REDACTED AUDIT REPORT

TO: Vicki B. Bott, Deputy Assistant Secretary for Single Family Housing, HU

Tanya E Schulze

FROM: Tanya E. Schulze, Regional Inspector General for Audit, Region IX, 9DGA

SUBJECT: HUD's Office of Single Family Housing's Management Controls Over Its Automated Underwriting Process

HIGHLIGHTS

What We Audited and Why

We audited the U.S. Department of Housing and Urban Development (HUD) Single Family Program Development Office's (Program Office) automated underwriting process. This audit was conducted as part of the HUD Office of Inspector General's (OIG) fiscal year 2010 annual audit plan and supported the audit plan objective to contribute to improving the integrity of the single-family insurance program. Our audit objective was to determine whether HUD had in place appropriate and effective management controls over its automated underwriting process.

What We Found

HUD's Program Office did not have appropriate and effective management controls in place over the automated underwriting process. Specifically, it implemented changes to the Federal Housing Administration (FHA) Technology Open to Approved Lenders Scorecard's (Scorecard) review rules without properly assessing the associated risk and

appropriately documenting the changes. As a result, loans valued at more than $6.1 billion were automatically approved for FHA insurance despite having debt ratios that exceeded established thresholds for automated underwriting. Without evaluating the risks associated with the higher ratios allowed by the automated underwriting system, HUD cannot provide assurance regarding whether these loans had conditions that might have posed an increased risk of losses to the FHA Mutual Mortgage Insurance Fund. In addition, the Program Office did not perform adequate monitoring of its automated underwriting process, including the use of authority to override automatic referrals for manual underwriting.

What We Recommend

We recommend that the Deputy Assistant Secretary for Single Family Housing develop or expand, as applicable, and implement written policies and procedures for (1) assessing the risk of proposed changes to the Scorecard's algorithm and review rules; (2) formally supporting, authorizing, and updating corresponding system documents for changes made to the automated underwriting process; and (3) continuous monitoring of the automated underwriting process through the normal course of business including the use of authority to override automatic referrals and, as applicable, periodic reviews, reconciliations, or comparisons of the automated underwriting processed data. Additionally, we recommend that the Program Office conduct a risk analysis to determine the appropriate front-end and back-end ratios for the Scorecard's review rules and institute the appropriate changes. For each recommendation without a management decision, please respond and provide status reports in accordance with HUD Handbook 2000.06, REV-3. Please furnish us copies of any correspondence or directives issued because of the audit.

Auditee's Response

We discussed our results with the Program Office during the audit and at the exit conference on July 27, 2010. We provided the Program Office with a copy of the draft report on July 13, 2010, and requested written comments by August 12, 2010. We granted the Program Office an extension for its written comments, which were to be provided by August 23, 2010. On August 25, 2010, we received the Program Office's written comments, which generally disagreed with the draft report. The complete text of the Program Office's response, along with our evaluation of that response, can be found in appendix B of this report.

