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Portents of the Year 2000 Computer Problem

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PORTENTS OF THE YEAR 2000 COMPUTER PROBLEM*

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TABLE OF CONTENTS

THE NATURE OF THE PROBLEM

You may recall the comic strip character Dilbert teaching that, "When the year 2000 comes, your computers will think it's the year '00' and cause major problems."[1]

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1. Scott Adams, *Dilbert®*, UNITED FEATURES SYNDICATE, INC., Sept. 17, 1996. Reprinted with permission.

The origin of the Year 2000 problem, of course, is the practice, originally adopted as a space-saving measure, of representing a year in two digits of computer storage instead of four, which necessarily assumed that every reference to a year was to a year in this century. The problem is that the need now exists to refer to the Year 2000, a reference that older "legacy" installations will not recognize.[2]

A significant portion of those older computers need to be replaced. Many are embedded computers — found, for example, in weapons systems, ships, turbines and many different kinds of manufacturing or control systems, including office telephone systems, fax machines, bank vaults and elevators.[3] Some older free-standing computers also will require replacement. For example, some IBM 3083 computers, in which the data functions were written in machine language and which IBM stopped shipping about 10 years ago, are still in use for air traffic control.[4]

SOFTWARE SOLUTIONS

Most discussion, however, has focussed on various software solutions to achieve "Year 2000 compliance," defined as the ability to recognize ac-

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2. The older computer systems will still interpret 00 to refer to the year 1900 and, utilizing current rules of interpretation, they will never refer to any year in the 21st century. Consequently, a calculation of the years between 12/31/98 and 12/31/00 could be either minus 98 or plus 98, depending on which number is used for the starting point, but it can never be two — the number needed if meant for "00" to refer to the year 2000, not 1900. *See* Leon A. Kappelman, *What is the Year 2000 Problem? – A Call to Arms, in* YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100, at 1, 2 (Leon A. Kappelman, 1997).

　　In the late 1950s, computer storage was severely limited and expensive compared with today's storage capacity. The IBM 650 rotating drum allowed the storage of no more than 2000 words. *See* Hal Byron Becker, Bits, Bytes and Bandwidth, Ch. 1 (draft unpublished memoir) (on file with the author). The cost of computer storage was 10,000 times more than it is now. *See* Leon A. Kappelman & Phil Scott, *What Everyone Should Know about the Year 2000 Century Date Problem, in* YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100, at 8 (Leon A. Kappelman, 1997).

3. The prevalence of legacy installations in our manufacturing systems was described in the magazine *Industry Week* as "The Real Year 2000 Nightmare." John Jesitus & Doug Bartholomew, *The Real Year 2000 Nightmare: Manufacturing Systems,* INDUSTRY WK., Jan. 5, 1998, at 22 (prevalence of legacy installations in our manufacturing systems). It is estimated that replacement of embedded chips will account for about 30% of total repair costs. *See The Millennium Bug,* THE ECONOMIST, Oct. 4, 1997, at 25, 29; *See also* Terry Costlow & Alexander Wolfe, *Embedded Systems May Harbor Hidden Glitches,* TECHWEB NEWS, (visited Oct. 24, 1998) <http://www.techweb.com/wire/story/TWB19980114S0002>.

4. IBM has advised the Federal Aviation Administration that those computers should be replaced before the year 2000. *See* Matthew L. Wald, *Warning Issued on Air Traffic Computers,* N.Y. TIMES, Jan. 13, 1998, at A16.

curately dates both before and after January 1, 2000.[5] Four of the methods that have been employed or proposed, described briefly in generic terms, are (1) date expansion; (2) clock modification; (3) windowing; and (4) date modification.

