filing. Gains in these areas, and others, are evaluated on the basis of the financial performance of the organization.
It is interesting to note that the Brooks International survey I referred to earlier found two-thirds of all workers saying, and I quote: "The quality of work done is not an important measure of performance in my group." Only one-fourth believe "management does an excellent job of rewarding work groups who make quality improvement recommendations."

Overall, I have seen significant progress in TQM in Control Data and other companies. However, TQM is still too dependent on heroes and missionaries. Even "believer" CEOs do not adequately institutionalize TQM. It is still not adequately integrated into the mainstream processes of strategy formulation and day-to-day operations.

Champions may move on to other goals or organizations. CEO exhortation has its limits. So, the fundamental challenge of TQM is to make it an integral part of everyday management processes.

**EMBEDDING TQM**

In basic terms, there are two kinds of processes involved in enterprise management: one kinds has to do with strategy and planning; the other kind with monitoring, directing and controlling the implementation of those plans.

Embedding TQM in the strategy processes is actually the easier task. Strategy may be defined as a plan for seeking competitive advantage. But what that really means is that it is a plan for "meeting customer expectations" better than one's competitors. Thus, at the strategic level, "quality" and "strategy" are essentially synonymous.
Quality or quality is made explicit -- that is, it is deployed -- through a detailed list of strategic initiatives which address improvement in products, services and all the support activities that are part of achieving market share and financial goals. Each of these broad initiatives is further deployed into tasks involving technology, administrative, operational, training, human interaction and communication processes. Each process must have continuous measurement of time, cost, and its other dimensions. Each process comprises a set of tasks with individual responsibility. These strategic initiatives and their deployment constitute the operating plan for an organization. The budget is simply the income and cost quantification of this operating plan. Thus, starting with the broad strategic goal of "meeting customer expectation" -- there is a process of deployment which is reasonably comfortable for most organizations.

Implementation -- monitoring, directing, controlling to expected results of the plan -- is even more of a challenge in making TQM truly integral to the management style of an organization.

Most operations reviews result in reaction to problems -- problems in the reported numerical results or in the numbers in a forecast. Corrective action is obviously a part of executing any plan. But unless the primary focus of operations reviews and of day-to-day management is on the processes underlying the organization's strategic initiatives, sustained quality cannot be achieved. The business will react and react, and react again. It will "make do." It may well achieve short-term financial success. But it will not achieve sustained quality and financial performance.

Underpinning this whole concept of TQM -- of planning and strategy deployment, of implementation which focuses on continuous process improvement -- is excellence in human resource management. This is a matter of leadership and it is required of every manager at every level of a company. Achieving that is not easy. But the reward is more than strategic or financial success. It is also a natural and highly satisfying way of running an enterprise.

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Outcomes

I have already cited the dramatic change that occurred in Control Data’s magnetic disk drive business, thanks to TQM.

Let me mention one other.

Earlier this month Control Data’s Canadian operations of its Government Systems Group was awarded a $850M contract to manage a multi-year, multi-vendor project to upgrade the country’s military and national emergency communication system. There was a note of surprise that ran through much of the media coverage of that contract award. There would not have been had they known that this organization was one of the earliest and most aggressive in embracing TQM.

Consider these brief vignettes from the “Quality Journey” of GSG over the past six years:

*AYK-14 Mean Time Between Failures of 1100 to 1800 hours compared to a contractual agreement of 250 hours, while product cost dropped 40% over the past 6 years, and the number of shipments increased an order of magnitude. The Navy has set this computer as the Navy Standard Airborne computer and publicly claims this computer to be the most reliable system in the entire fleet.

*Gov’t Systems worked very closely with the Dept. of Defense in developing the DoD’s TQM (Total Quality Management); Jack Strickland, Dr. Richard Stimson, Frank Dourghty and a team of others responsible for the development of TQM for application within the Federal Government as well as Federal Government contractors used Control Data’s TQMP as their model. In his many hundreds of presentations across the country over the past several years, Jack Strickland has held Control Data Gov’t Systems up as an example of the result of taking quality seriously, even in the face of financial difficulties.
Monthly TQMP reviews were held at all levels in the company, from the Management Board (the President's Staff), to a review that crossed the Strategic Business Units, to reviews held internal to each SBU. The purpose of these sessions when they first began in 1985, was to act as a disciplinary step to make sure that everyone was picking up the flag and carrying it .... in very short order however, the organizations had success stories to tell and these sessions became a place to share and get positive recognition and support.

Because employees from the President to the people working on the line attended these meetings, it showed what the priorities were and top on the priority list was process improvement.

We had exchange meetings with 3M and IBM which began in 1981 and continued for seven years. We would take turns hosting the one day sessions at each of our facilities. These meetings were very informative, but best of all, even though everyone was very careful not to divulge any company private data or any data of a competitive nature, all three companies agreed that it was an IBM, or 3M, or CDC problem, it is a nationwide concern and we chose to work together, three competitors, to do what we could for the bigger picture.

Many CDC employees have been asked to present papers at Quality symposiums and seminars. Other companies in the community would come and spend a day with Gov. Systems, asking questions and discussing possibilities. First Banks, a group of Korean delegates, American Family Insurance, Earnst & Whinney, just to name a few. This was again in the context of dealing with a larger picture.