OFFICE OF THE INSPECTOR GENERAL

November 8, 1999

00-DP-166-0802
Audit-Related Memorandum

MEMORANDUM FOR:  Gloria Parker, Chief Information Officer, Q

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

SUBJECT:  Year 2000 IV&V Review of HUDCAPS and A43C Claims Modules

Our office has completed a limited Independent Verification and Validation (IV&V) review of selected HUDCAPS and A43C Claims modules.  We selected these two mission critical systems because HUDCAPS is the focal point for integrating all HUD financial systems and A43C provides on-line update and inquiry capability to Single Family Insurance and Claims data bases. We reviewed 56 programs (see Attachments I and II) containing 300,000 lines of code focusing on date intensive modules.  The objective of our review was to determine if the modules would be able to process dates correctly in the year 2000 (Y2K).  The programs were selected based on discussions with TEAM 2000/Certification group and Information Technology (IT) staff.

We found that the HUDCAPS selected modules were Y2K compliant.  However, our review of A43 found that module A43TAA1, which contained statements with two digit year fields used in date calculations, would fail during the millennium transition.  This program also contained a leap year routine that would fail after the year 2000.  The IT staff researched this issue and corrected the two digit year problem.  But the leap year problem remains.  Even though the code would work in year 2000, it would fail for leap years 2004 and beyond.  Since minimum resources are required to correct this problem, we recommend that you work with Housing to correct the module A43TAA1 so that the program would work for the leap years beyond year 2000.

We are requesting a response to this memorandum's recommendation by November 19, 1999 on: (1) action taken; (2) the proposed action and date to be completed; or (3) why action is considered unnecessary.  The results of our work are provided below.  Should you have any questions, or require additional information, please call me or Eve Jacavage at 708-3444, extension 149 and 134 respectively.

## Review Summary

The review was conducted using an automated IV&V tool called CA-Fix/2000 developed by Computer Associates (CA) to process and analyze programming source code. CA-Fix/2000 performed a comprehensive data flow analysis, identified date fields in the modules, and flagged those that may cause errors in the year 2000. A CA computer specialist analyzed the flagged code and provided OIG with a summary of Y2K compliance issues. OIG reviewed, validated, and forwarded the issues to the IT staff for resolution.

We found that the HUDCAPS selected modules would work in the year 2000. However, we did find Y2K compliance issues with several Single Family Claims modules. The following is a summary of the results of our review.

## A75 - HUDCAPS

No outstanding Y2K compliance issues were identified in the review of the selected HUDCAPS modules. Windowing and shadowing techniques, to accommodate the millennium transition, were identified throughout the HUDCAPS modules. These techniques appeared to be efficient and Y2K compliant. The leap year routines were verified as being Y2K compliant. A number of two digit year fields were identified but were being used for equal/not equal comparisons. They were not being used in date calculations. Accordingly, these fields did not raise Y2K compliance concerns.

## A43C - CLAIMS

Programs A43BLS1, A43BLU1, and A43BPP1 contained statements that were flagged as date key elements requiring further review to determine if the corresponding data was Y2K compliant. The IT staff researched this and found that the corresponding data comes from the AMF, PCV, and PMF files, and the data formats were changed from YYMMDD to CCYYMMDD during Y2K renovation. As a result, there are no Y2K concerns.

Programs A43TJA1, A43TJE2, and A43TZK1 contained statements that were flagged as date key elements requiring further review. Although the date elements were verified as CCYYMMDD, further analysis was required to determine if the corresponding data was Y2K compliant. The IT staff reviewed the corresponding data records and found that all the date fields were fully expanded and did not contain erroneous data.

Program A43TAA1 contained statements with two digit year fields used in date calculations. It was determined the calculations on these fields would fail during the millennium transition. The IT staff researched this issue and found that the code for the two digit fields was updated, simultaneously with our review, to accommodate the millennium transition. OIG reviewed the updated code and verified that it appears to be Y2K compliant. Program A43TAA1 also contained a leap year routine that would fail after the year 2000. Leap years were specified up to and including the year 2000. As a result, the program would fail for leap years 2004 and beyond. This code needs to be fixed if the life expectancy of the program extends to the year 2004 and beyond.