1. Date Expansion.

The *date expansion* method directs the user to survey each computer program and database in its portfolio to identify every location where dates or equivalent data compressions are in use and reformat each instance to use four instead of two digits.[6]

2. Clock Modification.

Clock modification (sometimes referred to as "encapsulation") involves changing all years in existing databases and the system clock by deducting 28 years. The reason for the use of the number 28 is that the calendar resets itself completely every 28 years; thus, calculations involving a day of the week will yield the same result for the years 1971 and 1999.[7]

3. Windowing.

The basic programming technique of *windowing* is to assume the century of a two-digit year by comparing it to an arbitrary window of 100 years. For example, a program may be devised to assume that, if the two-digit year is equal to or greater than 50, the year is a 20th century year (1950-1999), but otherwise it is a 21st century year (2000-2049). A sliding window of years can be designed to be self-adjusting over time.[8]

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5. *See* Bank of England, *The Definition of Year 2000 Conformity Prepared by British Standards Institute (Document Ref: DISC PD2000-1)*, FINANCIAL SECTOR PREPARATIONS FOR THE YEAR 2000 Feb 1998, at App. B (visited Nov. 4, 1998) <http://www.bankofengland.co.uk/y2t0298.htm>.

6. *See* Doyle E. Westbrook, *Programming Alternatives and Repair Actions for the Year 2000, in* YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100, at 114-116 (Leon A. Kappelman, 1997) (discussing advantages and disadvantages of date expansion).

7. *See* CAPERS JONES, THE YEAR 2000 SOFTWARE PROBLEM 186 (1998).

8. The program usually specifies the number of years in the past and the future within the window based on the current year identified in the current operating system date. *See Set the Century Window for Two-digit Years,* (visited Oct. 25, 1998) <http://www.storage.ibm.com/storage/software/sort/srtmycw.htm>. *See also* Capers Jones, *Dangerous Dates For Software Applications* (Ver. 2 Mar. 24, 1998) (visited Oct. 25, 1998) <http://www.year2000.com/archive/dangers.html> [hereinafter *Dangerous Dates* (Ver. 2)].

4.   Date Modification.

Date modification (sometimes referred to as "compression") involves changing the symbolic system used to represent different years so as to accommodate more than the traditional 100 numbers in the two digits allocated for that purpose.[9]

There are many techniques for modifying date representations. One technique for squeezing four digits of information into a two digit date field is described in a Wall Street Journal article of June 20, 1997 under the intriguing title "Bob Bemer Aims 'Silver-Plated Bullet' at Year 2000 Problem."[10] Another technique is the subject of a patent entitled "Two-Digit Hybrid Radix Year Numbers for Year 2000 and Beyond."[11]

BENEFITS, AND COSTS

Given the vast expansion of computer storage in recent years, the date expansion method seems the obvious right way to go: It should fix the problem until the year 9999 — beyond any time period of interest to the most concerned user (or lawyer).

However, there are current difficulties in implementing such a solution that must be acknowledged. The principal ones are (1) time, (2) cost, and (3) the proliferation of error.

First, there are not enough programmers available to repair in a timely manner all defective applications by a time-consuming, line-by-line approach. Although there are about two million professional software personnel in the United States, few are familiar with the languages used in the

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9.   *See generally, Dangerous Dates* (Ver. 2), *supra* note 8.

10.   Thomas Petzinger, Jr., *Bob Bemer Aims 'Silver-Plated Bullet' at Year 2000 Problem,* WALL ST. J., June 20, 1997, at B1. *See also* Jones, *supra* note 7, at 129-30; Capers Jones, *Dangerous Dates For Software Applications* (Ver. 5, May 1, 1998) (on file with author) [hereinafter *Dangerous Dates* (Ver. 5)]; Capers Jones, *The Euro, The Year 2000, And The Software Personnel Shortage* 15 (Apr. 28, 1998) (on file with author); Peter Wayner, *Wanted: A Fix With Finesse for Year 2000 Problem,* N.Y. TIMES, Apr. 23, 1998, at D11; Russ Baker, *A Computer Pioneer Comes out of the Past to Fix the Year 2000 Glitch,* THE NEW YORKER, Jan. 12, 1998, at 30; Alden M. Hayashi, *Millennium Bug Zapper,* SCIENTIFIC AM., June 1998, at 36. No invention has proven a solution that could fairly be described as "a silver bullet." Thus, knowledgeable observers have noted that Mr. Bemer's approach addresses only code conversion, reflecting only about 20% of the cost of fixing the Year 2000 problem. Tim Ouellette & Robert L. Scheier, *Cobol Pioneer Pitches Year 2000 Fix,* COMPUTERWORLD, Aug. 11, 1997, *available in* 1997 WL 7735315. Nevertheless, John DiPetto has adopted the name "Silver Bullet Solution™" by which to promote a file conversion technique. *See* John DiPetto, *Welcome to the Silver Bullet Solution™ for the Year 2000 and Beyond!,* SILVER BULLET SOLUTIONS (Sept. 23, 1997) (on file with author).

