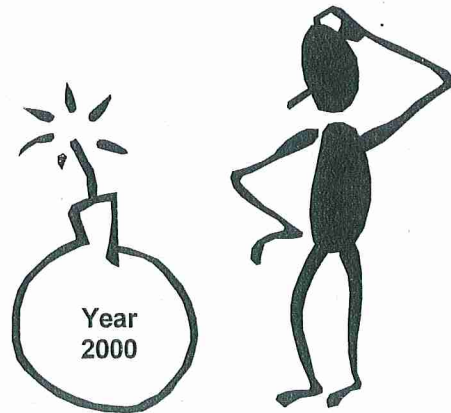


**Minnesota State Colleges & Universities
Office of Internal Auditing**

Final Report

The Year 2000 Computing Problem



July 1998

Public Copy Release Date: July 21, 1998

For more information, additional copies or alternative formats, such as large print, Braille, or audio tape, call 651/296-3471.

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Minnesota State Colleges & Universities

Honorable Nancy Brataas, Chair
MnSCU Audit Committee

Members of the MnSCU Audit Committee and other Members of the Board of Trustees

Chancellor Morris Anderson

MnSCU Presidents

Much has been written about the so-called "Year 2000 Computing Problem." Speculations on the severity of this problem range from an impending crisis to an overstated paranoia. Conventional wisdom, however, advises that organizations must assess their vulnerability to this problem and take the steps necessary to continue critical operations into the next millenium.

We conducted this audit in compliance with the *Institute of Internal Auditors Standards for Professional Practice* and the *Information Systems Audit and Control Association Standards for Information Systems Auditing*. This report represents the first final report of the MnSCU Office of Internal Auditing. I am extremely proud of my staff in completing this report. Although we do not yet have a full complement of employees, we managed to visit all 36 colleges and universities during June 1998.

The overall conclusions show that MnSCU colleges and universities recently have made good progress in the early phases of a successful "Year 2000 project." In particular progress has been made in the awareness and inventory phases of this project. Despite a late start, colleges and universities are beginning to position themselves to resolve the adverse consequences associated with this problem.

Much remains to be done, however. In particular, the System Office and the two largest universities have made limited progress. As a result, the organization's vulnerability remains far too uncertain. Valuable time continues to be lost as the clock ticks toward the next millenium. The MnSCU Office of Internal Auditing will continue to monitor progress and offer advice on how to resolve this problem.

Sincerely,

A handwritten signature in cursive script that reads "John Asmussen".

John Asmussen, CPA, CIA
Executive Director
MnSCU Office of Internal Auditing

End of Fieldwork Date: June 26, 1998
Public Release Date: July 21, 1998

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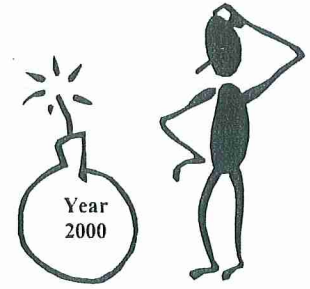
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**MnSCU Office of Internal Auditing
Final Report:
The Year 2000 Computing Problem
July 1998**



Audit Scope

This project included the MnSCU system office and all 36 colleges and universities in the system. It examined preparedness for the Year 2000 computing problem in several areas that are vulnerable to disruptions, failure, or unanticipated computing results. These areas included administrative and information technology, academic computing, and facilities. Consideration was given to the impact of this problem on computer hardware, software, embedded technology, interdependencies, and business relationships.

The evaluations in this report focused on conditions in place as of June 26, 1998. Internal Auditing will continue to conduct quarterly follow-up reviews to assess the progress made toward resolving this problem.

Purpose & Objectives

The primary purpose of this project was to assess the readiness of MnSCU and its colleges and universities for the Year 2000 computing problem. The project proposal presented to the Audit Committee on March 17, 1998 identified the following objectives for the project:

- Has MnSCU recognized the implications of this problem and initiated sufficient actions to ensure business continuity in the next century?
- Has MnSCU assigned clear responsibilities for diagnosing this problem, allocated sufficient resources to the project, and established reasonable timeframes for implementing corrective actions?
- Have MnSCU's core information systems been assessed for Year 2000 compliance?
- Have MnSCU colleges and universities inventoried and assessed systems, hardware, and firmware for Year 2000 compliance?
- Have adequate testing and quality assurance plans been developed?
- Have adequate contingency plans been developed to ensure that critical operations will continue with minimal disruption?

Methodology & Extent of Testing

At the outset of this project, the MnSCU Office of Internal Auditing contacted each college or university president and requested contacts for functional areas that would be vulnerable to Year 2000 computing problems. Contacts were requested for administrative and information technology systems, academic computing, and facilities. In April 1998, representatives of Internal Auditing conducted preliminary interviews with college and university contacts to the extent possible. The results of these preliminary interviews were used to prepare the interim report that Internal Auditing released to the Audit Committee on April 28, 1998.

The Office of Internal Auditing also completed the following procedures:

- Researched best practices and actions being taken by other organizations (See Appendix B for a list of resources).
- Developed criteria to measure the sufficiency of actions taken to prepare for the Year 2000 computing problem. Confirmed the validity of this criteria with the MnSCU Chief Information Officer, System Office Director of MIS Operations, and Vice Chancellor – Chief Financial Officer. (See Appendix C for a copy of the criteria)
- Conducted on campus interviews with most contacts identified by presidents (see Appendix A for a complete list of interviewees). Internal Auditing visited every MnSCU college and university during June 1998.
- Analyzed the results; searched for noteworthy accomplishments, trends, and additional actions needed.
- Reviewed documentation for any project phases that campus contacts believed to be complete (phases colored green on the chart in Appendix D).
- Discussed judgments with presidents or interim presidents of the colleges and universities. Advised the presidents on the next steps that were appropriate for their respective colleges and universities. Shared best practices between colleges and universities.
- Distributed a draft report for comment to the Chancellor, Vice Chancellor – Academic Affairs, and Vice Chancellor – CFO.

