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# AUDIT REPORT



## REVIEW OF HUD's EFFORTS TO CORRECT YEAR 2000 PROBLEMS (PHASE III)

99-DP-166-0004

September 30, 1999

INFORMATION SYSTEMS AUDIT DIVISION  
OFFICE OF AUDIT

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Issue Date	September 30, 1999
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TO: Saul Ramirez, Deputy Secretary, SD

FROM: Benjamin K. Hsiao, Director, Information Systems Audit Division, GAA

SUBJECT: Audit Report of HUD's Efforts to Correct Year 2000 Problems (Phase III)

Attached is the third report on our review of HUD's efforts to correct Year 2000 (Y2K) problems. The overall objective of our review was to determine whether the Department's Y2K efforts followed HUD guidelines and industry accepted best practices to minimize the impact of the Year 2000 date change. This review focused specifically on Y2K readiness of HUD's: (1) supporting Y2K contingency plans (2) Data Center, (3) building facilities, (4) end-user computing, and (5) four mission critical applications.

Our review found that while the Department has reported completion of Y2K renovation and certification of all mission critical systems, a number of weaknesses remain. First, the supporting Y2K contingency plans have not been fully developed and tested. Second, HUD's Data Center has not performed sufficient testing of system software for Y2K compliance. Third, critical HUD Headquarters building systems have not been Y2K certified. Fourth, HUD has not taken steps to ensure data exchanges between mainframe and personal computers will yield correct results in the Year 2000. Finally, one of four mission critical systems reviewed, Loan Accounting System (LAS), lacked sufficient basis to verify Y2K certification.

In the Department's September 1, 1999 response to the draft report issued on July 7, 1999, HUD did not agree with a number of recommendations. Had HUD initiated action to implement these recommendations prior to September 1, the risks of Y2K failures would have been greatly reduced. However, with less than 100 days left until the Year 2000, there is now insufficient time to implement these recommendations. Since the Department is accepting a higher degree of risk than necessary, it is more prudent for HUD to spend the remaining time preparing for Y2K failures. This effort should also ensure that the associated risks for not implementing the recommendations are addressed and mitigated in the Y2K contingency plans.

Since formal recommendations are not included in this report, we do not expect a response from the Department. However, we are issuing this report to alert HUD management of continued Y2K risks. Should you have any questions, or require additional information, please contact me at (202) 708-3444, extension 149.

Attachment

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# Executive Summary

The Year 2000 (Y2K) challenge is being faced by all businesses, including the Department of Housing and Urban Development (HUD), that depend on information technology for critical business processing. Sometimes called the “millennium bug,” the Y2K problem results from the long standing practice of writing computer programs to store and handle only the last two digits of the year, assuming the first two would always be “19.” In most cases, entering the year of “00” will be interpreted as “1900,” and create an exception. As we approach the Year 2000, this will cause many computers and applications to stop working or provide inaccurate or unpredictable results if the problem is not corrected. As a result, prior to the Year 2000, the Department must address Y2K issues associated with internal applications, system clocks, system software and hardware, and building equipment. Unless corrected, the impact of these failures will be widespread and costly to the Department. In addition, the health and safety of HUD personnel could be at risk.

This report is the third in a series of point-in-time reviews performed by the Office of Inspector General (OIG) as part of our continuing oversight of HUD’s Y2K initiative. Our objective was to determine whether the Department's Y2K efforts followed HUD guidelines and industry accepted best practices to minimize the impact of the Year 2000 date change. This review focused specifically on the Y2K readiness of HUD's: (1) supporting Y2K contingency plans (2) Data Center, (3) building facilities, (4) end-user computing, and (5) four mission critical applications. Our review found that while the Department has completed renovation and Y2K certification of all mission critical systems, a number of weaknesses remain.

First, Y2K contingency plans for the Data Center, HUD building, and four mission critical systems in the “Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000 Contingency Plans” are inadequate. The plans lacked the details necessary for HUD to successfully recover from Y2K failures. As a result, we have identified several weaknesses with the supporting contingency plans.

Second, HUD's Data Center has not mitigated the risk of Y2K failures. Our review of the Department’s Data Center found that Lockheed Martin Corporation (LMC), the contractor responsible for maintaining the computer mainframes, did not adequately test system software to validate their Y2K compliance. Instead of proactively testing system software for Y2K compliance, LMC is passively depending on system users and vendors to provide the information. Without independent testing, there is no assurance that all of the critical date functions will be identified and work properly in the Year 2000.

Third, the Department has not tested and certified critical HUD Headquarters building systems for Y2K compliance. Many building systems are controlled by embedded computer microchips that may have trouble recognizing the century date change. These embedded systems are generally used to control or monitor building systems such as

elevators, Heating Ventilation and Air Conditioning (HVAC), lighting, security systems, fire detection, etc. If the embedded systems that contain year-date functions are not identified and fixed, unpredictable outcomes could negatively affect the health and safety of building occupants come the Year 2000. This places HUD personnel and operations at significant risk should building systems fail in the Year 2000.

Fourth, although the Department plans to ensure that HUD standard software are Y2K compliant, there are no plans to conduct an inventory to determine the magnitude of non-HUD standard software that are not Y2K compliant and currently in use. Also, our review of the draft "Test Plan Outline for Y2K Certification of HUDware and its Baseline Applications" found no plans for integrated testing of HUDware and its baseline standard applications among different commercial off-the-shelf (COTS) software, with mainframe applications or any other host systems which store dates as two digits. Thus, any dates exchanged between different COTS or in-house developed software and mainframe applications may not yield correct results.

Finally, although three of the four critical applications reviewed had adequate documentation, one of the four critical applications we reviewed, Loan Accounting System (LAS), lacked documented evidence to support Y2K certification. In addition, because of personnel turnover, current contracting personnel had limited knowledge of the level of testing performed for us to ascertain if sufficient testing had been performed on LAS.

To mitigate these concerns, we recommended in the draft audit report issued July 7, 1999 that the Department complete the following:

- Develop and test detailed, supporting Y2K business continuity plans for the Data Center, mission critical applications, and critical HUD building systems. Further develop HUD's Year 2000 supporting contingency plans by including procedures and documentation that identifies: workflows that describe in detail how the applications will be run manually; methods to review for and detect errors which would result in the need for alternate means of processing; programs to perform scans to detect corrupted data; reports needed to support manual processing; the length of time the business can tolerate malfunctioning or unavailable systems; and, triggers, to include the earliest encounter dates, that will result in plans being activated (i.e., specific instances resulting in the need for alternate processing methods).
- Complete a risk analysis and prioritize system software products at the Data Center. Prepare a test plan and conduct tests of the critical system software products and document the results. Perform a certification of the critical systems software tested.