11.   United States Patent No. 5,668,989, issued Sept. 16, 1997.

legacy applications dating back to the 1960s (such as COBOL, Lisp, RPG and PL/1), let alone the programs written in assembly language.[12]

Second, the cost of such an approach can be enormous. A typical Fortune 500 organization is said to have a portfolio of 50 to 100 million lines of code with a current repair cost of about $2 per line.[13] The individual cost estimated by ten large companies, as reported in a recent Wall Street Journal article, ranges from 179 to 600 million dollars.[14]

Third, it must be recognized that fresh mistakes and errors inevitably will escape detection[15] and, consistent with Murphy's Law, may result in degradation of system performance at the most inconvenient times. Murphy's Second Law, the reader will recall, decrees that "everything that can go wrong, will go wrong — and at the worst possible time." One company reported that a software package that was supposed to be Year 2000 compliant worked fine in tests switching from December 31, 1999 to January 1, 2000. It then continued to work fine on January 31, 32, 33, and 34.

All of the other methods have advantages in minimizing or overcoming those difficulties. However, it also must be recognized that each method introduces its own problems.

For example, each method invites some performance degradation due to increased processing time or a greater maintenance burden.[16] Each method may cause a computer system to fail for lack of compatibility with other systems on which it depends. Again, by way of example, two com-

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12. *See* Capers Jones, *Global Economic Impacts of the Year 2000 Problem, in* YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100, at 12, 24 (1997).

13. Ed Yourdon has written in the February 1996 issue of AMERICAN PROGRAMMER that the typical Fortune 500 organization has a portfolio of 50-100 million lines of code. *See* Thomas McCabe, *Cyclomatic Complexity and the Year 2000,* IEEE SOFTWARE, May 1996, at 115.

  The cost was previously estimated at from $1.40 to $1.70 per line of code, recently increasing to $2.00 per line. Using $1.50 per line as the average cost of repairing source code, it has been estimated that a typical Fortune 500 company will incur about $30 million in compliance expense. *See* Warren S. Reid, *The Year 2000 Crisis: What Surprises Are Left?,* CYBERSPACE LAW., Sept. 9, 1997, at 9.

  Gartner Group consultants have estimated that a typical mid-sized company "could spend as much as $3 million to $4 million in personnel and computer resources to make the required changes." *See Frequently Asked Questions about the Year 2000 Challenge* (visited Oct. 16, 1998) <http://www.software.ibm.com/year2000/faq.html>.

14. Lee Gomes, *Companies Estimate 'Year 2000' Computer Costs,* WALL ST. J., Apr. 9, 1998, at B8. The ten companies providing their spending projections were (in millions): Citicorp ($600); General Motors ($410-540); BankAmerica ($380); AT&T ($350); GTE ($350); Chase Manhattan ($300); Bell Atlantic ($200-300); J.P. Morgan ($250); Bankers Trust ($180-230); Owens Corning ($179).

15. *Dangerous Dates* (Ver. 5), *supra* note 10, at 19-20.

16. *See* JONES, *supra* note 7, at 185 (reporting that windowing and compression both exact performance penalties, but those associated with compression "are not as severe").

panies both using a windowing system will risk the intrusion of major problems if they use different pivot years.[17]

In terms of cost, windowing offers the advantage of requiring only program changes without any data conversion. Compilers (which convert source code, written in high level languages, to object code) thus can be used to implement the needed program changes, making windowing much cheaper to implement.[18]   However, every year number still must be correctly identified.