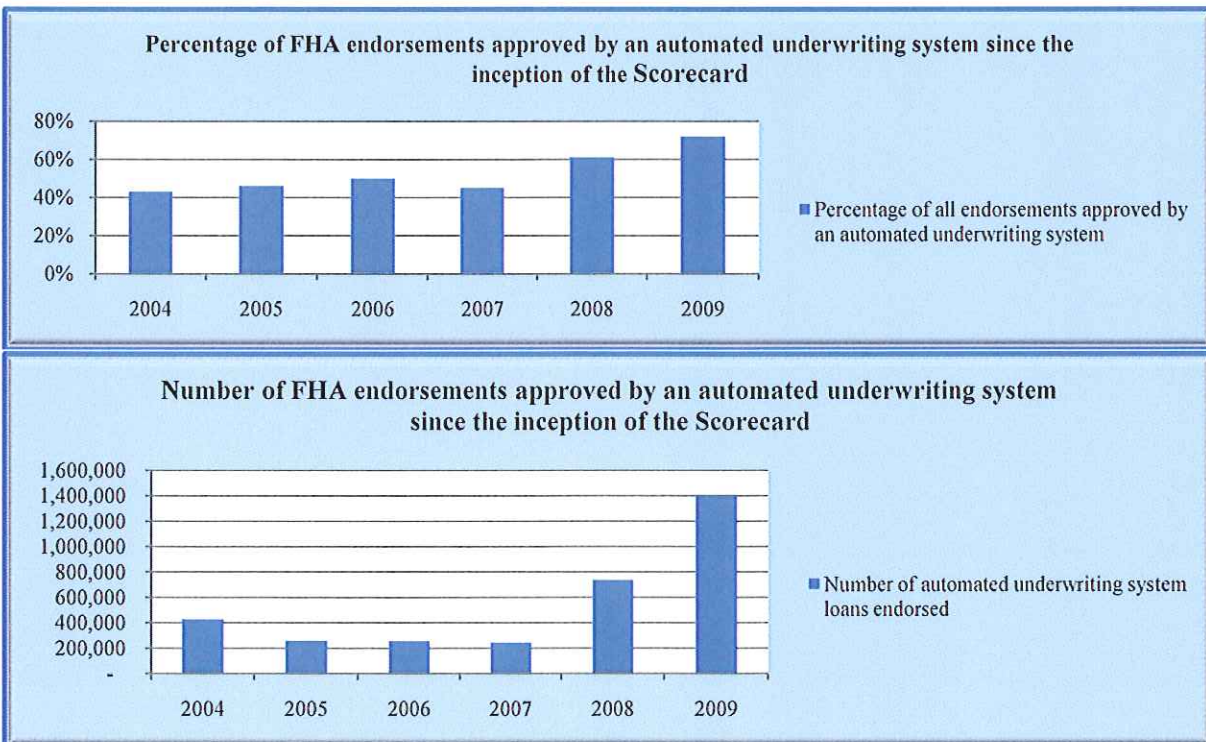# REDACTED AUDIT REPORT

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BACKGROUND AND OBJECTIVES

The Federal Housing Administration (FHA), created by Congress in 1934, is currently the largest mortgage insurer in the world. Between October 1, 2008, and September 30, 2009, FHA insured more than 1.9 million single-family mortgages totaling more than $360 billion. Loan applications must meet certain requirements to qualify for FHA mortgage insurance. The insurance reduces the lender's risk by protecting the lender against losses that could result from defaults by homeowners. Homeowners pay a mortgage insurance premium into the FHA Mutual Mortgage Insurance Fund (FHA Fund), and the U.S. Department of Housing and Urban Development (HUD) uses those premiums to operate the program. The FHA Fund pays claims to lenders in the event of a homeowner default on the mortgage.
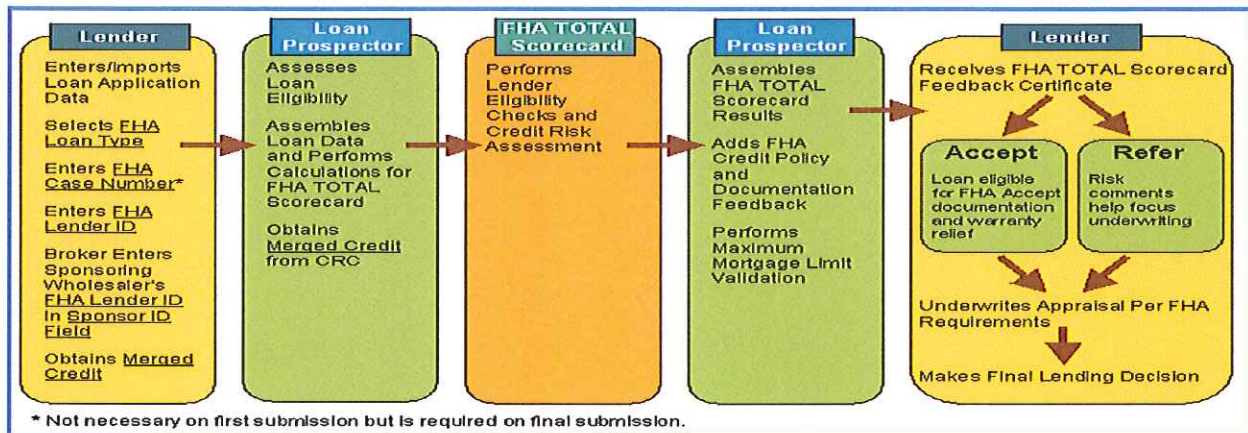
Since 2004, FHA has required single-family mortgages approved through the automated underwriting process to be evaluated for risk using FHA's Technology Open to Approved Lenders (TOTAL) Mortgage Scorecard (Scorecard). In recent years, the number of loans insured by FHA has increased dramatically, and the percentage of these loans approved through the automated underwriting process has also risen. Between October 1, 2008, and September 30, 2009, nearly 1.4 million FHA single-family mortgages were approved through the automated underwriting process, accounting for more than 72 percent of FHA's single-family mortgage loans. The two charts[1] below illustrate the number and percentage of FHA endorsements approved by an automated underwriting system by year since the inception of the Scorecard.

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[1] The charts are based on HUD's FHA Outlook reports that include monthly and/or yearly (based on the report) comparisons of total applications and total endorsements broken out by loan type.

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The Scorecard is a mathematical equation (algorithm) for use within an automated underwriting system. FHA's Scorecard evaluates the overall creditworthiness of each applicant based on a number of credit variables and, when combined with the functionalities of the automated underwriting system, indicates a recommended level of credit underwriting and documentation to determine a loan's eligibility for insurance by FHA. Taken together, Scorecard and the originating lender's automated underwriting system either (1) conclude that the borrowers' credit and capacity for repayment of the mortgage are acceptable or (2) will refer the loan application to a direct endorsement underwriter for further consideration and review (manual underwriting). The following diagram of how Scorecard works with Freddie Mac's system, Loan Prospector,[2] illustrates the overall FHA automated underwriting process.

Lender	Loan Prospector	FHA TOTAL Scorecard	Loan Prospector	Lender
Enters/Imports Loan Application Data	Assesses Loan Eligibility	Performs Lender Eligibility Checks and Credit Risk Assessment	Assembles FHA TOTAL Scorecard Results	Receives FHA TOTAL Scorecard Feedback Certificate
Selects FHA Loan Type	Assembles Loan Data and Performs Calculations for FHA TOTAL Scorecard		Adds FHA Credit Policy and Documentation Feedback	**Accept** — Loan eligible for FHA Accept documentation and warranty relief / **Refer** — Risk comments help focus underwriting
Enters FHA Case Number*				
Enters FHA Lender ID	Obtains Merged Credit from CRC		Performs Maximum Mortgage Limit Validation	Underwrites Appraisal Per FHA Requirements
Broker Enters Sponsoring Wholesaler's FHA Lender ID In Sponsor ID Field				
Obtains Merged Credit				Makes Final Lending Decision

* Not necessary on first submission but is required on final submission.

The increase in FHA activity has been accompanied by an increase in FHA-held mortgage notes and properties resulting from loan foreclosures. According to HUD, the current loss severity rate for FHA foreclosed-upon properties has risen to 60 percent, and the FHA Fund capital ratio[3] has fallen below the National Housing Act-mandated 2 percent to 0.53 percent.

Our objective was to determine whether HUD had in place appropriate and effective management controls over its automated underwriting process.