- Prepare test plans for testing the critical embedded systems and document the test results. Perform a certification of the critical embedded systems tested.
- Complete an inventory of non-HUD standard software utilized on the PCs and evaluate the risk and impact of their use on HUD's business processes and, if appropriate, ensure they are Y2K compliant. Conduct an analysis and develop a strategy to address the interaction of data from various applications that use different pivot dates. Include in the final "Test Plan Outline for Y2K Certification of HUDware and its Baseline Applications" plans for integrated testing of HUDware and its baseline standard applications among different COTS software, with mainframe applications, or any other host systems which store dates as two digits.
- Ensure that LAS be re-tested and re-certified, and that detailed documentation of the tests and re-certification be kept for Year 2000. Ensure that adequate testing documentation is available for all critical applications that have been previously certified.

The Department disagreed with most of the recommendations. With less than 100 days left until the Year 2000, there is now insufficient time to implement these recommendations. As a result, the Department is accepting a higher degree of risk than necessary. At this time, it is more prudent for HUD to prepare for Y2K systems and applications failures. However, the Department must ensure that the associated risks for not implementing the recommendations are addressed and mitigated in the Y2K contingency plans.

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# Introduction

The Year 2000 (Y2K) challenge is being faced by all businesses, including the Department of Housing and Urban Development (HUD), that depend on information technology for critical business processing. Sometimes called the “millennium bug,” the Y2K problem results from the long standing practice of writing computer programs to store and handle only the last two digits of the year, assuming the first two would always be “19.” In most cases, entering the year of “00” will be interpreted as “1900,” and create an exception. As we approach the Year 2000, this will cause many computers and applications to stop working or provide inaccurate or unpredictable results if the problem is not corrected. As a result, prior to the Year 2000, the Department must address Y2K issues associated with internal applications, system clocks, system software and hardware, and building equipment. Unless corrected, the impact of these failures will be widespread and costly to the Department.

This report is the third in a series of point-in-time reviews performed by the Office of Inspector General (OIG) as part of our continuing oversight of HUD’s Y2K initiative. Our review found that while the Department has completed renovation and Y2K certification of all mission critical systems, a number of weaknesses still exist. First the supporting Y2K contingency plans have not been fully developed and tested. Second, HUD’s Data Center has not sufficiently mitigated the risk of Y2K failures. Third, critical HUD Headquarters building facilities have not been Y2K certified. Fourth, HUD has not taken appropriate steps to ensure data exchanges among mainframe applications and applications running on the personal computers using commercial-off-the-shelf applications or in-house developed software will yield correct results. Finally, although three of the four critical applications we reviewed had adequate test procedures and documentation to justify Y2K certification, we could not verify the basis for the certification for one of the four systems due to the lack of documentation and personnel turnover.

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## Audit Objectives

The overall audit objective was to determine whether HUD’s Y2K project efforts are adequate to ensure that mission critical information systems will be made Y2K compliant and, continue to operate without an interruption of service after January 1, 2000.

## Scope and Methodology

To accomplish the objective, we evaluated:

- HUD’s supporting contingency plans for the Data Center, building facilities, and four highly critical application systems (HUD Central Accounting and Program System (HUDCAPS), Integrated Business System (IBS), Tenant Rental

Assistance Certification System (TRACS), and Loan Accounting System (LAS));

- HUD Data Center managed by Lockheed Martin Corporation;
- Headquarters HUD building facilities controlled by embedded systems;
- End-user computing hardware and software; and
- Procedures and documentation in support of the testing and certification performed on the four aforementioned application systems.

We interviewed staff from the Year 2000 Project Office, Office of Information Technology, and Office of Administrative and Management Services. We also reviewed guidelines and procedures promulgated by the Year 2000 Project Office, General Accounting Office, and industry-wide accepted best practices, as well as documentation provided by the application systems project teams.

We performed our work from January through June 1999. We conducted the audit in accordance with generally accepted governmental auditing standards.



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## The Supporting Y2K Contingency Plans Have Not Been Fully Developed And Tested

We found that Y2K contingency plans for the Data Center, HUD building, and four mission critical systems in the “Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000 Contingency Plans” are inadequate. The plans lacked the details necessary for HUD to successfully recover from Y2K failures. As a result, we have identified several weaknesses with the supporting contingency plans.

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Y2K contingency plans for the Data Center, HUD building, and four mission critical systems are inadequate.

The Department issued HUD's overall “Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000 Contingency Plans” on December 8, 1998. Our review found that Y2K contingency plans for the Data Center, HUD building, and four mission critical systems lacked the details necessary for HUD to successfully recover from Y2K failures. As a result, we have identified several weaknesses in the supporting contingency plans.

The General Accounting Office's (GAO's) “Year 2000 Computing Crisis: Business Continuity and Contingency Plan” guide draws from the State of Texas contingency plan by directing that “All information resources determined by agency management to be essential to the agency’s critical mission and functions, the loss of which would have an unacceptable impact, shall have a written and cost effective contingency plan that will provide for the prompt and effective continuation of critical state missions in the event of a disaster. The contingency plan shall be tested and updated at least annually to assure that it is valid and remains current.” Also, GAO's guide and industry accepted business practices require that detailed business contingency plans be developed and tested well before the failure date, especially when the failure date is as well known and publicized as the Year 2000.

**The Data Center does not have an adequate Y2K contingency plan**

The Data Center's Y2K contingency plan does not deal with Y2K induced disruptions.

The Department's Data Center is managed by Lockheed Martin Corporation (LMC). We found that the Data Center's business continuity plan developed by LMC presented in HUD's "Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000

Contingency Plans" does not deal specifically with Year 2000 induced disruptions. For example, LMC's proposed solution switches production operations to the disaster recovery facility in the event of work-stoppage resulting from Y2K problems. However, this will not solve a Y2K problem, since Year 2000 problems of the same type will be equally disruptive at both sites, as both sites use the same type of system hardware and software. The existing Y2K contingency plan is the standard disaster recovery procedure to follow when there is any type of disruption in telecommunication services and is not Y2K specific. Further, LMC does not take into account the fact that the Year 2000 crisis is considered a "planned" event. For example, the plan does not mention crisis staff being on-duty, on-site around the clock, particularly on December 31, 1999, but addresses only the desirability of establishing telephone-tree networks.

LMC has not and does not plan to conduct Y2K contingency testing for either the Data Center or its disaster recovery back-up facility.