Based on these procedures and analysis of the evidence, Internal Auditing has developed the findings and recommendations contained in this report. Furthermore, Internal Auditing will follow-up on the status of these findings and recommendations and produce quarterly reports for the presidents and members of the Board of Trustees.

Overall Conclusions

In the past few months, many MnSCU colleges and universities have made significant progress in addressing the Year 2000 computing problem. 22 of the 36 colleges and universities have made good progress in heightening the awareness about the problem. 24 colleges and universities have made good progress on inventorying areas that are vulnerable. These steps will provide the colleges and universities with a foundation for protecting themselves against the adverse consequences of this problem. The progress to date has occurred with limited leadership from the MnSCU system office. MnSCU Internal Auditing has filled some of the void and helped get several colleges and universities started. System office leadership, however, remains essential for the successful completion of this project.

There is still time for the system office to take actions that will constructively add efficiency. For example, it could develop common educational materials, such as a website and listserv, and coordinate communications with common business partners, such as the U.S. Department of Education. At this point, however, it is essential for any system office efforts to complement the actions already started by colleges and universities.

The system office must assume responsibility for assessing the Year 2000 readiness of the MnSCU administrative systems, e.g., accounting, human resources, and student systems. Because these systems are so critical to the colleges and universities, the system office must communicate positive assurance that the systems are Year 2000 compliant. Also, the system office must assemble an overall financing plan to ensure there are sufficient resources to remedy problems.

It is important for the colleges and universities to continue making rapid progress. All colleges and universities should attempt to be substantially complete with the first four phases of this project (awareness, inventorying, assessment, and renovation) by the end of calendar year 1998. This goal is within reach, but will require diligent efforts. Most of calendar 1999 will be required for comprehensively testing the readiness of systems and devices and developing contingency plans to protect against unforeseen circumstances.

Background

Existing computer hardware, software, and equipment with embedded technology that create, store, and/or use two digit dates, is at risk for Year 2000 failure. On January 1, 2000, these systems will either stop running, or produce illogical or erroneous results. The potential impacts of this problem, if not addressed, could range from minor nuisances to major shutdowns.

What does this mean to the Minnesota State Colleges and Universities (MnSCU)? At this point it is unclear what all the effects would be, it depends on what is found to be not Year 2000 compliant. However, some potential effects if Year 2000 issues are not resolved include:

- Administrative - not being able to register students, collect tuition, pay invoices, print documents, or make telephone calls.
- Facility – having malfunctioning energy management systems (no heat in classrooms), security systems, fire alarm systems, or elevators.
- Academic – students may be unable to use computer and science labs, classroom equipment, and/or purchase books.

Computer technology is critical for accomplishing the overall MnSCU mission. Computer systems support administrative functions such as financial accounting, personnel and payroll, purchasing and accounts payable processing. In addition, administrative systems support student registration and grades, classroom scheduling, and communication with students, faculty, staff, and other constituents. Many sophisticated technologies are embedded in the heating and cooling systems, security and fire alarm systems, telephone systems, and elevators. Technology is also used extensively in academic programs. Colleges and universities use satellite teaching technology. Equipment in libraries, science laboratories, automotive and carpentry shops, and computer labs, are only a few of the areas that need to be evaluated for Year 2000 problems.

Some potential problem areas already identified by the system office and colleges and universities include:

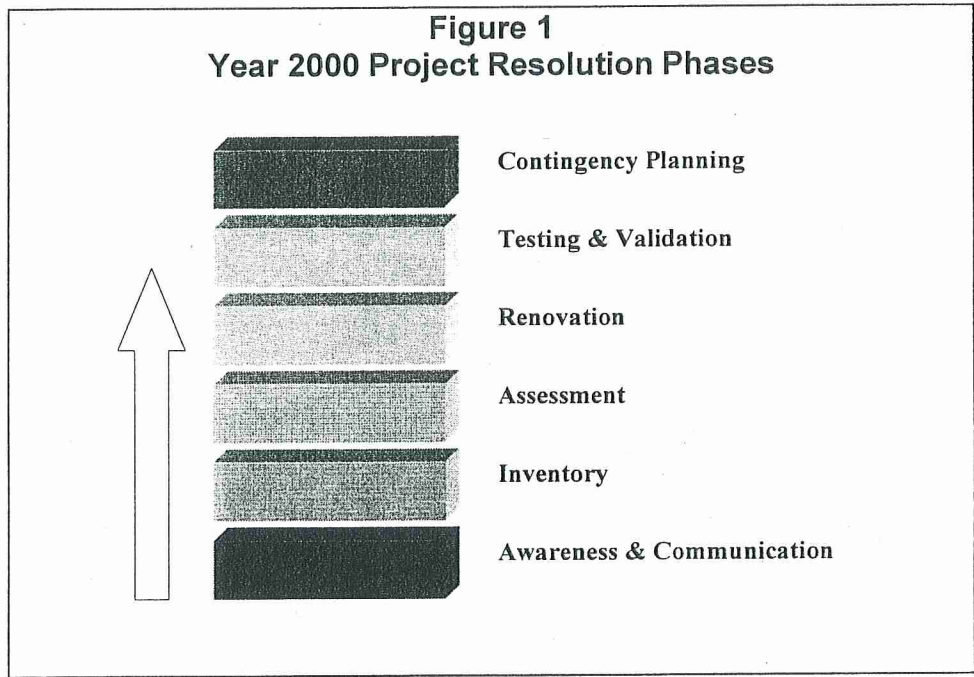
- Some energy management systems are not compliant.
- Thousands of computer workstations are not compliant.
- Many local area networks need to be upgraded or replaced.
- A few routers that support the centralized administrative systems, provide security, and allow college and university campuses to communicate are not compliant.