The date modification technique promises even greater cost savings. An implementation of the Hybrid Radix technique called "The 19T0 Solution" is the invention of David and William Lappen.[19]   They explain that, for computer programs written in high level languages, the changes needed can be incorporated in compilers and their run-time support libraries and automatically implemented by recompilation of existing application programs. All changes would be automatically made in all proper variables by the recompilation process. In that way, the technique offers the promise of tremendous time and cost savings. But those benefits are mainly available only by repair of unadulterated source code, which may not be available.

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17.   *See id.*

18.   *See News at Progestic International* (last modified Apr. 21, 1997) <http://www. progestic.com/docs/n970304.htm>. "Projects using DVR 2000 resulted in a cost of $0.34 US per line of code while the same projects using the sliding window and date definition expansion resulted in a cost of $1.10 US and $1.70 US per line of code, respectively." *Id.*

19.   *See* 19T0 Home Page (visited Nov. 5, 1998) <http://www.19t0.com>.

ANCILLARY PROBLEMS

I would be remiss if I did not mention that the Year 2000 problem is not the only one that requires immediate attention.[20]

A particularly interesting historical problem is that the year 2000 is a leap year but the year 1900 was not. Consequently, a computer program for the year 1900 will not acknowledge the existence of February 29, 2000.[21]

Another fix may be required for those programs that calculate the day of the week from a future date because January 1, 1900 was a Monday, whereas January 1, 2000 will be a Saturday.

An even earlier fix may be required to avoid the problems resulting from the common usage of the numbers "99" or "9999" to indicate termination of a page or file or an unknown date, which may be misinterpreted as the date September 9, 1999.[22]

For companies doing business in one or more of the 11 countries of the European Monetary Union ("EMU"), or with other companies in the EMU, significant computer adjustments will be needed.[23] The adjustments will be required both to accommodate the conversion of the currencies of

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20. A number of anticipated operational problems, both immediate and intermediate, are recounted in *Dangerous Dates* (Ver. 5), *supra* note 10. In addition to those described in the text, Jones outlines date problems such as will be created when the UNIX and C libraries roll over (on Jan. 18, 2038) *See id* at pp. 23-24; when telephone numbers and social security numbers will exceed the capacities of their respective number systems (estimated at circa 2025) pp. 22, 26; and when the Dow-Jones Industrial Average tops 10,000 (estimated at circa 2010) p. 21. *See also* Lynda Radosevich, *Market's Bull Run Could Crash Computers*, (visited Oct. 25, 1998) <http://www.infoworld.com/cgi-bin/displayStory.pl?98058.whdox.htm>. Jones also describes problems inherent in using common applications that use dates or have calendar routines as embedded functions, as in various Microsoft programs. JONES, *supra* note 7, at 23-25. For example, the Excel 95 spreadsheet package handles dates only up to 2019 using 2-digit dates, or up to 2078 using 4-digit dates. *Dangerous Dates* (Ver. 5), *supra* note 10, at 25.

21. Matthew L. Wald, *Leap Day 2000 Might Pose Big Problem for Some Computers' Software*, N.Y. TIMES, Feb. 9, 1998, at D5. When Julius Caesar decreed in 46 B.C. the addition of one day every four years to the annual calendar on the assumption that the Earth takes 365 1/4 days to circumnavigate the Sun, he did not take full account of the speed of the Earth's movement. It turns out that the Earth moves eleven minutes fourteen seconds faster every year. In result, Spring was arriving one additional day earlier each 128 years. In 1582, aided by advice from a Neapolitan physician and a German astronomer, Pope Gregory XIII dropped the ten days that had accumulated (so that October 5, 1582 was followed by October 15, 1582) and, as a future adjustment, he ordained that leap years not be observed in any year ending in 00 unless that year is evenly divisible by 400. *See* JEROME T. MURRAY & MARILYN J. MURRAY, THE YEAR 2000 COMPUTING CRISIS 1-5 (1996); .