LMC has not and does not plan to conduct Y2K contingency testing for either the Data Center or its disaster recovery back-up facility. The contractor feels that because the Unisys and Hitachi computers at both sites are processing in a Year 2000 environment, there is no need to test the contingency plan. However, as indicated previously, both the Data Center and disaster recovery sites are using the same type of computer hardware and software, therefore, the same Y2K disruptions at the Data Center would also be experienced at the back-up site.

Y2K failures at the Data Center could cripple HUD's ability to carry out its mission.

It is critical that the Data Center fully develop and test Y2K specific business continuity and contingency plans. Many of HUD's mission critical functions are dependent upon a fully functional Data Center. Its failures could cripple the Department's ability to carry out its mission.

**There is no Y2K facilities contingency plan for the HUD Headquarters building**

No detailed supporting contingency plan exists for the Headquarters HUD building.

Other than the Department's overall "Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000 Contingency Plans" issued December 8, 1998, there exists no detailed supporting Y2K contingency plan for the HUD Headquarters building. The overall plan calls for the "development of contingency plans for the Headquarters building, program areas and HUD supported housing facilities. This includes identification of buildings at significant risk and manual overrides or alternatives for building infrastructure systems." However, when we requested such detailed plans for review, we were directed back to the Department's overall plan.

HUD's overall Y2K contingency plan directs the testing of the HUD building infrastructure systems to take place on January 1, 2000.

HUD's overall Y2K contingency plan directs the testing of building infrastructure systems to take place on January 1, 2000. This is unacceptable for several reasons. First, testing should commence well before January 1, 2000, the day failures could occur. Second, although the first Monday in the Year 2000 is on January 3, the two days in between would probably not be adequate time to correct a major Y2K failure. Finally, the health and safety of employees who will be required to work in the building during the century date change weekend will be jeopardized.

**The supporting Year 2000 contingency plans for four systems lacked the details necessary to successfully recover from Y2K failures**

Business functions' Y2K contingency plans lacked the details necessary to successfully recover from Y2K failures.

We reviewed the supporting contingency plans for four mission critical systems (HUDCAPS, IBS, TRACS, and LAS) included within the Department's "Year 2000 Business Process Continuity Contingency Plan" issued December 8, 1998. Although we found that, to varying degrees, some procedures for manual workarounds existed, more details are needed. Specifically, we found there were no: (1) documented workflows that described in detail how the applications will be run manually, (2) details on methods to review for and detect errors which would result in the need for

alternative means of processing, (3) evidence that consideration was made for developing programs to perform scans to detect corrupted data, (4) identification of additional reports needed to support manual processing, and (5) determination of the length of time the business can tolerate malfunctioning or unavailability of systems before it significantly impacts the business mission. Additionally, the supporting plans did not define specific triggers, to include the earliest encounter date, that will result in plans being activated (i.e., specific instances resulting in the need for activating alternate processing methods).

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Draft Audit Report Recommendations
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In the draft audit report issued July 7, 1999, we recommended that the Deputy Secretary direct the Chief Information Officer (CIO) and the Acting Assistant Secretary for Administration to:

- 1A. Conduct a risk analysis of the HUD building facilities and the Data Center operations and develop supporting contingency plans for each based on the assessed risks.
- 1B. Test the supporting Year 2000 contingency plans and procedures for the HUD building facilities and Data Center operations.
- 1C. Further develop HUD's Year 2000 supporting contingency plans by including procedures and documentation that identifies:
  - Workflows that describe in detail how the applications will be run manually;
  - Methods to review for and detect errors which would result in the need for alternate means of processing;

- Programs to perform scans to detect corrupted data;
- Reports needed to support manual processing;
- The length of time the business can tolerate malfunctioning or unavailable systems; and
- Triggers, to include the earliest encounter dates, that will result in plans being activated (i.e., specific instances resulting in the need for alternate processing methods).

<p>Summary of Auditee Comments to Draft Audit Report Recommendations</p>
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1A. The Department disagreed with our recommendation in the draft audit report. HUD went about identifying the threats posing the greatest risk to critical core business processes and the agency's efforts to respond to likely failure scenarios in an iterative fashion; by adding increasing levels of detail and specificity through time. The Department found no compelling reason to develop fully articulated procedures a full year or even six months, before these practices would need to be pulled off the shelf and executed. The supporting contingency plans, revised continuously, will continue to be embellished and expanded upon:

- September 13 to incorporate OIG and IV&V recommendations;
- October 25 to incorporate Day One strategies and testing activities;
- November 22 to incorporate results of Day One tests; and
- December 13 to incorporate final updates.

- 1B. The Department disagreed with our recommendation in the draft audit report. HUD found no compelling reason to achieve validation and testing milestones earlier than necessary. It is important to limit the maintenance of these plans, and it is also important for staff to be able to retain their training, which would occur concurrent with testing the plan. Both of these

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facts argue for conducting the testing close to the execution data. Testing of HUD's contingency plans is scheduled to be completed prior to November 30, 1999.

- 1C. The Department concurs with our recommendations and will include them in contingency plan updates.

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OIG Evaluation of Auditee Comments
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- 1A. Although OIG disagrees with the Department's response, we have removed this recommendation from the audit report. Despite the Department's claims, our review found that a risk analysis of the HUD building facilities and data center operations has not been completed as required by the GAO's "Year 2000 Computing Crisis: Business Continuity and Contingency Plan" guide, published in August 1998. Since the issuance of this recommendation in the draft audit report on July 7, 1999, HUD had made no effort to implement our recommendation. With less than 100 days left until the Year 2000, it is currently too late to conduct a risk analysis of the HUD building facilities and data center operations. The Department must now accept the associated risks and ensure that they are addressed and mitigated in the Y2K contingency plans.
- 1B. Although OIG disagrees with the Department's response, we have removed this recommendation from the audit report. HUD's response indicates that the Department has accepted the risks associated with conducting tests so close to the failure date that there may not be enough time fix problems. However, the Department must ensure that these risks are addressed and mitigated in the Y2K contingency plans.





- 1C. We accept the Department's response to this recommendation. However, it should be noted that based on an OIG Audit-related Memorandum #99-DP-166-0003 (Review of the Department's Overall "Year 2000 Business Process Continuity Contingency Plan and Supporting Year 2000 Contingency Plans"), there is still much work to be completed on the Y2K contingency plans.

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## HUD's Data Center Has Not Adequately Tested System Software for Y2K Compliance

Our review of the Department's Data Center found that Lockheed Martin Corporation (LMC) did not test system software residing on the computer mainframes to validate their Y2K compliance. Instead, LMC is relying on information provided by system users and vendors rather than independently testing system software for Y2K compliance. Without independent testing, there is no assurance that all of the critical date functions will be identified and work properly in the Year 2000.