Currently, the system office and campuses are in the process of assessing the impacts on these non-compliant items. It is unknown, at this time, whether the impacts will be minimal or a major concern.

Colleges and universities have also found many systems and devices that are Year 2000 compliant or that are not date sensitive. However, until the full project is completed, much uncertainty will remain, particularly in the academic area.

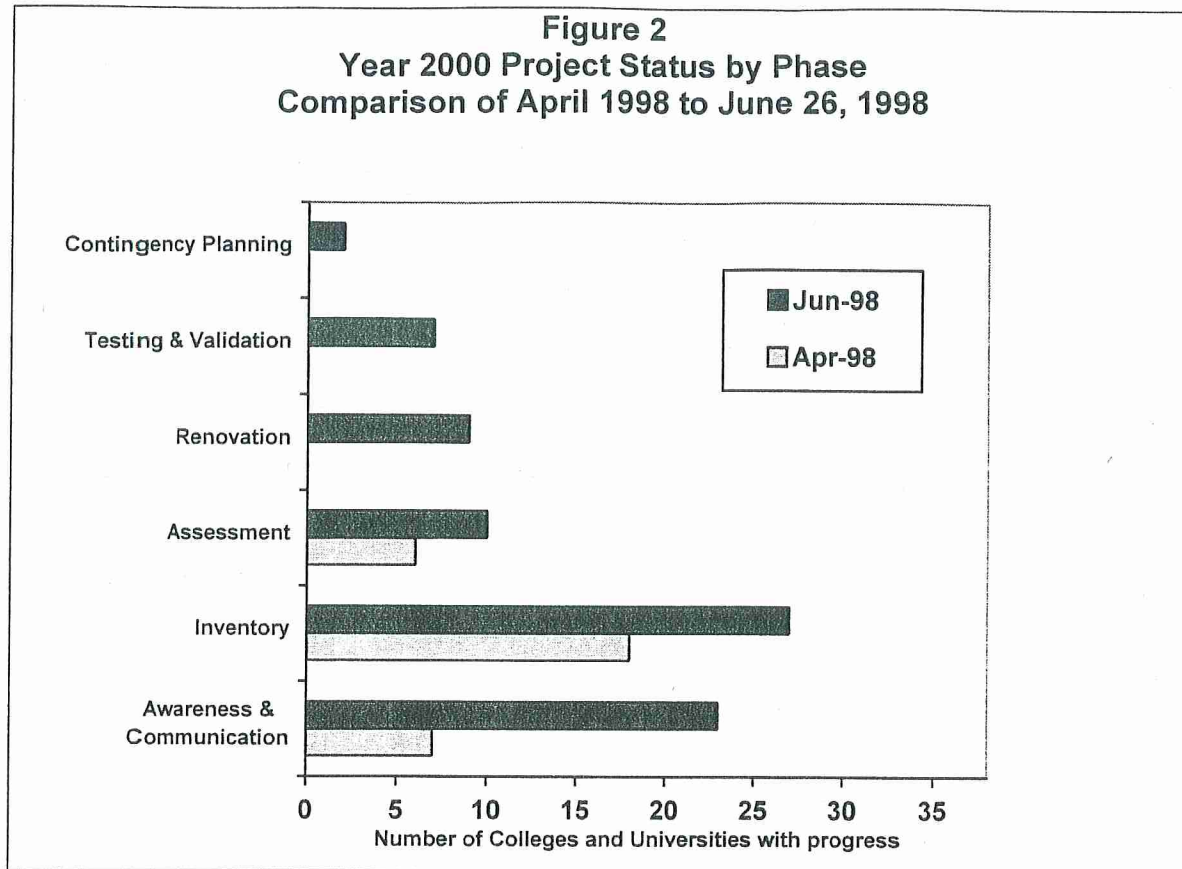
Status of MnSCU's Progress on the Year 2000 Computing Problem

Experts on the Year 2000 computing problem have identified several stages or phases that a typical Year 2000 project should follow. Figure 1 identifies these phases. In the remainder of this section, we discuss each of these phases in detail.



Appendix D shows the Year 2000 readiness status on each phase for the system office and each college and university as of June 26, 1998. Figure 2 documents the progress that the system office and colleges and universities have made since our interim report was issued in April 1998.

Where should MnSCU be in a Year 2000 project? Industry standards suggest that the renovation phase be complete by the end of calendar year 1998 to allow sufficient time to complete testing and develop contingency plans. Based on this standard, most colleges and universities must complete substantial work in the months ahead. In fact, only one campus, Normandale Community College, has prepared itself to complete the project on a timely basis.



The Year 2000 is a worldwide concern that needs to be addressed in a structured format. Based on our work conducted at the system office and each college and university, we have developed several findings and recommendations. Finding 1 discusses the system office lack of leadership in providing guidance to colleges and universities on the Year 2000 problem. Findings 2 – 7 address weaknesses within the system office and colleges and universities on their status in resolving the Year 2000 problem.