22. *Dangerous Dates* (Ver. 5), *supra* note 10, at 15.

23. Andrew Ross Sorkin, *A Year Before the Millennium Bug, There's the Euro Problem*, N.Y. TIMES, Mar. 9, 1998, at D2.

those countries to the new euro currency on January 1, 2002, and the regulations governing the transition period starting on January 1, 1999.[24]

As only one example of the detail of those regulations, the conversion of monies between euro-zone members must be by a triangulation process — converting one national currency into euros and then converting the euros into a second national currency, with the intermediate euro containing at least three places of decimals before being rounded.[25]

I am informed that virtually no computer system installed prior to 1998 was designed to handle the triangulation requirement, let alone compliance with all of the other regulations.

One consequence is that a world-wide search for programmers to make the required EMU adjustments is underway, contributing to the continuing difficulty and increasing cost of timely achievement of Year 2000 compliance.[26]

LITIGATION IMPLICATIONS

The overall consequences of the year 2000 problems are viewed as from serious to disastrous, depending on the date-dependant computer system function that is affected. Grave concern has been expressed particularly as to the performance of key functions in the banking and financial services industries,[27] in industries dependent on the furnishing of elec-

24. *See* Brendan Lawlor, EMU Compliant Software — Through The Looking-Glass 11 (Dec. 1, 1997) (draft manuscript on file with Price Waterhouse Management Consultants, Dublin). *See generally* Edmund L. Andrews, *11 Nations Taking Next Pivotal Step Toward Euro*, N.Y. TIMES, Apr. 26, 1998, at 1 (discussing European leaders yielding individual control over exchange rates); Thomas Kamm, *EMU Is Born Amid Battle Over Central Bank*, WALL ST. J., May 4, 1998, at A17 (discussing selection of Wim Duisenberg to run the European Central Bank (ECB)).

25. *See* Lawlor, *supra* note 25, at 14-21. *See also* Clifford Chance, *Conversion and Rounding*, EUROPEAN MONETARY UNION: THE LEGAL FRAMEWORK 15-18 (Oct. 1997).

26. *See* Capers Jones & Jan Hufmann, *Resource Conflicts between Year/2000 and Euro-Currency Conversion Problems* (visited Oct. 25, 1998) <http://www.y2kjournal.com/issues/issue_7/jones.htm>.

27. In the United States, the Federal Financial Institutions Examination Council (the FFIEC) recently issued two interagency statements providing guidance concerning the risks to member agencies of non-compliance by customers and from the inability of service providers and software vendors to respond to demands by customers on them. *See generally Guidance Concerning the Year 2000 Impact on Customers* (last modified Mar. 27, 1998) <http://www.ffiec.gov/y2k/impact.html>; *Guidance Concerning Institution Due Diligence in Connection with Service Provider and Software Vendor Year 2000 Readiness* (last modified Mar. 27, 1998) <http://www.ffiec.gov/ y2k/vendor.html>. The FFIEC agencies are the Board of Governors of the Federal Reserve System, Office of the Comptroller of the Currency, Federal Deposit Insurance Corporation, Office of Thrift Supervision and National Credit Union Administration. The statements are summarized in *FFIEC Publishes Year 2000 Guidance*, DELOITTE & TOUCHE REVIEW, Apr. 13, 1998, at 3. The Securities and Exchange Commission has enacted a rule for the

tric power, and in governmental regulation and record-keeping (e.g., Social Security benefit qualifications, medical histories, transportation system maintenance, and telecommunications transmission).[28]

A Wall Street Journal front page article on May 4, 1998, reported a projection by Edward Yardeni, an economist with Deutsche Morgan Grenfell, that the odds of a global recession caused by the Year 2000 problem were 60%.[29] Other projections are less alarming, but the article ends with an admission that "no one really knows" how easily big problems can be remedied.[30]

One respected observer, Capers Jones, Chairman of Software Productivity Research, has projected that 5-7% of the 30,000 companies in the United States qualifying as mid-size will probably fail "due to year 2000 problems"[31] — by which, I take it, he means either a failure to achieve timely Year 2000 compliance or distress from the added burden of unproductive costs.