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System software have not been tested to validate their Y2K compliance

Our review found that LMC did not independently test system software. LMC is responsible for maintaining the computer mainframes at HUD's Data Center. LMC is also responsible for purchasing and installing the system software that controls and monitors the computer operations as well as running all applications. We were informed by LMC and HUD officials that their testing was limited to installing system software onto a Y2K compliant platform where the system clock has been date forwarded to the Year 2000. Problems would be identified and reported by the users and subsequently resolved. Additionally, LMC is relying on vendor certification statements for Y2K compliance of vendor supplied system software. Although these methods do provide some assurance that system software is Y2K compliant, it does not go far enough to provide HUD with the necessary level of assurance that the system software will process dates correctly and not jeopardize HUD's ability to perform core business operations after the millenium.

A more proactive approach for system software testing is needed

System software functions include supporting daily business applications and administering computer operation activities such as job scheduling, tape inventory, monitoring computer performance, etc. Because system software is complex and is integrated into all of HUD's computer operations, the risk of Y2K failures is increased. Accordingly,

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this increase in risk would require a more proactive approach to mitigate the possible disruptions caused by Y2K failures.

LMC is relying on HUD system users to identify Y2K problems within system software.

LMC is relying on HUD system users to identify and report Y2K problems within system software. HUD has installed system software onto a Y2K compliant platform where the system clock has been date forwarded to the Year 2000. By letting the system software run in this environment under day-to-day operations, any Y2K problems would then be expected to be identified and reported by the users and subsequently resolved. However, this approach does not provide assurances that all potential date problems have been identified. Users cannot be fully relied upon to provide Y2K failure information as they may not use all the potential date functions which only Y2K specific testing could detect. For example, CA-7 is a job scheduling system software which involves future dates. Individual jobs, such as user reports and database updates, are scheduled by CA-7 for execution at a specific future date and time. Because user interaction with this software is limited, it would be necessary for LMC to test the dates into the Year 2000, at a minimum, the millennium turnover, and leap year, to ensure that any Year 2000 dates will process correctly.

LMC is also relying on vendor certification statements and Y2K warranties for Y2K compliance of

LMC is also relying on vendor certification statements and Y2K warranties as validation of Y2K compliance of vendor supplied system software. However, this approach does not provide the necessary assurances that the system software will process dates correctly in the Year 2000. Vendors are relying on their users, such as HUD, to provide them information on Y2K problems with their software. In turn, the vendors will incorporate the software changes in their next software release update or as a separate Program Temporary Fix (PTF) along with a Y2K compliance certification statement. As a result, software that was certified by

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the vendor as Y2K compliant may become subsequently "de-certified" at a later date since the software is no longer Y2K compliant. For example, we found an automated scheduling software, used at the Data Center to automatically invoke certain processing programs at specific dates and time, was originally certified by the vendor as Y2K compliant. The vendor

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later de-certified this product by removing it from the Y2K compliant list of software. We also found that another major computer vendor, Unisys, refused to sign a Y2K warranty clause contained in the Department's maintenance purchase order for Unisys system software and hardware. Additionally, Unisys does not provide any Y2K assurances for their hardware and software as their Internet website explicitly states that clients must conduct their own testing to validate Y2K compliance.

Non-compliant software could adversely cause many HUD applications to stop working or provide inaccurate or unpredictable results.

LMC must independently perform Y2K testing for all critical system software, since relying on vendor and user supplied information increases the risk of Y2K system failures. Y2K problems created by non-compliant system software could adversely affect not one, but all HUD applications dependent on it for processing. This could cause many applications to stop working or provide inaccurate or unpredictable results. Without the assurance of the date and system software specific testing, dependent applications may fail to function properly and may not be restored in a reasonable time.

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Draft Audit Report  
Recommendations

In the draft audit report issued July 7, 1999, we recommended that the Deputy Secretary direct the Chief Information Officer (CIO) and the Acting Assistant Secretary for Administration to:

- 2A. Perform a risk analysis and identify the critical Data Center system software products.
- 2B. Prepare a test plan and conduct tests of the critical system software products and document the results.
- 2C. Perform a certification of the critical systems software tested.

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Summary of Auditee Comments to Draft Audit Report Recommendations
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The Department disagreed with our recommendation in the draft audit report. HUD made a business decision not to expend its resources attempting to independently test platform for the following reasons:

- HUD obtained written verifications from vendors as well as conducted web-based research with the hardware and software vendors.
- HUD felt no compelling need to duplicate the efforts of other government agencies facing the same issues.
- HUD felt confident that the vendors are committed to customer service and it would be extremely unlikely that they would risk their reputation and future by either failing to test or hiding a Y2K bug from their customer base.
- The platform is validated each time HUD performs testing in a date forwarded environment.

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OIG Evaluation of Auditee Comments
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Although OIG disagrees with the Department's response, we are not including these recommendations in the audit report. Since the issuance of these recommendations in the draft audit report on July 7, 1999, HUD has made no effort to implement the recommendations. With less than 100 days left until the Year 2000, it is currently too late to perform a risk analysis and identify critical data center system products, and independently test and certify critical system software. In addition, HUD's response indicates that the Department has accepted the associated risks. However, HUD must ensure that these risks are addressed and mitigated in the Y2K contingency plans.

## Critical HUD Headquarters Building Systems Have Not Been Y2K Tested And Certified

Our review found that the Department has not tested and certified critical HUD Headquarters building systems for Y2K compliance. Many building systems are controlled by embedded computer microchips that may have trouble recognizing the century date change. These embedded systems are generally used to control or monitor building systems such as elevators, Heating Ventilation and Air Conditioning (HVAC), lighting, security systems, fire detection, etc. If the embedded systems that contain year-date functions are not identified and fixed, unpredictable outcomes could negatively affect the health and safety of building occupants come the Year 2000. This places HUD personnel and operations at significant risk should building systems fail in the Year 2000.

Many building systems are controlled by embedded systems that may have trouble recognizing the century date change.

Our review found that HUD has not tested and certified critical HUD Headquarters building systems for Y2K compliance. Many building systems are controlled by embedded systems that may have trouble recognizing the century date change. Embedded systems is the technical term commonly used to identify building equipment or devices controlled by computer microchips. They include elevators, HVAC, lighting, security systems, fire detection, etc. If the embedded systems that contain year-date functions are not identified and fixed, unpredictable outcomes could negatively affect the health and safety of building occupants come the Year 2000.

HUD has not Y2K tested and certified critical building facility components.