1. The MnSCU system office has not taken a leadership role in addressing the Year 2000 problem.

Colleges and universities expressed frustration over the lack of support and leadership from the system office. We made several observations in our interim report suggesting that the system office had an opportunity to coordinate an efficient approach with the colleges and universities. However, since the issuance of the interim report, the system office has not established itself in a leadership role for the project. On June 1, 1998, the system office hired a new Chief Information Officer (CIO). The Vice Chancellor – CFO has designated the new CIO as responsible for coordinating the Year 2000 project for the system office. The CIO has an acute awareness for the organization's vulnerability to Year 2000 problems. He accompanied Internal Auditing on some campus visits about this issue. Until August 1998, however, he will only be working for MnSCU on a part-time basis. Also, in light of other demands on his time, the CIO has not had sufficient

time to devote to this issue. He is in the process of hiring a project manager to take the lead on the project. However, final decisions have not been made on the type of assistance the system office will be providing to colleges and universities.

The lack of leadership from the system office is unfortunate. There was a tremendous opportunity to build substantial efficiency into the project. Most colleges and universities were eagerly awaiting guidance on how to proceed. MnSCU Internal Auditing has filled some of the void left by the system office. Many colleges and universities have used the measurement criteria (see Appendix C) as a guideline for developing project plans. Also, Internal Auditing has attempted to share best practices across the organization. As a result of the system office's slow response, the organization will have to tolerate the redundancy that has resulted from 36 colleges and universities creating unique project plans and approaches. Furthermore, the system office must be content to devise actions that complement the activities already started by colleges and universities. Nonetheless, in going forward, there is still time for the system office to take actions that will constructively add efficiency, including:

- Increasing the awareness about the Year 2000 computing problem and the potential impacts on operations by providing an educational campaign. This campaign would provide colleges and universities with information to distribute to staff, faculty, students, and other constituents.
- Establishing a web site, listserv, or any other communication device to provide awareness and resources for Year 2000 issues. *[Note: In December 1997, the system office created a website shell that was to be devoted to Year 2000 issues. However, it is in a very obscure location and has not been populated or maintained since that time.]*
- Providing helpful guidance and facilitating campuses sharing of "best practices". For example, the University of Texas has developed an inventory template that would be helpful to many campuses.
- Coordinating efforts to assess the readiness of common vendors or business partners, such as the U.S. Department of Education and the Minnesota Department of Administration. In addition, the system office should facilitate sharing of product and service information between colleges and universities.

Beyond helping build efficiency into the project, the system office will remain obligated to carry out certain actions for which it has primary responsibility, including:

- Determining whether the central administrative systems and supporting hardware and systems software are Year 2000 compliant. Colleges and universities depend on these systems for their day to day operations and need positive assurance that the systems will be compliant. System office employees have expressed confidence that the administrative systems are Year 2000 compliant. However, we received an inquiry from a business manager concerned with Year 2000 dates entered into the MnSCU accounting system. The business manager had entered a grant expiration

date of "08/31/00" in a grant record. The system populated the field with the date August 31, 1900. Upon investigation, we learned that the current version of the application software was programmed to add "19" to the beginning of any two-digit year entered into the system. The database was built with a four-digit year field, but would accept and interpret two-digit year entries. Users need to enter the full four-digit date field in order for dates in the next century to populate the database. System office employees indicated that the next version of the application software should interpret two-digit year entries differently. Even though this anomaly is not a fundamental flaw in the system, it points out the importance and need for detail testing of the systems and educating users about their Year 2000 readiness.

- Developing and overseeing an integrated system testing plan. The MnSCU administrative systems must be tested in conjunction with the state systems and campus users to verify full operational readiness.
- Coordinating the preparation of a financing plan to meet any budgetary demands caused by renovation or replacement remedies. The Legislature provided \$23 million to other state agencies to finance Year 2000 compliance problems. MnSCU had not analyzed the financial impact on its colleges and universities and has received no additional funding to date. The system office must take the lead on developing financing plans to ensure consistent measurements (including staffing and renovation costs) and equitable treatment. There is a risk that some colleges and universities may seek additional funding for expensive replacements, rather than implementing more cost-effective workarounds. Also, some campuses expressed concern about using their own funds to resolve problems, if the system office would be providing funding later to colleges and universities that were slow to implement solutions.

It is important for the system office to take immediate action to ensure the success of this project.

Recommendations:

- ✓ *The system office should identify and act upon opportunities to provide an efficient approach to system-wide Year 2000 concerns.*
- ✓ *The system office should determine whether the centralized administrative systems and supporting hardware and systems software are Year 2000 compliant. This includes developing an integrated test to ensure all processes and interfaces will continue to operate in the Year 2000.*
- ✓ *The system office should develop a system-wide financing and resource plan.*

System Office Response:

The work of the Internal Auditor is a valuable first step in design of an overall system strategy for managing the Year 2000 (Y2K) challenge. The system office has concerns about both its' own operational impacts as well as provision of leadership/assistance to MnSCU colleges and universities. Development of system office and system wide plans has begun. The Chancellor has directed that the system office complete the 1st and 2nd phases, Awareness and Inventory, concerning its' own systems by the end of August 1998. The 3rd and 4th phases, Assessment and Renovation, are scheduled for completion no later than December 1998. The timing of the effort coordinates with completion and installation of the new student systems and will support that effort as those systems are critical to ensuring Year 2000 compliance.

The Vice Chancellor – Chief Financial Officer has responsibility for the system office's efforts to date, concerning the Y2K project. The MnSCU Office of Internal Auditing was encouraged to undertake this project in order to provide critical information to the planning process. During the spring of 1998, resources were dedicated to hiring of a MnSCU Chief Information Officer (CIO), establishment of the Campus Services Unit, and the successful implementation of the new student systems at fifteen colleges and universities across the state. Completion of these objectives have substantially improved the system office's capacity to address the Y2K challenge.