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[2] The Loan Prospector is Freddie Mac's automated underwriting system. The diagram used to illustrate the flow of how the Scorecard works was from "Processing FHA TOTAL and VA Mortgages," Freddie Mac, November 2009. The acronym "CRC" used in the table stands for credit reporting company.

[3] The "Federal Housing Administration Annual Management Report Fiscal Year 2009" states, "this ratio compares the economic net worth (net asset position, after booking the present value of all expected future revenues and net claim expenses, and then adding that to current cash resources) of the FHA Fund to the balance of active, insured loans, at a point in time."
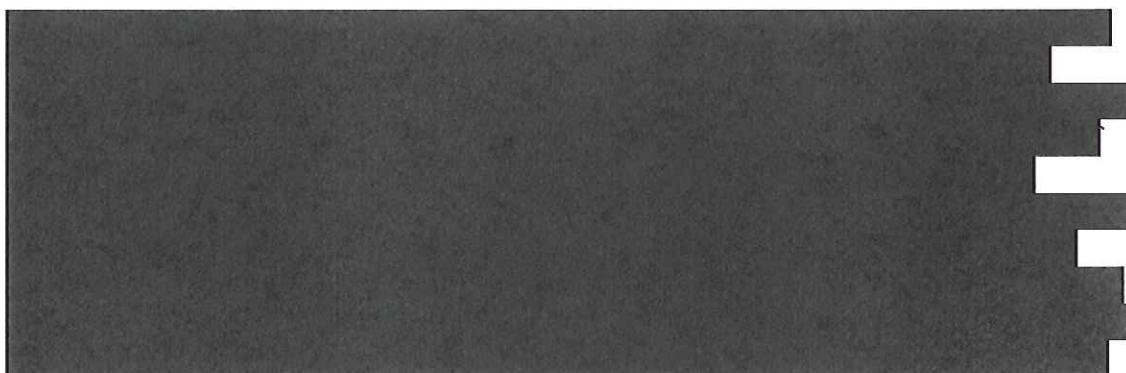
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RESULTS OF AUDIT

Finding: HUD Lacked Appropriate and Effective Management Controls Over Its Automated Underwriting Process
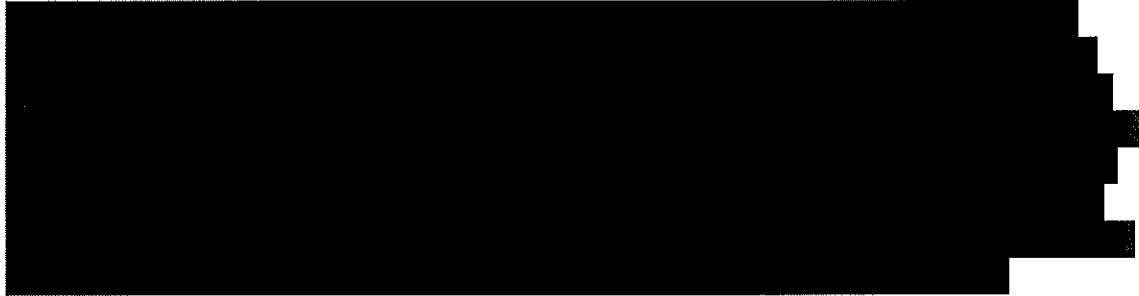
HUD's Single Family Office of Program Development (Program Office) did not have in place appropriate and effective management controls over the automated underwriting process. HUD implemented changes to the Scorecard's review rules without properly assessing the potential risk and without appropriately documenting the system changes that were made. In addition, the Program Office did not adequately monitor the results of the automated underwriting process. This occurred because the Program Office failed to fully implement the management control practices established by the Office of Management and Budget. Also, it failed to completely implement internal policies and procedures set forth in 2006 to manage updates to the Scorecard. Consequently, HUD did not have reasonable procedures in place to ensure that the automated underwriting process only approved (1) loans rated "accept" after passing all system tests and edit checks at endorsement or (2) loans not rated "accept" but that went through an appropriate and documented override process. Moreover, HUD's procedures could not determine why some loans were automatically approved despite their exclusion from the above two categories. As a result 1,073 loans were improperly approved for endorsement by the automatic underwriting process and posed unnecessary risk to the FHA Fund. We conservatively estimated that the projected loss to the FHA Fund was $1.8 million for the outstanding balance of more than $249 million for insured loans that did not undergo further review and, if indicated, manual underwriting because of the Program Office's lack of monitoring.

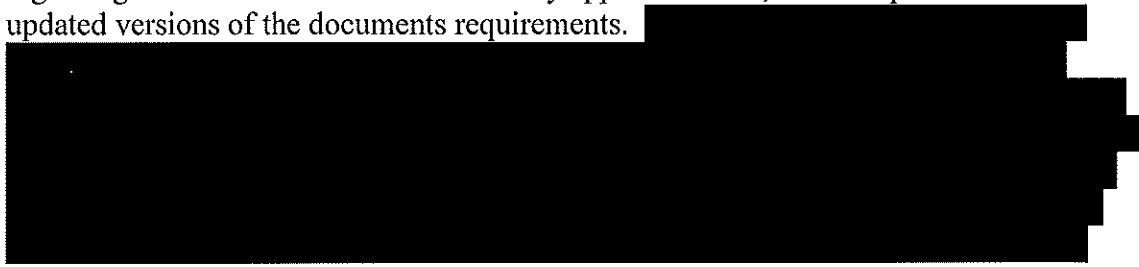**Scorecard Review Rules Were Changed Without a Documented Risk Assessment**

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[4] At that time, HUD used two tiers for its review rule thresholds that were conditioned on the mortgage score credit risk rating of the loan applicant.