The Department has identified three environmental facility components, i.e., elevators, HVAC, and fan coils for air distribution, as the only critical date-driven embedded microchip systems at HUD Headquarters. HUD officials have indicated that they have performed a preliminary assessment of these Headquarters facilities' embedded systems. HUD's preliminary assessment has disclosed that a prolonged electrical power outage is a primary factor that will affect these embedded systems and HUD's operations. HUD officials have also indicated that at this time these embedded systems



have not been tested or certified as Y2K compliant. Additionally, although test plans have

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not been developed, HUD plans to complete their testing and certification, to include documentation, by July 30, 1999.

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Draft Audit Report  
Recommendations

In the draft audit report issued July 7, 1999, we recommended that the Deputy Secretary direct the Chief Information Officer (CIO) and the Acting Assistant Secretary for Administration to:

- 3A. Prepare test plans for testing the critical embedded systems and document the test results.
  - 3B. Perform a certification of the critical systems tested.
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Summary of Auditee  
Comments to Draft  
Audit Report  
Recommendations

The Department disagreed with our recommendations in the draft audit report. HUD does not believe that testing and independent certification testing of embedded chip components is warranted because HUD's Office of Administrative and Management Services efforts, with the aid and assistance of Team 2000, have accomplish the following:

- Adopted and followed best practices that endorsed getting written certifications from vendors.
- Validated this strategy with industry experts from IEEE (Institute of Electrical and Electronics Engineers) to GSA (General Service Administration) to BOMA (Building Operators and Managers Associations).
- Weighted the impact and probabilities of failures.
- Is cognizant that forward date testing of an embedded microchip component would

accidentally introduce an error that produces immediate and possibly irrevocable harm to its daily operations.

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- Does not underestimate how difficult it is to properly and comprehensively test an embedded microchip without nearly total reliance on the vendor or system integrator, from whom we would have sought written compliance anyway.
  - Has contingency plans to address major failures of HUD's headquarters building.

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OIG Evaluation of Auditee Comments
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Although OIG disagrees with the Department's response, we have removed this recommendation from the audit report. Since the issuance of this recommendation in the draft audit report on July 7, 1999, HUD had made no efforts to implement our recommendation to independently test and certify critical embedded systems as advocated by industry experts. With less than 100 days left until the Year 2000, it is currently too late to independently test and certify critical embedded systems at the HUD Headquarters building. HUD's response indicates that the Department has accepted the associated risks. However, HUD must ensure that these risks are addressed and mitigated in the Y2K contingency plans.

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## HUD Has Neither Taken an Inventory of Non-standard Software Nor Ensured That Data Exchange Among Different Computer Platforms Will Yield Correct Results

Our review found that although the Department plans to ensure that HUD standard software are Y2K compliant, there are no plans to determine the magnitude of non-HUD standard software that are not Y2K compliant and currently in use. Also, our review of the draft "Test Plan Outline for Y2K Certification of HUDware and its Baseline Applications" found no plans for integrated testing of HUDware and its baseline standard applications for end-user computing with mainframe and commercial-off-the-shelf (COTS) applications or any other host systems which store dates as two digits. Thus, any dates exchanged between different COTS or in-house developed software and mainframe applications may not yield correct results.

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HUD will not conduct an inventory to determine what non-HUD standard software are currently in use and for ensuring they are Y2K compliant.

The Department developed and implemented HUDware as the standard Graphical User Interface (GUI) platform for all HUD Personal Computer (PC) users. HUDware is intended to provide a stable GUI environment for all of HUD's existing standard office automation and in-house developed applications on the PC. HUD has identified the standard commercial-off-the-shelf (COTS) and in-house developed applications and will be conducting tests of these applications to ensure they are Y2K compliant. In addition to the standard software, HUD employees may also be running stand alone, non-HUD standard software with date functions, such as DBase and Lotus 1-2-3, to generate information to use as a basis for management decisions. However, there are no plans to conduct an inventory to determine the magnitude of non-HUD standard software that are not Y2K compliant and currently in use. As a result, the impact and risk to HUD's business processes from the use of non-standard, non-Y2K compliant software cannot be assessed at this time.

Although the Department is aware that there exists

different pivot dates among applications using the windowing technique to correct the Y2K problem, no analysis has been performed of the effects of their

No analysis completed on the use of different pivot dates used among different applications that interact with each other.

interaction. Pivot dates are used in the windowing technique which allows for two-digit date input by establishing a year for which dates are interpreted as either 1900 or 2000 based. Different COTS software use different pivot dates. In-house developed applications for the PCs and mainframe also use different pivot dates. Our review of the draft "Test Plan Outline for Y2K Certification of HUDware and its Baseline Applications" found no plans for integrated testing of HUDware and its baseline standard applications among different COTS software, with mainframe applications, or any other host systems which store dates as two digits. Thus, any dates exchanged between different COTS or in-house developed software and mainframe applications may not yield correct results.

Draft Audit Report  
Recommendations

In the draft audit report issued July 7, 1999, we recommended that the Deputy Secretary direct the Chief Information Officer (CIO) and the Acting Assistant Secretary for Administration to:

- 4A. Complete an inventory of non-HUD standard software utilized on the PCs and evaluate the risk and impact of their use on HUD's business processes and, if appropriate, ensure they are Y2K compliant.
- 4B. Conduct an analysis and develop a strategy to address the interaction of data from various applications that use different pivot dates.
- 4C. Include in the final "Test Plan Outline for Y2K Certification of HUDware and its Baseline Applications" plans for integrated testing of HUDware and its baseline standard applications among different COTS software, with mainframe applications, or any other host systems which store dates as two digits.

Summary of Auditee  
Comments to Draft  
Audit Report  
Recommendations

- 4A. The scope of the current initiative, Year 2000 Desktop Readiness, is to identify all non-HUD standard and non-compliant software that exists on any HUD PC. The Y2K compliance of hardware, software packages, and existing data will be addressed. Team 2000 and the Computer Services Group (CSG) are currently in the final stages of evaluating and selecting the best tool to automate the process of collecting and reporting the appropriate data. These reports will include Y2K:
- Hardware Report of Servers and PCs
  - Desktop Application Reports
  - Desktop Application Data Analysis Report
- 4B. HUD's Guide to Y2K Readiness addressed the need to share pivot strategies with interfacing applications. The Y2K certification effort addressed a system as a stand alone entity and did not specifically examine the exchange of data between applications. Interaction of PC applications with mainframe applications is being addressed with HUD's Integration Certification Testing (ICeT). Applications that exchange data in order to completely execute a business transaction are clustered together during ICeT, specifically to demonstrate that data interpretation is consistent from one application to the next, end-to-end. Since ICeT focuses on only critical business transactions, there is the chance that non-critical data exchanges do not share common pivot dates. This may introduce an error if the year is exchanged among these applications using a two digit format. Team 2000 will ensure the recertification procedures address the exchange of pivot dates.