The litigation implications of the situation I have described are ominous. Several suits already have been filed:

A retailer in Michigan has sued the maker of its sales terminals, installed in 1995, because the terminals cannot handle credit cards that expire

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filing of readiness reports by non-bank registered transfer agents. *See* Year 2000 Readiness Reports to be Made by Transfer Agents (Correction), 17 C.F.R. pt. 240 (visited Oct. 25, 1998) <http://www.sec.gov/rules/final/34-40163a.htm>.

The Securities Industry Association ("SIA") has established committees to address elements of a compliance program. *See SIA Year 2000* (visited Oct. 25, 1998) <http://www.sia.com/year2000>. In Great Britain, the Bank of England has published a guide to preparations by regulated institutions to achieve Year 2000 compliance. *See* Bank of England, *supra* note 5. The document contains a section on international preparations based on material provided by the Federal Reserve Bank of New York. *See* Bank of England, *supra* note 5, at 20-24.

28.   *See* JONES, *supra* note 7, at 173 (noting that the Year 2000 problem may disrupt electric power for as along as one week). *See also* Matthew L. Wald, *Few Answers on Monster of All Cyberbugs*, N.Y. TIMES, Mar. 19, 1998, at A17. A number of statutory remedies protecting against suits against governmental agencies have been proposed. Nevada and Georgia have enacted statutes in effect preserving sovereign immunity to protect against suits based on computer generation of an incorrect date. *See* NEV. REV. STAT. § 41.0321 (Michie 1996 & Supp. 1997); GA. CODE ANN. § 36-60-20 (Michie 1993 & Supp. 1998). The Georgia statute qualifies the immunity by the conditions that "the failure or malfunction causing the loss was unforeseeable" or the plan or design "was prepared in substantial compliance with generally accepted computer and information system design standards in effect at the time . . . ." GA. CODE ANN. § 36-60-20(B) (Michie 1993 & Supp. 1998).

29.   David Wessel, *The Outlook—Year 2000 Is Costly, But Not Catastrophic*, WALL ST. J., May 4, 1998, at A1.

30.   *Id.*

31.   Capers Jones, *Global Economic Impacts of the year 2000 Problem*, YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100, at 12, 19 (1997).

after 1999.[32] Three suits filed in California and one in Ohio complain that the defendants — suppliers of software packages — have not offered their customers the fixes they have available except upon payment of a fee for purchase of an updated program.[33] The claims variously asserted include breach of an implied warranty of merchantability, violation of the Magnuson-Moss Consumer Product Warranty Act, fraud, and unfair business practices. All parties filing suit, of course, are seeking class action status. Future cases seem likely to be premised on every conceivable contract, statutory and tort theory against every conceivable target.[34]

Defendants will not lack for defenses of their own. In shareholder suits, directors, of course, will rely on proof of prudent conduct and the Business Judgment Rule.[35] Two other defenses that are likely to be key in many cases are: (1) the assertion of the applicable statute of limitations;[36] and (2) the invocation of the economic loss doctrine (rejecting damage

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32. Produce Palace Int'l v. TEC-America Corp., No. 97-CK (Mich. Cir. Ct., Macomb County filed June 12, 1997).

33. Atlaz Int'l, Ltd. v. Software Bus. Techs., Inc., No. 172539 (Cal. Super Ct., Marin County filed Dec. 2, 1997); Capellan v. Symantec Corp., No. CV772147 (Cal. Super. Ct., Santa Clara County filed Feb. 19, 1998); Paragon Networks Int'l v. Macola, Inc., No. 98 CV 0119 (Ct. of C.P., Marion County, Ohio filed Apr. 1, 1998); Issokson v. Intuit Inc., No. CV 773646 (Cal. Super. Ct., Santa Clara County filed Apr. 28, 1998).