Mr. Ken Niemi was named MnSCU Associate Vice Chancellor for Information Services – Chief Information Officer on June 1, 1998 by the Vice Chancellor – Chief Financial Officer and will have principal responsibility for the MnSCU Y2K project. Mr. Niemi was CIO of the Minnesota Department of Economic Security for four years where he led the department's Y2K project, a project well on track and the subject of praise by the state's Y2K project office. Mr. Niemi chose to participate in several of the interviews in order to gain a more complete understanding of the extent of the Y2K problem at MnSCU and was consulted on the design of the survey/assessment tool.

The CIO and his staff are preparing a comprehensive MnSCU Y2K strategy and plan and have placed implementation of this plan as a priority of the highest order. Organization of a system wide communication plan and sharing of best practices is a recommendation that the system office supports. MnSCU colleges and universities, while responsible for their own progress would benefit from general guidance and assistance. The CIO intends to organize a group of campus representatives to assist in this effort. In addition, greatly expanded MnSCU cooperation with the statewide Y2K project office, housed in the Department of Administration, will leverage use of the state's technical knowledge, expertise and perhaps funding.

The Vice Chancellor – Chief Financial Officer will provide periodic updates to the Board of Trustees as milestones are reached. The next report is anticipated at the end of 1998.

Awareness & Communication Phase

- 2. In the last two months, colleges and universities have made significant progress toward completing the awareness and communication phase of their Year 2000 projects. However, the system office and some colleges and universities have made little or no progress in implementing a comprehensive structured plan to address the Year 2000 issue.**

The awareness and communication phase sets the foundation for a Year 2000 project. This phase establishes an understanding about the Year 2000 computing problem and the potential impacts on college and university operations. It establishes a plan that clarifies what needs to be done to ensure that mission critical systems and equipment are Year 2000 compliant. It also establishes responsibility and accountability for completion of the project.

Experts on Year 2000 projects emphasize the importance of communicating with employees and customers (i.e. students) about the Year 2000 problem. Increasing the awareness level of users will help in the overall progress of Year 2000 projects. Although the issue has received much general media attention, it is essential to translate the problem so users realize where they are vulnerable. Many people still believe that this is a mainframe computer or COBOL programming problem and do not realize that it may impact their daily lives. Users who are familiar with how the Year 2000 may impact them are more likely to identify potential areas of concern and aid in evaluating Year 2000 issues on a timely basis.

In order for colleges and universities to successfully complete the awareness and communication phase they need to demonstrate that:

- Representatives from all functional areas are working on the Year 2000 problem.
- Employees working on the Year 2000 problem have been delegated responsibility, are accountable for resolving issues, and have been given clear direction.
- A comprehensive and structured plan addresses the Year 2000 problem.
- New purchases and contracts are verified for Year 2000 compliance.
- Administrative staff, faculty, and students are informed about the potential impact of the Year 2000 problem.

We found that 22 of the 36 colleges and universities had made good progress on developing an awareness of the problem. Some campuses had made significant and/or innovative progress on the awareness and communication phase. For example:

Normandale Community College developed a comprehensive project charter to address the problem. The charter has been shared with many colleges and universities as a starting point for their Year 2000 projects. In addition, a

marketing instructor is working on a campus-wide awareness campaign. The project responsibilities have been shared broadly so it is not a burden to a single person or department.

Anoka Hennepin Technical College established a Year 2000 committee made up of representatives of all functional areas. As phases of the project are completed, the committee reviews documentation to ensure completeness.

Moorhead State University developed a Year 2000 web site to provide a resource to faculty, students, and staff.

For those campuses that had made only limited progress, we noted a few typical problems that colleges and universities need to overcome in order to successfully complete a Year 2000 project. These include:

- Lack of representation from all functional areas. Many college and university campuses have technology committees that are addressing the Year 2000 problem. However, we noted that not all functional areas were represented on the committees. For example, many of these committees do not include representation from the facilities area or have inadequate faculty representation.
- Selecting overburdened employees to head Year 2000 projects. A common practice at most campuses was to make the technology director responsible for the Year 2000 project. In some cases, these employees were too overburdened with other projects to devote sufficient time to the Year 2000 project.

Several colleges and universities noted barriers that resulted in not having a successful Year 2000 project started.

- Lack of technical resources. Several campuses were concerned with the workload of their technical staff and did not feel they had sufficient resources to work on a Year 2000 project.
- Unsure how to structure a Year 2000 project. A number of campuses did not know how to go about organizing a Year 2000 project. These campuses felt overwhelmed by the magnitude of a Year 2000 project. One campus sent an employee out of state to obtain training on how to organize a Year 2000 project.

Recommendation:

- ✓ *The system office and colleges and universities should continue to meet the criteria established to complete this phase. This includes addressing the problem in all functional areas, assigning responsibility and ensuring accountability, developing a comprehensive plan, verifying that new purchases and contracts are compliant, and communicating with staff, faculty, and students.*

Inventory Phase

- 3. In the last two months, the system office and colleges and universities have made progress in completing a comprehensive inventory. However, some colleges and universities have made little or no progress toward completing this phase.**

The Year 2000 problem is not just a technical issue. Rather, it is a business issue. The problem involves all aspects of a college or university, including facilities, academic programs, and campus relationships. It is necessary to inventory all of these areas.

Mainframe and personal computers, network servers, routers and bridges, printers, and other computing devices are the obvious items that should be included in a Year 2000 inventory. A comprehensive inventory would also include less obvious items such as heating and cooling systems, security systems, and elevators. Instructional equipment for courses in graphic arts, woodworking, auto mechanics, as well as, science labs use embedded technology. The inventory should include both owned and leased equipment and facilities. A common practice is to start with existing inventory records.

Colleges and universities also need to evaluate whether they have mission critical interdependencies, including business or legal relationships, to be investigated for Year 2000 compliance. Examples of this are banks, bookstore or food service providers, and utility and telephone service providers.