Program A43TUA2 contained statements that were flagged as date key elements requiring further review. The date elements were verified as CCYYMMDD but required further analysis to determine if the corresponding data was Y2K compliant. The IT staff researched this issue and found that the current date is used to populate these fields and is controlled by this program, not outside influences, and does not affect any calculations.

**Note:** Programs A43TAA1 and A43TUA2 reside under the ownership of A43I but were propagated into the A43C review.

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**<u>Recommendation</u>**

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We recommend the Department modify the source code for module A43TAA1 of the A43I application to add additional leap years beyond the year 2000 to accommodate the life expectancy of the program.

cc:
Chuck Yoshida, Real Estate Insurance Division, AORME
Pam Woodside, Director, Systems Integration and Efficiency, Q
William Apgar, Assistant Secretary for Housing, H
W.B. Erwin, Office of Systems, FY

## HUDCAPS Selected For Review

**HUDCAPS**

| Program | Lines of Code |
|---|---|
| DYNDOCDB | 1,028 |
| FFSAPIF | 48,133 |
| FFSBERP | 30,957 |
| FFSHDCO | 31,741 |
| FFSHT08 | 17,526 |
| FFSHT21 | 7,387 |
| FFSTATN | 47,618 |
| INITOFFL | 1,477 |
| NUMVAL | 334 |
| OFFERR | 313 |
| RPTSTAT | 6,746 |
| UTDATE | 519 |
| ZADNDMR | 8,909 |
| **HUDCAPS Total:** | **202,688** |

# A43C Claims Modules Selected For Reviewed

**A43C Claims Batch**

| Program | Lines of Code |
|---|---|
| A43BJF2 | 2,291 |
| A43BJK3 | 1,390 |
| A43BKW1 | 1,175 |
| A43BKZ1 | 1,402 |
| A43BLC1 | 1,995 |
| A43BLD2 | 1,708 |
| A43BLE2 | 1,698 |
| A43BLH1 | 1,083 |
| A43BLS1 | 1,522 |
| A43BLT1 | 996 |
| A43BLU1 | 2,471 |
| A43BLV1 | 1,365 |
| A43BLX1 | 3,581 |
| A43BNM1 | 1,000 |
| A43BPP1 | 1,525 |
| A43BVR2 | 2,069 |
| **Batch Total:** | **27,271** |

**A43C Claims Online**

| Program | Lines of Code |
|---|---|
| A43BREF | 557 |
| A43BSB3 | 460 |
| A43TAA1 | 3,595 |
| A43TAA2 | 2,087 |
| A43TEO2 | 662 |
| A43TJA1 | 7,626 |
| A43TJA2 | 2,920 |
| A43TJA8 | 4,814 |
| A43TJA9 | 1,951 |
| A43TJB1 | 11,915 |
| A43TJB2 | 4,831 |
| A43TJB3 | 2,211 |
| A43TJB9 | 2,581 |
| A43TJE2 | 1,896 |
| A43TLJ9 | 615 |
| A43TUA2 | 5,105 |
| A43TZA1 | 1,748 |
| A43TZB1 | 850 |
| A43TZC1 | 552 |
| A43TZD1 | 1,137 |
| A43TZE1 | 510 |
| A43TZF1 | 1,344 |
| A43TZF2 | 359 |
| A43TZH1 | 646 |
| A43TZI1 | 479 |
| A43TZK1 | 1,707 |
| A43TZL1 | 1,077 |
| **Online Total:** | **64,235** |

**A43C Claims Total:** **91,506**

**bcc:**

| | | |
|---|---|---|
| **G** | **GAFFNEY** | **8256** |
| **G** | **CONNORS** | **8256** |
| **GA** | **KUHL-INCLAN** | **8286** |
| **GA** | **PHELPS** | **8286** |
| **GAA** | **HSIAO** | **8172** |
| **GAA** | **WALKER** | **8172** |
| **GAA** | **DO** | **8172** |
| **GAA** | **CHRON** | **8172** |
| **GFP** | **FILE ROOM** | **8266 (2012.2)** |

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