- 4C. Team 2000, in conjunction with CSG, is in the process of finalizing the test plan targeting the issue of data interaction from the various applications that comprise HUDware II. The

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dates and tests data selected will address the century change, leap year recognition, and the different pivot dates of the various applications.

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OIG Evaluation of Auditee Comments
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4A. We accept the Department's response to this recommendation.

4B, C. Although the Department's response did not adequately address these recommendations, we have removed both from the audit report. The intent of these two recommendations was to address the fact that in-house developed applications for the PCs and mainframe use different pivot dates. Our review found no plans for integrated testing of HUDware and its baseline standard applications among the various COTS software, with mainframe applications, or with any other host systems which store dates as two digits. ICeT and recertification do not address these issues. Since the issuance of this recommendation in the draft audit report on July 7, 1999, HUD had made no efforts to implement our recommendation. With less than 100 days left until the Year 2000, it is currently too late to perform the tests. The Department must now accept the associated risks and ensure that they are addressed and mitigated in the Y2K contingency plans.

## One of Four Mission Critical Systems Reviewed Lacked Sufficient Documentation to Verify Y2K Certification

We found that the Y2K test procedures for three of the four mission critical applications were adequate to validate their certification status. However, we found one application where we were not able to determine the basis for its Y2K certification because of a lack of available test documentation. The Loan Accounting System (LAS) did not have sufficient documentation for us to determine if adequate testing procedures were performed to support its certification status. Also, because of personnel turnover, current personnel had too limited a knowledge of the level of testing that was done for us to obtain assurance that adequate testing had been performed. HUD needs to ensure that sufficient testing documentation is available for all of its applications. This documentation is critical in case of Y2K failures where the recovery of the test conditions is necessary to timely and effectively identify the cause of failure due to insufficient testing.

We reviewed Y2K tests procedures and contingency plans for four HUD mission critical application systems as follows:

- HUDCAPS
- IBS
- TRACS
- LAS

Y2K certification documentation for one of the four mission critical systems reviewed was not

Y2K certification documentation for one of the four mission critical systems reviewed was not complete. We obtained impact analyses for each of the four applications to select a sample of modules identified for remediation. We then traced the modules to test plans, test scripts and test results. We were able to reconcile the sample of modules from the impact analysis to the test plans, test scripts and test results for three of the four mission critical system. However, one application, LAS, lacked sufficient documentation to verify Y2K certification.

We were unable to determine the basis for the Y2K certification due to the lack of documentation available and personnel turnover.

LAS completed testing and was certified by Team 2000 as Y2K compliant during August 1997. However, we were unable to determine the basis for

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the Y2K certification due to the lack of documentation available and personnel turnover in which current personnel had limited knowledge of the level of testing performed.

Our review of the documentation available found that the impact analysis information did not provide the basis for developing test plans. We noted general test plans which appeared to be designed based on application design, but did not include detailed test scripts with objectives and expected results. In addition, the test results appeared incomplete.

We found a lack of interface balancing controls to detect corrupt data received from outside resources.

In all four applications reviewed, we also found that while some batch transmission controls exist, there were no interface balancing controls. Without such mechanisms, it will be difficult to detect corrupt data received from outside sources before accepting and processing it downstream. If these mechanisms can not be developed, management will need to emphasize 20xx testing of interfaces. We surfaced this issue in our second Y2K report issued March 25, 1999 (99-DP-166-0002). The Department's response was that this will be addressed during Integrated Certification Testing (ICeT), which will include the use of aged test data to validate the accuracy of systems and interface processing for both internal and external systems.

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Draft Audit Report  
Recommendations

In the draft audit report issued July 7, 1999, we recommended that the Deputy Secretary direct the Chief Information Officer (CIO) and the Acting Assistant Secretary for Administration to:

- 5A. Ensure that the Loan Accounting System (LAS) be re-tested and re-certified and detailed documentation of the tests and re-certification be kept for Year 2000.
- 5B. Ensure that adequate testing documentation is available for all critical applications that have been previously certified.

Summary of Auditee  
Comments to Draft  
Audit Report  
Recommendations

- 5A. LAS is in the process of being retested and recertified. In the effort to ensure Y2K compliance of HUD critical systems, Team 2000 has employed a three pronged effort to individual application certification/recertification, integrated cluster testing of HUD's core business processes (during ICeT), and Renovation Quality Evaluation (automated code review). All processes and test results are documented and retained. Even though documentation was deemed inadequate by IG, current plans do not include retesting and redocumenting previously tested and certified code that has not been modified.
  
- 5B. Documentation is retained for all Team 2000 quality assurance processes. The existing documentation for all previously certified critical applications is currently under review. Wherever possible, documentation levels will be increased as we recertify applications

OIG Evaluation of  
Auditee Comments

- 5A We accept the Department's response to this recommendation.
  
- 5B We accept the Department's response to this recommendation.

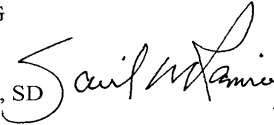
# Auditee Comments



**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT**  
**THE DEPUTY SECRETARY**  
WASHINGTON, D.C. 20410-0050

September 1, 1999

MEMORANDUM FOR : Susan F. Gaffney, Inspector General, G

FROM : Saul N. Ramirez, Jr., Deputy Secretary, SD 

SUBJECT : Response to Draft Audit Report of HUD's Efforts to Correct Year 2000 Problems (Phase III), dated July 7, 1999

The attached report addresses each recommendation from the Phase III Audit Report of HUD's efforts to correct Year 2000 problems. The Department has identified actions and dates, where appropriate which will be taken in regards to the recommendations which focus specifically on the Year 2000 readiness of HUD's contingency plans, data center, building facilities, end-user computing and four mission critical applications.

Because our organizations are co-located in the field as well as at Headquarters, I need to know the status of your Year 2000 preparations in order to report the Department's Year 2000 status to the Office of Management and Budget and Congress. Please provide a report that describes what has been done in assessing and fixing the IG's systems, facilities, and embedded microchips. I would also like to receive a copy of your Year 2000 contingency plan(s). These materials are needed no later than Friday, September 3, 1999. If a written response within this time frame is not possible, Pam Woodside is available to meet and discuss your status with your designate during the week of August 30, 1999.