In order for colleges and universities to successfully complete the inventory phase they need to demonstrate that:

- A documented inventory has been completed for administration (hardware, software, and interfaces), facilities, academia, and campus interdependencies.
- Inventory has been subject to an independent review and compiled in a standard format.
- A process is in place to keep the inventory records current as changes occur.

We found that 24 of the 36 colleges and universities had made good progress on the inventory phase of the project.

- **Normandale Community College** had made significant progress in this phase. The Year 2000 project team at Normandale assigned responsibility for completing inventory records to faculty and staff. These employees are also responsible for reporting dependency relationships. Inventory due dates were established and enforced. College administrators, including the President, two Vice Presidents, and academic deans follow-up with faculty and staff and ensure that deadlines are met. Inventory records are centrally reviewed, compiled and entered into a database. One employee devotes approximately one-fourth of her time to maintaining Year 2000 project records.

- Several colleges and universities were taking advantage of the summer months to conduct inventories. In many instances, student workers were hired to help with the process.

For those campuses that had not made significant progress, we noted common problems that resulted in the colleges and universities needing a larger effort in the inventory phase. These include:

- Incomplete or non-existent inventory records. Existing inventory records are a good starting point for campuses completing Year 2000 inventories. Colleges and universities without reliable inventory records need to spend more time and effort in this phase.
- Unidentified campus interdependencies. Many colleges and universities had not identified business and legal relationships in the inventories even though the suppliers or business partners provide goods or services that are critical.
- Software applications, computer files, and equipment used in the classrooms were overlooked. Some items that could potentially be affected by the millenium bug are more obvious than others. Campuses that overlooked items, such as classroom equipment, did not have representation from academic areas working on the project.

Recommendations:

- ✓ *The system office and colleges and universities should continue to meet the criteria established for this phase. This includes documenting a comprehensive inventory in all areas on the campus, including identifying interdependencies, ensuring inventory records are complete, and developing a process to keep inventory records current.*

Assessment Phase

- 4. Although some progress has been made in evaluating whether inventory items are Year 2000 compliant, the system office and most colleges and universities have made limited progress toward completing the assessment phase.**

Assessment includes determining whether items and interdependencies identified in the inventory phase are Year 2000 compliant. Determining Year 2000 compliance may include:

- testing hardware and software to determine if it can handle dates in the next century,
- reviewing vendor web sites for product information, and
- contacting equipment and software vendors.

Assessment results should be documented as part of the overall inventory. In addition, it is important to maintain documentation to refer back to and to provide evidence that the college or university acted with "due diligence" in addressing the Year 2000 problem.

As the assessment phase is being completed, the system office and colleges and universities must determine resources that will be needed to make items compliant. Resources would include estimates of employees time to upgrade or patch existing systems. In addition, the campuses need to determine costs for upgrades and replacements.

In order for colleges and universities to successfully complete the assessment phase they need to demonstrate that:

- A reasonable process is in place for evaluating whether items identified in the inventory phase are Year 2000 compliant.
- The evaluation results are documented as part of the overall inventory.
- The process includes prioritizing mission critical systems, equipment, and interdependencies.
- The analysis should include an estimate of required resources and a financing plan.

Nine of 36 colleges and universities have made some progress on the assessment phase. For example:

North Hennepin Community College developed a letter and a Year 2000 compliance form that is sent to vendors and service providers. The college provides sufficient product information, such as model number, serial number, and version number, so that vendors can respond. The letter also request information on the cost to renovate non-compliant items.

Moorhead State University determined that its energy management system is not compliant.

Normandale Community College set aside funds in a Year 2000 contingency budget, although the college has not yet ascertained the final cost of the Year 2000 remedies. The President felt it was important to ensure that funding would be available to replace critical equipment if it was needed.

Most colleges and universities have not fully completed inventories and therefore have not made significant progress in the assessment phase. An aspect of the assessment phase that is particularly crucial includes:

- Setting priorities and identifying mission critical systems and devices. It is simply not possible to address all of the potential problems; colleges and universities will have to make choices on where to deploy their resources. As a

result a structured method of setting priorities is needed. Some systems, such as heating and ventilation are clearly mission critical. Also, many devices and systems in the academic area are necessary to support the full course curriculum. Thus, colleges and universities will need input from the faculty to develop a full understanding of items that are mission critical. Any systems or devices that are judged to be mission critical should receive most of the attention. For lower priority items, colleges and universities may choose to simply design contingency plans and "wait and see" if problems develop.

Recommendations:

- ✓ *Colleges and universities must set priorities in order to focus their attention on the most mission critical systems and devices.*
- ✓ *The system office and colleges and universities need to establish a process for evaluating inventory items for Year 2000 compliance. This process should contain reasonable timeframes.*

Renovation Phase

5. The system office and colleges and universities have made little or no progress in renovating Year 2000 issues.

This phase includes developing a strategy to resolve date-structure problems. It focuses on items that are assessed as non-compliant, with the most attention devoted to the most mission critical items. Solutions may include retiring, replacing, or renovating non-compliant code, infrastructure, and interdependencies. At this point, eight colleges and universities have made some progress in renovating non-compliant items. Progress is slow, primarily because colleges and universities have not finished the inventorying and assessing phases and do not fully know what items need to be fixed.

Most campuses have technology plans that will result in the replacement of a significant number of workstations by the Year 2000. In addition, some campuses are working with vendors and maintenance contractors to determine what upgrades may be needed to energy management systems. Other campuses have made or plan to complete upgrades to campus local area networks, primarily the servers.