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[REDACTED]

During the audit, officials did not provide supporting documentation, including written change orders and the corresponding updated systems documents, for the 2005 and 2007 changes. Program Office officials stated that a deliberative process was followed by the Program Office, if not documented, to obtain the FHA Commissioner's approval of the 2005 and 2007 review rule changes for the front-end and back-end ratios. Officials explained that the changes were made because of tax code changes and to prepare for risk-based pricing changes. Although HUD's contractor maintained reports titled "Documents Requirement"[6] to track system changes, neither HUD nor its contractor produced a documents requirement for the Scorecard that documented the ratio review rule changes at the time they were purportedly made in 2005 or 2007. After Office of Inspector General (OIG) audit staff questioned HUD officials on January 11, 2010, regarding excessive ratios for automatically approved loans, officials provided two updated versions of the documents requirements. [REDACTED]

Program Office could not show that a change order or equivalent documentation was used to direct the contractor to make the system changes. According to HUD's "System Development Methodology"[7] and policies and procedures for updating the Scorecard, the change documentation should have been available through the normal course of operations.

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[5] Such loans had received an "Accept" rating from the Scorecard algorithm, before the review rules were applied.
[6] These reports define the functional and data requirements for the automated underwriting system for deploying the Scorecard externally.
[7] The "System Development Methodology" was established by HUD's Chief Information Officer. It states that the HUD "System Development Methodology (SDM) provides an approach for solving information management needs that arise during the lifecycles of automated information systems. Although this methodology should be used on all information system projects related to HUD programs, it is intended to be flexible..."

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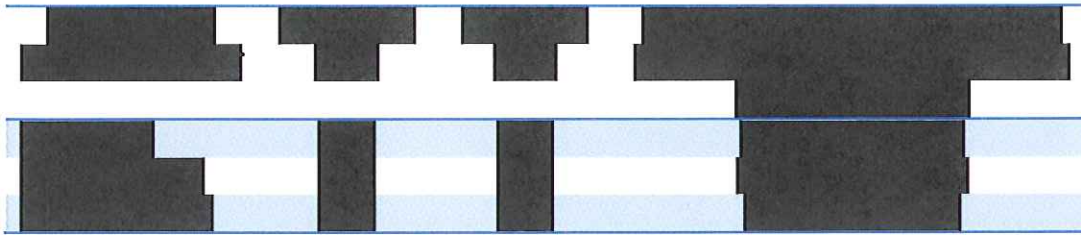
The Program Office did not properly document system changes or otherwise maintain a clear audit trail for the changes because it failed to completely implement management controls over its automated underwriting process. Further, the failure to properly document the most recent change in 2007 was inconsistent with its policies and procedures for updating the Scorecard, dated August 2006. The Program Office developed these policies and procedures in response to a recommendation made by the Government Accountability Office in a 2006 report that evaluated the way HUD developed and used the Scorecard.[9] Accordingly, HUD was not in compliance with Office of Management and Budget Circular A-123 requirements for control activities and risk assessment and HUD's "System Development Methodology" for system maintenance and change request initiation. HUD officials informed us that they recognized the need for a more formalized authorization process for system changes and stated that they had begun development of a procedure wherein no system changes would be made without the signature of the system owner or his/her designee.

The importance of making appropriate and informed decisions regarding the automated underwriting process is demonstrated by the increase in volume of FHA-insured loans approved through the automated underwriting process, along with the decrease in the FHA Fund capital ratio over the past few years (as detailed in the Background and Objectives section of this report). Because loans approved through the automated underwriting process without manual review are a significant portion of the loans insured by FHA, changes in the risk associated with these loans could significantly impact the FHA Fund capital ratio. . Therefore, management did not know whether the changes would significantly affect default and claim rates for automatically approved loans and negatively impact the FHA Fund.

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[8] The actual date of the ratio review rule change was not validated at the time of the audit.
[9] "Mortgage Financing: HUD Could Realize Additional Benefits From its Mortgage Scorecard," GAO-06-435, dated April 2006.

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Monitoring of the Automated Underwriting Process Was Inadequate

The Program Office inadequately monitored its automated underwriting process outputs as demonstrated through its failure to support overrides of loans rated "refer" or to identify erroneous data produced by a truncation error. HUD's Scorecard algorithm was only one piece of the automated underwriting process, which also included the review rules, Computerized Home Underwriting Management System logic that interfaces with the Scorecard[10], and procedures for manual overrides. However, the only documentation that HUD provided to support monitoring of the automated underwriting process was the Office of Evaluation's outlook reports and the Office of Policy Development and Research's annual reestimates that focused on the algorithm. Appropriate monitoring would include periodic reviews, reconciliations, or comparisons of data to detect unexpected outputs. Such monitoring should be included as part of the regular assigned duties of personnel that are ingrained in the agency's operations as provided for in Office of Management and Budget Circular A-123 standards for monitoring.

Our review of the automated underwriting approved loans in HUD's Single Family Data Warehouse revealed a number of loans with excessive front-end and back-end ratios that could have easily been detected if the Program Office had monitored the automated underwriting process outputs. In response to OIG's request for explanations regarding how or why these loans were automatically approved, HUD consulted with its contractor and determined the following:

- Six loans referred by the Scorecard for manual underwriting either had postendorsement changes or had the manual underwriting decision overridden by management or the homeownership centers to allow automated underwriting approval. During the audit, HUD did not provide supporting documentation to justify the staff decisions to override the automatic referrals, and apparently there was no audit trail to support the overrides.

- OIG's further review of loan data in Single Family Data Warehouse revealed that these six loans were included in a total of 1,073 loans that had been flagged as refer ("R") to manual underwriting by the Scorecard.[11] However, all of these loans were ultimately approved through the automated underwriting process.

- For 368 of the loans with excessive ratios, the Program Office determined that the ratio data for these cases were inaccurate because of a data-truncation

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[10] The Computerized Homes Underwriting Management System rescore logic evaluates loan changes to determine if the loan needs to be rescored through the Scorecard, if so then the Scorecard is prompted to rescore the loan.