If you have any questions or concerns, please contact Gloria Parker at 708-1008.

Enclosure

# Auditee Comments

Comments Regarding  
Draft Audit Report of HUD's Efforts  
to Correct Year 2000 Problems (Phase III)  
July 7, 1999

1. **Finding: The supporting Year 2000 contingency plans have not been fully developed and tested.**

**Recommendations & Responses:**

- 1.1. **Conduct a risk analysis of the HUD building facilities and the data center operations and develop supporting contingency plans for each based on the assessed risks.**

Response: HUD followed the GAO Year 2000 Computing Crisis Business Continuity and Contingency Planning guidelines, published in August 1998. This best practice covered the full spectrum of contingency planning, including assessing the potential impact of a mission-critical system's failure on the agency's core business processes; identifying failure scenarios; examining the impact of failure, of systems or infrastructure, on each core business process; and developing and documenting actions that would enable HUD to maintain the minimum acceptable level of support within each business process.

According to these best practices, each agency was to focus their planning on those threats posing the greatest risk to critical core business processes and the agency's efforts in response to likely failure scenarios. The BPCCP team recognized early on that the optimal approach would be to pursue this effort in an iterative fashion; by adding increasing levels of detail and specificity through time.

This approach not only enabled a maturation in thought and planning, but it also supported just-in-time delivery of the procedures and practices to be followed in the days and weeks of the new year. We found no compelling reason to develop fully articulated procedures a full year, or even six months, before these practices would need to be pulled off the shelf and executed.

# Auditee Comments

The Business Process Continuity Contingency Planning process, followed in accordance with GAO guidelines, has identified risks associated with HUD building facilities and the HUD Data Center. The applicable contingency plans, first developed on September 30, 1998, and most recently revised on July 26, 1999, include:  
 4.11.1 Utilities/HQ Building (OAMS), 4.11.2 HUD Integrated Network (CSG) and 4.11.3 HUD Computer Centers (CSG). These supporting contingency plans, being revised continuously, will continue to be embellished and expanded upon:

- September 13 to incorporate OIG and IV&V recommendations;
- October 25 to incorporate Day One strategies and testing activities;
- November 22 to incorporate results of Day One tests; and
- December 13 to incorporate final updates.

**1.2. Test the supporting Year 2000 contingency plans and procedures for the HUD building facilities and data center operations.**

Response: Again, HUD followed the GAO Year 2000 Computing Crisis Business Continuity and Contingency Planning guidelines, published in August 1998. This best practice included specific validation and testing activities associated with its contingency strategy and procedures. Training is also an essential component of adequate contingency planning, and it is a widely accepted industry practice to train the staff concurrent with testing the plan. Again, there is no compelling reason to achieve these milestones earlier than necessary. It is important to limit the maintenance of these plans, and it is also important for the staff to be able to retain their training. Both these facts argue for conducting the testing close to the execution date. Testing of HUD's contingency plans is scheduled to complete prior to November 30, 1999.

**1.3. Further develop HUD's Year 2000 supporting contingency plans by including procedures and documentation that identifies:**

**1.3.1. Work flows that describe in detail how the applications will be run manually;**

Response: The workflow recommendation has already been incorporated into a Contingency Plan Checklist and provided to



# Auditee Comments

the contingency plan authors. Workflows will be created for each supporting contingency plan and included in the September 13, 1999 update.

**1.3.2. Methods to review for and detect errors which would result in the need for alternate means of processing;**

Response: This recommendation is accepted and will be included in the contingency plan test procedures.

**1.3.3. Programs to perform scans to detect corrupted data;**

Response: This recommendation is accepted and will be included in the Y2K Day One plan.

**1.3.4. Reports needed to support manual processing;**

Response: This recommendation is accepted and will be included in the supporting contingency plans.

**1.3.5. The length of time the business can tolerate malfunctioning or unavailable systems; and**

Response: This has already been included in the contingency plans in the "Expected Life of Plan" section of the contingency plans.

**1.3.6. Triggers, to include the earliest encounter dates, that will result in plans being activated (i.e., specific instances resulting in the need for alternate processing methods.)**

Response: This recommendation has been incorporated into the contingency plans. It is reflected in the July 26, 1999 update.

**2. Finding: HUD's data center has not adequately tested system software for Year 2000 compliance.**

**Recommendations & Responses:**

- 2.1. Perform a risk analysis and identify the critical data center system software products;**
- 2.2. Prepare a test plan and conduct tests of the critical system software products and document the results;**
- 2.3. Perform a certification of the critical systems software tested.**

# Auditee Comments

**Response:** The strategy HUD followed to achieve a compliant computer platform was consistent with that prescribed as early as 1996: inventory; assess; fix and/or certify. During weekly meetings between HUD's Team 2000 and the Computer Services Group, the team identified the hardware, operating system software, third party software and shareware in HUD's mainframe environments. Following best practices which endorsed getting written verification from vendors, HUD insisted that Lockheed Martin conduct web-based research with the hardware and software vendors as one approach to certification documentation. Listings were generated quarterly.

Further, HUD made a business decision not to expend its scarce resources attempting to independently test platform compliance. HUD possessed no extraordinary expertise or renown in these components. HUD was cautious and wanted to avoid accidentally introducing possibly irrecoverable errors as it advanced the date and exercised platform components. HUD felt no compelling need to duplicate the efforts of other government agencies facing the same issue. In interagency forums other agencies actively discussed strategies and the results of their verification testing with others. HUD benefited from this open dialog and shared experience. For example, Social Security brought experts from its data center, enabling HUD to benefit from their experience. Finally, HUD strongly believed that its large platform vendors would have an urgent commitment to customer service. It was extremely unlikely that they would risk their reputation and future by either failing to test or hiding a Year 2000 bug from their customer base. We remain confident that this decision made sense then and continues to be sound.

Every time HUD performs testing in a date forwarded environment, we are validating the platform. Certification testing in the "Y" environments began in late 1997. During Integrated Certification Testing, HUD is demonstrating the integrity of the platform. We believe that this testimony, combined with the vendor certification letters and vendor patch updates, makes the current policy a cost effective and reasonable approach to ensuring HUD's mainframe systems software is Y2K compliant and that HUD has performed 'due diligence' in this effort.