In order for colleges and universities to successfully complete the renovation phase they need to demonstrate that:

- A process should be in place for retiring, replacing, or renovating non-compliant code, infrastructure, and interdependencies.
- The process should include milestones and reasonable timeframes for completing steps.

- The process should be carried out and non-compliant items should be remedied according to the established schedule.

Recommendations:

- ✓ *The system office and colleges and universities need to develop a process to renovate non-compliant items. This plan should include milestones and reasonable timeframes.*

Testing & Validation Phase

6. The system office and colleges and universities have made little or no progress in developing testing plans to ensure Year 2000 compliance.

The system office and colleges and universities need to be confident that they will be able to operate in the Year 2000. The only way to gain this confidence is to validate or test all critical functions. Validation may include obtaining documentation from vendors that equipment is Year 2000 compliant. Testing, on the other hand, includes actually verifying that software, hardware, and interfaces are able to handle dates in this century and the next millenium. Ideally, most colleges and universities will have completed the first four phases of the project and be able to begin testing in early calendar year 1999.

In order for colleges and universities to successfully complete the testing and validation phase they need to demonstrate that:

- An overall testing and validation plan should be developed.
- Tests should be completed to ensure that changes made to software are Year 2000 compliant and do not adversely affect existing processing.
- Tests and validations should be prioritized to focus on mission critical applications and functionality.
- Test and validation work should be documented to support results.

Recommendations:

- ✓ *The system office and colleges and universities need to develop a process to ensure that they will continue to operate in the next millenium. The plans should include milestones and reasonable timeframes for completing testing and validation.*

Contingency Planning Phase**7. Most colleges and universities and the system office have not started to consider contingency planning for the Year 2000.**

A recent article¹ states that companies are “addressing contingency planning for year 2000 as the final step in preparedness and the final proof of due diligence. A contingency plan lays out exactly what your company will do if, despite your best efforts, systems, processes, services, or external partners crucial to your business cease to function properly because of year 2000.”

Ideally, colleges and universities could incorporate Year 2000 contingency planning as part of existing business continuity plans (also referred to as disaster recovery plans). We are not aware, however, that much business continuity planning has occurred throughout the organization.

In order for colleges and universities to successfully complete the contingency planning phase they need to demonstrate that:

- A contingency plan should be in place that identifies policies, procedures, and resources for responding to Year 2000 failures.

Some campuses plan to have facility employees on campus on December 31, 1999 to ensure energy management systems will continue to work. One president commented that he had thought about being on vacation for the turn of the century. However, he has reconsidered and decided that he should be near campus in case issues occur due to the Year 2000 problem.

Recommendation:

- ✓ *The system office and colleges and universities need to develop a well-documented plan for dealing with Year 2000 failures.*

Response from Presidents:

We met with all MnSCU college and university presidents and interim presidents to discuss the Year 2000 status of each campus. The presidents were interested in learning more about the Year 2000 problem and generally appreciated our guidance. Most presidents were anxious to resolve the problem and welcomed any input on what steps needed to be taken to ensure Year 2000 readiness on their campuses.

¹ Article by Kathleen Melymuka entitled “When all else fails.” Computer World, July 6, 1998

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Appendix A
List of Contacts and Interviewees

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Appendix B
Year 2000 Resources

Web Sites:

Resource Type	Location	Description
State of Minnesota	www.state.mn.us/ebranch/admin/ipo/2000.htm	Minnesota Department of Administration Year 2000 web site. Contains a best practice guide with templates.
Higher Education	www.utsystem.edu/oir-year2000/homepage.htm	University of Texas Year 2000 web site. A good resource for determining how a higher education institution is addressing the Year 2000 problem.
Higher Education	www.moorhead.msus.edu/y2k	Moorhead State University Year 2000 web site.
Technical Resource	www.itaa.org/year2000.htm	Information Technology Association of America web site on the Year 2000.
Commercial Sites	www.y2k.com	Contains: frequently asked legal questions, articles, and links to government, media and commercial sites.
Commercial Sites	www.year2000.com	Provides links to Year 2000 vendor sites.
Commercial Sites	www.datamation.com/PlugIn/workbench/yr2000/year.htm	Contains several article and resources on the Year 2000 problem.

Articles:

Author	Article Name	Location
Jon Huntress	The Year 2000 and Embedded Systems: For Most Businesses, This Does Not Have to be a Major Problem.	Posted on website http://www.year2000.com
Janus Technologies	Managing the Risk of Year 2000: How to Protect Your Organization from Over Spending, Failure and Litigation.	Posted on website http://www.year2000.com
Ed Meagher	The Complexity Factor	Poste on website http://www.year2000.com
Capers Jones	Getting Down to the Wire	Application Development Trends, April 1998
The Computer Information Centre	The Year 2000 Date Problem – Support Centre. Where to Look for Potential Problems in your Organization! Departmental Systems and Embedded Systems.	Posted on website http://www.compinfo.co.uk
Bruce Caldwell	Race to the Finish – As 2000 approaches, tech managers are turning their attention to compliance efforts of their partners, suppliers, and customers.	Information Week, June 8, 1998
M.J. Zuckerman	Government earns an ‘F’ for fixing Year 2000 woes.	USA Today, Wednesday, June 3, 1998
Mary Jane Smetanka	Year 2000 conversion, software changes raise costs at U	Star Tribune, Friday, July 10, 1998

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Appendix C
Year 2000 Computing Problem
College and University Progress Toward Compliance

College or University: _____

Date Visited: _____

Auditor: _____

Meeting Participants: _____

Phase	Information Technology & Administration					Academic					Facilities					Overall Rating
	Criteria Met	1	2	3	4	5	1	2	3	4	5	1	2	3	4	
Awareness																
Inventory																
Assessment																
Renovation																
Testing & Validation																
Contingency Planning																

Overall Rating = Red (limited progress), Yellow (some progress), Green (completed)

(note: auditor needs to see documentation in order to give a Green rating)

Awareness Criteria:

1. Campus has representation from all functional areas working on the Year 2000 problem.
2. Employees working on the Year 2000 problem have been delegated responsibility, are accountable for resolving issues, and have been given clear direction for setting priorities.
3. Campus has developed a comprehensive and structured plan for addressing the Year 2000 problem.
4. Campus verifies that all new purchases and contracts are Year 2000 compliant.
5. Campus has communicated with staff, faculty, and students about the potential impact of the Year 2000 problem.