[11] These loans were flagged "R" in the Single Family Data Warehouse field, "misc_aus_dcsn_cd," which was an attribute defined in HUD's data dictionary as a "TOTAL Scorecard decision code after processing in CHUMS. Values: A = Accept; R = Refer". During May 2010, the explanation for the referral to the manual underwriting field in HUD's Single Family Data Warehouse that we used to identify the 1,073 loans was modified and left undefined.

error.[12] Specifically, the ratios were computed in HUD's Computerized Homes Underwriting Management System, which transferred the erroneous information to Single Family Data Warehouse where the ratios were incorrectly stated because of the truncation error. Once this condition was brought to HUD's attention, officials took steps to correct the truncation error.

Thus, HUD's lack of monitoring failed to uncover or explain instances in which loans were: (1) approved for automatic underwriting by an override of the referral to manual underwriting by the automatic underwriting process; (2) flagged "R" in Single Family Data Warehouse; or (3) automatically approved despite debt ratios that greatly exceeded review rules. Although HUD officials explained that the flag "R" or "A" in Single Family Data Warehouse occurred in a derived field that was not generated by a Scorecard refer or accept decision; they could not provide documentation or audit trails to explain why each loan had been flagged "R".

HUD officials informed us that an "R" flag could have resulted when a user with administrative override authority endorsed the loan or a user with post endorsement change authority performed an update of a previously endorsed loan. However, Single Family also informed us "[t]here is no field that indicates which cases were endorsed through an administrative override.... it is possible that user had administrative override when they processed the loan...." In addition, HUD officials stated "[w] e do not know if the [Computerized Homes Underwriting Management System] rescore logic was bypassed because the user had administrative override authority" (see appendix B). Thus, HUD could not explain why the 1,073 loans had an "R" flag in Single Family Data Warehouse, or otherwise ensure that the loans were properly underwritten at endorsement. As a result, the 1,073 loans with an "R" flag in HUD's Single Family Data Warehouse posed an unnecessary risk to the FHA Fund because HUD allowed them to be automatically approved. These loans totaled more than $249 million in FHA-insured unpaid mortgage balances with projected losses of more than $1.8 million.[13]

Conclusion

HUD's Program Office operated the automated underwriting process without appropriate and effective management controls in place. For the 1-year period covered by our audit, these problems allowed automatic approval of 29,325 loans with FHA-insured unpaid mortgage balances totaling more than $6.1 billion, and posed an unknown risk to the FHA Fund because HUD failed to document a risk analysis and authorization to support the ratio review rule changes. Additionally, FHA insured 1,073 loans that were flagged

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[12] The truncation error produced ratios that exceeded 100 percent. A ratio of more than 100 percent would result if, for example, the borrower's monthly payments exceeded the borrower's monthly income.

[13] At the time of the audit, the Neighborhood Watch nationwide seriously delinquent and claims rate of 1.26 percent was the best measure of the additional risk to the FHA Fund posed by the 1,073 loans with a "Refer" indicator in Single Family Data Warehouse that were ultimately approved through the automated underwriting process . We applied the factor to the unpaid mortgage balances and applied HUD's loss severity rate of 60 percent.

"R" by the automated underwriting process for unknown reasons; yet were automatically approved without HUD being able to clearly determine whether the loans had passed all system tests and edit checks in the automated underwriting process, or failure to pass was appropriately overridden. The projected loss to the FHA Fund for the 1,073 loans was $1.8 million for the outstanding balance of more than $249 million. These failures occurred because the Program Office disregarded management control standards set forth by the Office of Management and Budget as well as its own internal policies including the 2006 "TOTAL Mortgage Scorecard Policies and Procedures for Updating the Scorecard."

Recommendations

We recommend that the Deputy Assistant Secretary for Housing-Federal Housing Commissioner

1A. Develop or expand, as applicable, and implement policies and procedures for assessing the risk of proposed changes to the Scorecard's algorithm and review rules.

1B. Conduct a risk analysis to determine the appropriate front- and back-end ratios for the Scorecard's review rules and institute the appropriate changes to ensure no unnecessary risk to the FHA Fund is undertaken. Coupled with this analysis, calculate the estimated loss for assuming the additional risk to the FHA Fund for the 29,325 loans insured without support for the ratio review rule changes that led to their FHA mortgage insurance approval. This estimated loss will constitute funds to be put to better use once the appropriate ratio changes are implemented.

1C. Develop or expand, as applicable, and implement policies and procedures for formally supporting, authorizing, and updating corresponding system documents for changes made to the automated underwriting process.

1D. Develop or expand, as applicable, and implement policies and procedures for providing continuous monitoring of the automated underwriting process through the normal course of program operations including the use of authority to override automatic referrals and, as applicable, periodic reviews, reconciliations, comparisons, and analyses of the automated underwriting process data to ensure that the $1.8 million in funds is put to better use or eliminated (see appendix A).

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SCOPE AND METHODOLOGY

We performed an audit of FHA's automated underwriting process, which was managed by HUD's Program Office. Our audit period covered loans with closing dates between October 1, 2008, and September 30, 2009. We conducted our fieldwork at FHA's Office of Single Family Housing offices at HUD headquarters in Washington, DC, in January 2010 and in our Phoenix office from October 2009 to May 2010.

To accomplish our objectives, we reviewed HUD policies, procedures, and reference materials related to the single-family automated underwriting process. Additionally, we reviewed guidance issued by the Office of Management and Budget, interviewed appropriate HUD and contractor staff, analyzed HUD's data pertaining to loans approved through the automated underwriting process, and analyzed data provided by ATS, a HUD contractor. We compared the loan data from HUD's Single Family Data Warehouse[14] to HUD-established criteria to evaluate whether the automated underwriting process followed the established criteria for loan origination and automated underwriting.