**3. Finding: Critical HUD headquarters building facilities have not been Year 2000 tested and certified.**

**Recommendations & Responses:**

- 3.1. Prepare test plans for testing the critical embedded systems and document the test results;**
- 3.2. Perform a certification of the critical systems tested.**

# Auditee Comments

Response: Team 2000 does not believe that testing and independent certification testing of embedded chip components is warranted. HUD's OAMS effort, with the aid and assistance of Team 2000:

- Adopted and followed best practices that endorsed getting written certifications from vendors.
- Validated this strategy with industry experts from IEEE (Institute of Electrical and Electronic Engineers) to GSA (General Services Organization) to BOMA (Building Operators and Managers Association).
- Weighed the impact and probabilities of failure.
- Is cognizant that forward date testing of an embedded microchip component could accidentally introduce an error that produces immediate and possibly irrecoverable harm to its daily operations.
- Does not underestimate how difficult it is to properly and comprehensively test an embedded microchip without nearly total reliance on the vendor or system integrator, from whom we would have sought written compliance anyway.
- Has contingency plans to address major failures of HUD's headquarters building.

4. **Finding: HUD has neither taken an inventory of non-standard software nor ensured that data exchange among different computer platforms will yield correct results.**

#### Recommendations & Responses:

- 4.1. **Complete an inventory of non-HUD standard software utilized on the PCs and evaluate the risk and impact of their use on HUD's business processes and, if appropriate, ensure they are Year 2000 compliant;**

Response: There is a major initiative, Year 2000 Desktop Readiness, currently underway to ensure the Year 2000 compliance of all HUD PCs. Its scope is the identification of all non-HUD standard and all non-compliant software that exists on any HUD PC. The Year 2000 compliance of hardware, software packages, and existing data will be addressed. Team 2000 and CSG are currently in the final stages of evaluating and selecting the best tool to automate the process of collecting and reporting the appropriate data. These reports will include:

- Y2K Hardware Report of Servers & PCs
  - ⇒ Summary Reports for CIO, IT, Team 2000
  - ⇒ Detailed Reports for Team 2000, Microcomputer, TMD, DTD, Field Offices

# Auditee Comments

- Y2K Desktop Application Reports
  - ⇒ Y2K Application Compliance Report
  - ⇒ User License Accounting Report
  - ⇒ Application Version Control Report
  - ⇒ Unauthorized Applications Found (UAF) Report to include:
    - \* UAF but legal; e.g. Netscape 4.5
    - \* UAF but may need removal notice; e.g. Solitaire
    - \* UAF with Permission (TBD)
  - ⇒ Summary Reports for CIO, IT, Team 2000
  - ⇒ Detailed Reports for Team 2000, Microcomputer, TMD, DTD, Field Offices,
  - ⇒ Individual Workstation Report
- Y2K Desktop Application Data Analysis Report
  - ⇒ Summary Reports for CIO, IT, Team 2000
  - ⇒ Detailed Reports for Team 2000, Microcomputer, TMD, DTD, Field Offices,
  - ⇒ User (Individual Report)

**4.2. Conduct an analysis and develop a strategy to address the interaction of data from various applications that use different pivot dates.**

Response: Interaction of PC applications with mainframe applications is being addressed with HUD's Integrated Certification Testing (ICeT). Applications that exchange data in order to completely execute a business transaction are clustered together during ICeT, specifically to demonstrate that data interpretation is consistent from one application to the next, end-to-end.

HUD's Guide to Year 2000 Readiness addressed the need to share pivoting strategies with interfacing applications. Kickoff meetings with development organizations emphasized the importance of these special considerations if a pivot date strategy was adopted. The Year 2000 certification effort addressed a system as a stand alone entity and did not specifically examine the exchange of data between applications. Since ICeT focuses on only critical business transactions, there is the chance that non-critical data exchanges do not share common pivot dates. This may introduce an error if the year is exchanged among these applications using a two digit format. Team 2000 will ensure the recertification procedures address the exchange of pivot dates.

**4.3. Include in the final "Test Plan Outline for Year 2000 Certification of HUDware and its Baseline Applications" plans**

# Auditee Comments

**for integrated testing of HUDware and its baseline standard applications among different COTS software, with mainframe applications, or any other host systems which store dates as two digits.**

Response: Team 2000, in conjunction with CSG, is in the process of finalizing the test plan targeting the issue of data interaction from the various applications that comprise HUDware II. The dates and test data selected will address the century change, leap year recognition, and the different pivot dates of the various applications. A brief summary of the approach is included.

The following scenarios of data exchange between the Microsoft Office 95 will be used for Year 2000 testing:

Word:

Insert | Get Database | Access  
Mail Merge from Excel & Access data

Excel:

Get External data from Access  
Get External data from Text document  
Receive Access data through Analyze It

Access:

Convert to Access (from Excel)  
Get External data from Text document  
Get External data from Excel

Note:

Copy & Paste commands between these COTS applications will not be tested as the data being copied and pasted are transferred/pasted to the receiving COTS:

- ⇒ as text, if the pasting is done on Word;
- ⇒ as date cells using the default date format if pasted on Excel; with Excel, however, the pivot year of Excel applies if the data pasted is on a 2 digit year format;

Copy & Paste Special commands between these COTS applications will not be tested as the data copied and pasted special are transferred to the receiving COTS applications as objects. The pivot years for the originating COTS applications will still apply on these objects. Inserting a text file into Word with dates as data will not be tested as the data are transferred as text.

# Auditee Comments

The data to be exchanged for testing will contain the following dates:

01/01/1900  
02/29/1900  
01/01/80  
01/01/1980  
01/01/99  
01/01/1999  
01/01/00  
01/01/2000  
02/29/00  
02/29/2000  
01/01/2079  
01/01/2080  
01/01/2099

This covers the pivot dates for Windows 95 and Office 95 as well as standard Y2K test dates.

5. **Finding: One of four mission critical systems reviewed lacked sufficient documentation to verify Year 2000 certification.**

**Recommendations & Responses:**

- 5.1. **The Loan Accounting System (LAS) be re-tested and re-certified and detailed documentation of the tests and re-certification be kept for Year 2000;**

Response: The Loan Accounting System (LAS) is in the process of being retested and recertified. In the effort to ensure Year 2000 compliance of HUD critical systems, Team 2000 has employed a three pronged effort of individual application certification/recertification, integrated cluster testing of HUD's core business processes (ICeT), and Renovation Quality Evaluation (automated code review). All processes and test results are documented and retained. Even though documentation was deemed inadequate by OIG, current plans do not include retesting and redocumenting previously tested and certified code that has not been modified.

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## Auditee Comments

**5.2. Ensure that adequate testing documentation is available for all critical applications that have been previously certified.**

Response: Documentation is retained for all Team 2000 quality assurance processes. The existing documentation for all previously certified critical applications is currently under review. Wherever possible, documentation levels will be increased as we recertify applications.

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