Inventory Criteria:

1. A documented inventory should be completed for administration (hardware, software, and interfaces), facilities, academia, and campus interdependencies.
2. A verification that each inventory has been subject to an independent review and compiled in a standard format.
3. A process is in place to keep the inventory records current as changes occur.

Assessment Criteria:

1. A reasonable process should be in place for evaluating whether items identified in the inventory phase are Year 2000 compliant.
2. Evaluation results are documented as part of the overall inventory.
3. A prioritization process needs to be in place for determining mission critical systems, equipment, and interdependencies.
4. The analysis should include an estimate of required resources and a financing plan.

Renovation Criteria:

1. A process should be in place for retiring, replacing, or renovating noncompliant code, infrastructure, and interdependencies.
2. The process should include milestones and reasonable timeframes for completing steps.
3. The process should be carried out and noncompliant items should be remedied. *(Note: Criteria 2 and 3 of the renovation phase are closely linked.)*

Testing & Validation Criteria:

1. An overall testing and validation plan should be developed.
2. Tests should be completed to ensure that changes made to software are Year 2000 compliant and do not adversely affect existing processing.
3. Tests and validations should be prioritized to focus on mission critical applications and functionality.
4. Test and validation work should be documented to support results.

Contingency Planning Criteria:

1. Contingency plan should be in place that identifies policies, procedures, and resources for responding to Year 2000 failures.

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Appendix D

College and University Year 2000 Readiness by Phase As of June 26, 1998

College/University Name	1	2	3	4	5	6
Alexandria Technical College	Some	Some	Limited	Limited	Limited	Limited
Anoka Hennepin Technical College	Completed	Some	Some	Limited	Limited	Limited
Anoka Ramsey Community College	Some	Some	Some	Some	Some	Limited
Bemidji State University	Limited	Limited	Limited	Limited	Limited	Limited
Central Lakes College	Some	Some	Limited	Limited	Limited	Limited
Century Comm/Tech College	Limited	Limited	Limited	Limited	Limited	Limited
Dakota Technical College	Limited	Some	Limited	Limited	Limited	Limited
Fergus Falls Community College	Some	Some	Limited	Limited	Some	Limited
Fond du Lac Community College	Limited	Limited	Limited	Limited	Limited	Limited
Hennepin Technical College	Limited	Limited	Limited	Limited	Limited	Limited
Hibbing Comm/Tech College	Limited	Limited	Limited	Limited	Limited	Limited
Inver Hills Community College	Some	Some	Some	Some	Limited	Limited
Itasca Community College	Some	Some	Limited	Limited	Limited	Limited
Lake Superior Comm/Tech College	Some	Some	Limited	Limited	Limited	Limited
Laurention Comm/Tech College	Some	Some	Limited	Limited	Limited	Limited
Mankato State University	Limited	Limited	Limited	Limited	Limited	Limited
Metro State University	Completed	Some	Some	Some	Some	Limited
Minneapolis Comm/Tech College	Limited	Limited	Limited	Limited	Limited	Limited
Minnesota West Comm/Tech College	Limited	Some	Limited	Limited	Limited	Limited
Moorhead State University	Completed	Some	Some	Some	Some	Some
Normandale Community College	Completed	Completed	Some	Some	Limited	Some
North Hennepin Community College	Completed	Some	Some	Some	Limited	Limited
Northland Comm/Tech College	Limited	Some	Limited	Limited	Some	Limited
Northwest Technical College	Limited	Limited	Limited	Limited	Limited	Limited
Pine Technical College	Limited	Limited	Limited	Limited	Limited	Limited
Rainy River Community College	Some	Some	Limited	Limited	Limited	Limited
Redwing/Winona Technical College	Some	Some	Limited	Limited	Limited	Limited
Ridgewater Comm/Tech College	Some	Some	Limited	Limited	Limited	Limited
Riverland Comm/Tech College	Some	Some	Limited	Limited	Limited	Limited
Rochester Comm/Tech College	Some	Limited	Limited	Limited	Limited	Limited
South Central Technical College	Some	Some	Some	Some	Limited	Limited
Southwest State University	Some	Some	Limited	Limited	Some	Limited
St. Cloud State University	Limited	Some	Limited	Limited	Limited	Limited
St. Cloud Technical College	Some	Some	Limited	Limited	Limited	Limited
St. Paul Technical College	Limited	Limited	Limited	Limited	Limited	Limited
Winona State University	Some	Some	Some	Some	Limited	Limited
Campus Services Unit	Some	Some	Some	Some	Some	Limited
System Office	Limited	Some	Limited	Limited	Limited	Limited
IDEAL STATUS as of 6/26/98	Completed	Completed	Complete by 9/30/98	Complete by 12/31/98	Complete in 1999	Complete in 1999

Phase Legend:

- 1 – Awareness & Communication
- 2 – Inventory
- 3 – Assessment
- 4 – Renovation
- 5 – Testing & Validation
- 6 – Contingency Planning

Legend:

- Completed – Completed
- Some -- Some Progress
- Limited – Limited Progress