34. *See* Warren S. Reid and Steven Brower, *BEYOND AWARENESS: Ten Management and Ten Legal Pitfalls Regarding The Year 2000 Computer Problem That You May Not Have Considered, YET!* (visited Oct. 14, 1998) <http://www.year2000.com/ archive/beyond.html>.

Potential defendants include suppliers of computer systems, software, and services; business managers (including corporate officers and directors); professional advisers (lawyers and accountants); consultants; providers of telecommunications, financial, building management, and other computer-dependent services; insurers; and all other "targets."

35. A director shall discharge his duties as a director "(1) In good faith; with the care an ordinarily prudent person in a like position would exercise under similar circumstances; and in a manner he reasonably believes to be in the best interests of the corporation." MODEL BUS. CORP. ACT § 8.30(a) (1997). Some states that have codified the rule have added a requirement of "reasonable inquiry." *See* CAL. CORP. CODE § 309(a) (West 1990).

The Business Judgment Rule is codified in Section 141(e) of the Delaware General Corporation Law as follows:

"A member of the board of directors . . . shall, in the performance of his duties, be fully protected in relying in good faith upon the records of the corporation and upon such information, opinions, reports or statements presented to the corporation by any of the corporation's officers or employees, or committees of the board of directors, or by any other person as to matters the member reasonably believes are within such other person's professional or expert competence and who has been selected with reasonable care by or on behalf of the corporation."

DEL. CODE. ANN. tit. 8, § 141(e) (1996).

36. The Year 2000 problem received public attention by 1995 when credit cards with 5-year expiration dates hit the Year 2000 barrier and those with expiration dates after December 31, 1999 stopped being accepted. *See Dangerous Dates* (Ver. 5), *supra* note 10, at 17. It achieved notoriety no later than the time of the publication of the Dilbert cartoons in September 1996.

claims that would undermine the warranty provisions of the Uniform Commercial Code, thus in effect eliminating most tort claims).[37]

In addition, on October 19, 1998, the President signed the Year 2000 Information and Readiness Disclosure Act.[38] To advance its declared purpose of encouraging the disclosure of relevant information, the Act (i) limits the admissibility of any "year 2000 readiness disclosure" to prove the accuracy or truth of any "year 2000 statement" (both defined and narrowly circumscribed terms) contained therein and (ii) limits liability for any false, inaccurate, or misleading year 2000 statement. However, the limited scope of the Act makes it of doubtful utility. Moreover, the "bad faith or fraud" and "actual knowledge" exceptions to the operative limitations in the Act[39] may increase the risk of reliance on the Act by focusing the litigation on the state of mind of a defendant accused of making an inaccurate statement.

Two related points deserve emphasis:

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37. In Seely v. White Motor Co., 63 Cal. 2d 9, 403 P.2d 145, 45 Cal. Rptr. 17 (1965), the California Supreme Court held that economic losses due to product defects are not recoverable by imposition of strict liability absent personal injury or injury to other property. Kaiser Steel Corp. v. Westinghouse Elec. Corp., 55 Cal. App. 3d 737, 747, 127 Cal. Rptr. 838, 845 (1976), reinforced that ruling by holding that strict liability cannot be used as a basis for recovery for a product defect if the buyer's injury arose out of a commercial transaction between commercially sophisticated parties. A majority of states now follow the *Seely* ruling. See East River S.S. Corp. v. Transamerica Delaval, Inc., 476 U.S. 858 (1986); Laurens Elec. Coop. v. Altec Indus., Inc., 889 F.2d 1323, 1325 (4th Cir. 1989) (adopting the economic loss rule under South Carolina law, noting that the unanimous decision in East River should have a "substantial harmonizing influence" in the law); Bocre Leasing Corp. v. Gen. Motors Corp., 645 N.E.2d 1195 (N.Y. 1995) (adopting majority rule as set forth in East River and citing supporting authorities).