We conducted initial analyses of FHA-insured loan data downloaded in December 2009 from HUD's Single Family Data Warehouse. In May 2010, we redownloaded the data to capture any additional loans subsequently endorsed and to obtain additional data fields. We identified all loans that were in either active or claim status with an indicator that the loan was processed through the automated underwriting system.[15] We then filtered for all loans closed during our audit period of October 1, 2008, through September 30, 2009, that were approved through the automated underwriting process as indicated by the underwriter identification code.[16] This process resulted in a universe of 1,316,941 FHA-insured loans. We concluded that loans with ratios that exceeded the maximum variance allowed presented an unnecessary risk to the FHA Fund because there was no written documentation supporting or justifying the review rule ratio changes made in 2005 and 2007. The final sample of 29,325 loans consisted of all loans closed during our audit period that were approved by the automated underwriting system and endorsed and in either active or claim status and had front-end and/or back-end ratios that exceeded HUD's thresholds established in 2004.

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[14] HUD's Single Family Data Warehouse is a large and extensive collection of database tables structured to provide HUD users easy and efficient access to single-family housing case-level data on properties and associated loans, insurance, claims, defaults, and demographics.

[15] A "Y" in the Single Family Data Warehouse misc_aus_ind field indicates that the loan came to the Computerized Homes Underwriting Management System via the Scorecard, thus indicating that the loan was processed through the automated underwriting system.

[16] Underwriter codes beginning with "ZF" indicate that the loan was approved through the automated underwriting system.

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For the 29,325 loans that exceeded FHA-established risk levels,[18] we further determined that 1,073 records were flagged[19] for referral to manual underwriting yet were ultimately approved by the automated underwriting process.

We reviewed a sample of the Single Family Data Warehouse loan data to determine whether the data were sufficiently reliable to achieve our audit objective. Specifically, we asked HUD to validate data from our initial download for 111,890 loan records that appeared to have been automatically approved despite containing excessive front-end and/or back-end ratios. HUD compared the data to data maintained by its contractor for the same loans, and through our review, we concluded that the Single Family Data Warehouse data were sufficiently reliable to determine whether the loans conformed to HUD's automated underwriting process standards. We did not verify that the loan-level data provided by HUD's systems were documented and supported.

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████████████████████████. HUD also determined that a data truncation error allowed 368 of the loans to be approved with the appearance of excessive ratios. HUD also informed us that in some cases HUD staff can manually override the referral recommendation made by the automated underwriting process.

We conducted the audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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[19] Those loans having an "R" in the Single Family Data Warehouse field, misc_aus_dcsn_cd, are referred to manual underwriting. On May 13, 2010, the Single Family Data Warehouse field, misc_aus_dcsn_cd, was defined as "TOTAL Scorecard decision after processing in CHUMS [Computerized Homes Underwriting Management System]. Values: A = Accept; R = Refer." We issued a finding outline to HUD with this as one of our findings on May 25, 2010. As of June 2, 2010, the field definition was "Definition to follow. Updated 5/2010."

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INTERNAL CONTROLS

Internal control is a process adopted by those charged with governance and management, designed to provide reasonable assurance about the achievement of the organization's mission, goals, and objectives with regard to

- Effectiveness and efficiency of operations,
- Reliability of financial reporting, and
- Compliance with applicable laws and regulations.

Internal controls comprise the plans, methods, and procedures used to meet the organization's mission, goals, and objectives. Internal controls include the processes and procedures for planning, organizing, directing, and controlling program operations as well as the systems for measuring, reporting, and monitoring program performance.

Relevant Internal Controls

We determined that the following internal controls were relevant to our audit objectives:

- Program operations - Policies and procedures that management has implemented to reasonably ensure that the program meets its objective.

- Reliability - Policies and procedures that management has implemented to reasonably ensure that the automated underwritten approved loan data are obtained and maintained in a manner that allows the data to be reliable.

- Compliance with applicable laws and regulations - Compliance with applicable internal and regulatory requirements.

We assessed the relevant controls identified above.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, the reasonable opportunity to prevent, detect, or correct (1) impairments to effectiveness or efficiency of operations, (2) misstatements in financial or performance information, or (3) violations of laws and regulations on a timely basis.

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Significant Deficiencies

Based on our review, we believe that the following items are significant deficiencies:

- HUD had incomplete and unimplemented written policies and procedures.

- HUD had inadequate monitoring protocols over the automated underwriting process to ensure compliance with both internal and external requirements.

- HUD did not fully implement change control procedures regarding its Scorecard system.

- HUD did not have policies and procedures for evaluating the impact of changes to the Scorecard review rules (or other aspects of the automated underwriting process that were outside the scope of its reviews on the Scorecard algorithm) on the overall risk to the FHA Fund.

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FOLLOW-UP ON PRIOR AUDITS

1. Government Accountability Office report number GAO-06-435, "HUD Could Realize Additional Benefits from Its Mortgage Scorecard," dated April 2006.

   In this 2006 audit report, the Government Accountability Office concluded, "[t]o enhance [FHA] understanding of risk posed by its borrowers, FHA has adopted automated underwriting and developed its own scorecard.

   FHA followed an accepted process in developing TOTAL [Technology Open To Approved Lenders] and has already seen significant benefits from the scorecard. Because TOTAL has the same types of capabilities as private sector scorecards, FHA has the option to use and benefit from TOTAL in many different ways as do private sector organizations. Specifically, FHA could use TOTAL to help compete in the marketplace, manage risk, and serve its mission for borrowers. TOTAL's capabilities are important to FHA, in part, because as it begins to insure more inherently risky loans, such as loans with down payment assistance, it needs to understand the risks they pose to the FHA insurance fund and manage those risks.

   However, the potential benefits of TOTAL cannot be realized without ensuring that TOTAL is regularly updated and exploring additional uses of TOTAL. For example, by not developing and implementing policies and procedures for [routinely] updating TOTAL, it may become less reliable and, therefore, less effective at predicting defaults...."

   The Government Accountability Office recommended that HUD "develop policies and procedures for updating TOTAL on a regular basis, including using updated data, testing additional variables, exploring hazard model benefits, and testing other cut points...." HUD agreed to develop "instructions for reviewing and updating the scorecard on a regular schedule" to satisfy this audit recommendation. As a result, the Program Office issued its internal policy memorandum, "TOTAL Mortgage Scorecard Policies and Procedures for Updating the Scorecard," dated August 2006 (see appendix C, criterion 3). This recommendation has been closed.

2. HUD OIG report number 2008-KC-0006, "HUD's Office of Single Family Housing Had Not Fully Implemented an Internal Control Structure in Accordance with Requirements," dated September 8, 2008.

   In this 2008 audit report HUD OIG found that "Single Family had not fully implemented an internal control structure in accordance with GAO [Government Accountability Office] internal control standards and HUD requirements. Specifically, it did not (1) perform a formal, systematic annual risk assessment of its programs and administrative functions, (2) plan and conduct ongoing management control reviews or alternative management control reviews of its programs, (3) establish an overall strategy regarding its risk-based monitoring of program activities and participants, or (4) identify corrective

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actions required to improve its management controls in a timely manner." The report continued by emphasizing that "[g]iven the increasing business that Single Family currently experiences and will likely continue to experience, it is imperative that Single Family quickly implement an effective internal control structure to help it ensure that its programs, activities, and functions operate efficiently and effectively. Such action is critical to ensure the lasting integrity of the FHA insurance fund."

OIG recommended that "HUD ensure that Single Family managers and staff fully implement an acceptable internal control structure by preparing and implementing effective written policies and procedures that comply with the GAO internal control standards and HUD Handbook 1840.1 requirements." As a result HUD's Office of Single Family Housing established a formal quality control review structure to satisfy the audit report recommendations. This recommendation had not been closed as of June 21, 2010.

Appendix A

SCHEDULE OF FUNDS TO BE PUT TO BETTER USE

Recommendation number	Funds to be put to better use 1/
1D	$1,887,442

1/   Recommendations that funds be put to better use are estimates of amounts that could be used more efficiently if an OIG recommendation is implemented. These amounts include reductions in outlays, deobligation of funds, withdrawal of interest, costs not incurred by implementing recommended improvements, avoidance of unnecessary expenditures noted in preaward reviews, and any other savings that are specifically identified. In this case, if Single Family implements policies and procedures to control management override authority and maintains an audit trail to ensure that loans flagged as referred in Single Family Data Warehouse were properly endorsed, then the estimated losses associated with the 1,073 loans (approved during a 1-year period) would be Funds To Be Put To Better Use. We used HUD's loss rates applicable to our audit period to estimate the probable loss of $1.8 million for the outstanding balance of $249 million insured by FHA for these loans.
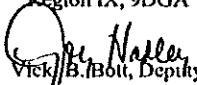
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Appendix B

AUDITEE COMMENTS

MEMORANDUM FOR: Tanya E. Schulz, Regional Inspector General for Audit, Region IX, 9DGA

FROM: Vicki B. Bott, Deputy Assistant Secretary for Single Family Housing, HU

SUBJECT: HUD's Office of Single Family Housing's Management Controls Over Its Automated Underwriting Process

The Office of Inspector General (OIG) audited the U.S. Department of Housing and Urban Development (HUD) Single Family Program Development Office's (Program Office) automated underwriting process. The OIG found that HUD's Program Office did not have appropriate and effective management controls in place over the automated underwriting process. Specifically, the audit stated that changes to the Federal Housing Administration (FHA) Technology Open to Approved Lenders (TOTAL) Scorecard's (Scorecard) review rules were implemented without properly assessing the associated risk and appropriately documenting the changes. As a result loans valued at more than $6.1 billion were automatically approved for FHA insurance despite having conditions that might have posed an increased risk of default. In addition, the audit stated that the Program Office did not perform adequate monitoring of its automated process.

Comment 1

The Office of Single Family Housing (Single Family) will review and evaluate the current processes and documentation of those processes and findings for (1) assessing the risk of proposed changes to the Scorecard's algorithm and review rules; (2) formally documenting and authorizing corresponding system documents for changes made to the automated underwriting process; and (3) monitoring the automated underwriting process through the normal course of business.

Comment 2

Single Family disagrees with the assessments made regarding unknown risk for the population of 29,325 loans scored in the 1-year audit period solely based on front- and back-end ratios changes made to the algorithm. Further, Single Family disagrees with the audit content related to 1,073 loans identified in the audit as referred loans. These transactions did not have a final Refer risk classification that would require manual underwriting. In fact, sampling of the identified loans indicated that the final risk scoring event prior to closing and insurance endorsement was an Accept or Approve. The internal CHUMS system edits are performing appropriately.

Single Family responses to the audit recommendations are as follows:

OIG's Determination:
Develop or expand, as applicable, and implement policies and procedures for assessing the risk of proposed changes to the Scorecard's algorithm and review rules.

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Comment 3

Single Family's Response:
Single Family will evaluate the current protocols and expand or revise the standards for assessing risk and documenting that process and findings based on the results of that evaluation.

OIG's Determination:
Conduct a risk analysis to determine the appropriate front-and back-end ratios for the Scorecard's review rules and institute the appropriate changes to ensure no unnecessary risk to the FHA Fund is undertaken. Coupled with this analysis, calculate the estimated loss for assuming the additional risk to the FHA Fund for the 29,325 loans insured without support for the ratio review rule changes that led to their FHA mortgage insurance approval. This estimated loss will constitute funds to be put to better use in the future once the appropriate ratio changes are implemented.