A majority of the cases that have considered the question have applied the doctrine to preclude recovery of economic losses in negligence actions. See Zamora v. Shell Oil Co., 55 Cal. App. 4th 204, 211, 63 Cal. Rptr. 2d 762, 766 (1997). Some dissenting courts have relied on the California Supreme Court's decision in J'Aire Corp. v. Gregory, 24 Cal. 3d 799, 804, 598 P.2d 60, 63, 157 Cal. Rptr. 407, 410 (1979), which recognized a cause of action for negligent interference with prospective economic advantage if a "special relationship" existed between the parties. Ott v. Alfa-Laval Agri, Inc., 31 Cal. App. 4th 1439, 1448, 37 Cal. Rptr. 2d 790, 796 (1995). However, at least one court, has confined *J'Aire* to the negligent performance of services rather than the sale of goods. *See* Sacramento Reg'l Transit Dist. v. Flxible, 158 Cal. App. 3d 289, 300, 204 Cal. Rptr. 736, 744 (1984).

38. *See* Year 200 Information and Readiness Disclosure Act of 1998, Pub. L. No. 105-271, 112 Stat. 2386.

39. *E.g.*, a year 200 readiness disclosure statement may be admitted in evidence to serve as the basis for a claim for anticipatory breach of contract, and the court in any case is given discretion to limit application of the Act if the court determines that the maker's use of the statement amounts to bad faith or fraud or "is otherwise beyond what is reasonable to achieve the purposes of this Act." Year 2000 Information and Readiness Disclosure Act of 1998, Pub. L. No. 105-271, § 4(a), 112 Stat. 2386. Similarly, the limitation of liability under the Act is inapplicable if a claimant establishes by clear and convincing evidence that the maker had "actual knowledge that the year 2000 statement was false, inaccurate, or misleading" or was made with a "reckless disregard as to [its] accuracy." *Id.*, at 4(b)

First, given the size of the dollar expenditures required to achieve Year 2000 compliance and the attendant risks, many companies will be obliged to consider whether the company should sue, or at least sue over against a third party defendant, those who are or may be primarily or jointly responsible for losses or liabilities incurred.

It is noteworthy in that regard that a great many Securities Exchange Commission ("SEC") filings have made a point of qualifying assurances of only non-material losses by stating that "the corporation could be adversely impacted by the *Year 2000* date issue if suppliers, customers and other businesses do not address this issue successfully."[40]

Second, litigation may focus on the incurring of excessive cost — that is, choosing a more expensive solution when a suitable one was available that would or might have been less expensive. It is not hard to imagine a management critic, following the example of Dilbert, expressing shock at the cost of fixing a Year 2000 problem.[41]

What are the chances that everyone with a modicum of responsibility for curing a Year 2000 problem will be found to have acted prudently to do the right thing at the right time in the most efficient way — that is, in the most cost-effective way? I don't know, but I do know that the percentage chance that some jurors will find some defendants liable is greater than zero.

The Irish humorist Hal Roach provides an apt allegory. He tells of the teacher who asked Patrick, a ten-year old who had appeared less than attentive to the lesson of the day, who it was that blew down the walls of Jericho. He responded, "I don't know, but it wasn't me." The teacher later told Patrick's mother of her son's answer, and the mother said, "If my son

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40. *See* United Technologies Corp., Form 10-K (Feb. 17, 1998). Other filed statements have acknowledged that, notwithstanding the company's efforts, it could "potentially experience disruptions to some aspects of its various activities and operations as a result of non-compliant systems utilized by unrelated third party governmental and business entities." *See* Exxon Corp., Form 10-K (Mar. 18, 1998).

41. Scott Adams, *Dilbert®*, UNITED FEATURES SYNDICATE, INC., Sept. 19, 1996. Reprinted with permission.

says it wasn't him, then he didn't do it!" The teacher then saw the boy's father and recounted what both his son and his wife had said. The father interrupted and said, "Look, I don't want any trouble. Just tell me how much it will cost to repair that wall."