Single Family's Response:
Front-and-back end ratios: Single Family disagrees with the OIG assessment. The 29,325 loans scored in the 1-year period covered by the audit do not constitute an unknown risk to the FHA Fund as stated. The TOTAL scoring equation evaluates the credit risk of loans across five dimensions: loan-to-value ratio, cash reserves, credit scores, amortization speed and amount, and the mortgage-payment (front-end) ratio. Thus, the risk profile is a combination of factors, within the TOTAL scoring algorithm. It is thus not true that loans with higher payment ratios necessarily pose greater risk to FHA. The ability of TOTAL to balance credit risk across these five dimensions was a primary reason for raising the ratio allowances for Accept decisions in 2007.

Comment 4

The TOTAL scoring equation does not measure any additional risk from higher debt-to-income (back-end) payment ratios. This is because the statistical analysis of historical FHA loan performance could not distinguish any additional risk, after controlling for the front end ratio; FHA has accepted loans with higher back-end ratios for many years and without experiencing any undue increase in credit risk. The two percentage point increase in allowable ratios that was instituted in 2007 has not increased credit risk in the FHA insurance programs. Borrowers with high back-end ratios that are credit risks will likely have lower FICO scores, lower cash reserves, and higher loan-to-value ratios. Their additional risk will thus be captured in variables that are included in the TOTAL scoring.

OIG's Determination:
Develop or expand, as applicable, and implement policies and procedures for formally supporting, authorizing, and updating corresponding system documents for changes made to the automated underwriting process.

Comment 5

Single Family's Response:
Single Family has implemented an interim process for requesting F17 system modifications while options for automating the process are considered and evaluated. Once a final process methodology has been determined, written protocols will be developed and issued to all Program Office staff.

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OIG's Determination:
Develop or expand, as applicable, and implement policies and procedures for continuous monitoring of the automated underwriting process through the normal course of program operations including, as applicable, period reviews, reconciliations, comparisons, and analyses of the automated underwriting process data to ensure that the $1.8 million in funds is put to better use or eliminated.

Single Family's Response:
Single Family disagrees with the audit content related to 1,073 loans identified in the audit as referred loans. These transactions did not have a final Refer risk classification that would require manual underwriting. In fact, sampling of the identified loans indicated that the final risk scoring event prior to closing and insurance endorsement was an Accept or Approve. The internal CHUMS system edits are performing appropriately.

Comment 6

The *misc_aus_dscn_cd* field that OIG used to reach this conclusion is not a reliable field to be used as a basis for this type of analysis. Entry of an R in this field does not represent a "refer". Further, there is no field that indicates which cases were endorsed through an administrative override. There is a field which indicates the user who last updated loan information via the Insurance Application screen (idb_2.stf_id_prcsr). For any loan where the idb_2.sft_id_prcsr begins with an "H", it is possible that user had administrative override when they processed the loan.

When a loan is endorsed in CHUMS, multiple edits are performed. For example, CHUMS verifies the loan-to-value ratio is within range and also verifies that the base loan amount does not exceed the statutory geographical limit. If the underwriter id entered is ZFHA, CHUMS will verify the acceptability of this entry using the following steps:

- Verify the latest scoring event is an Accept. If the latest scoring event is a Refer, ZFHA is not allowed.
- Verify that if the latest scoring event is an Accept, CHUMS will verify the data entered is within tolerance of the data submitted via the latest scoring event. If it is tolerance, ZFHA is allowed.
- If the data is not within tolerance, CHUMs will rescore the loan. If the rescore is an Accept, ZFHA is allowed. If the rescore is a Refer, ZFHA is not allowed.

The fact that a loan is endorsed means that the loan passed all internal verification and edit checks which were applied by CHUMS. There is no code to indicate which edit checks CHUMS deemed necessary. For example, if the underwriter is ZFHA, we know that it passed the CHUMS edits to allow it. We do not know if the rescore logic was bypassed because the user had administrative override authority.

Single Family will evaluate the current protocols and expand or revise the monitoring standards as needed based on this review and evaluation.

Single Family disagrees with the OIG's determination of $1.8 million in Funds to Be Put to Better Use. Based on review of the 1,073 loans, and the findings stated above, Single Family has determined that $0 in Funds to Be Put to Better Use should be used for reporting purposes.

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OIG Evaluation of Auditee Comments

Comment 1   We acknowledge that the Office of Single Family Housing's (Single Family) plans to review and evaluate the current processes and documentation of those processes for (1) assessing the risk of proposed changes to the Scorecard's algorithm and review rules; (2) formally documenting and authorizing corresponding system documentation for changes make to the automated underwriting process; and (3) monitoring the automated underwriting process through the normal course of business.

Comment 2   We disagree with Single Family's assertion that the 29,325 loans scored in the 1-year period covered by the audit did not constitute an unknown risk to the FHA Fund. See OIG comment 4. We disagree with Single Family's assertion that it is a fact that the 1,073 loans identified in the audit as referred loans were transactions that did not have a final "Refer" risk classification that would require manual underwriting. See OIG comment 6. Because we identified automatically approved loans with data-truncation errors and very high ratios, we also disagree with Single Family's assertion that all Computerized Homes Underwriting Management System edits are performing appropriately.

Comment 3   We acknowledge Single Family's expressed intent to evaluate the current protocols and expand or revise the standards for assessing risk and documenting that process and findings based on the results of that evaluation.

Comment 4   We disagree with Single Family's assertion that the 29,325 loans scored in the 1-year period covered by the audit do not constitute an unknown risk to the FHA fund. We acknowledge that the Scorecard algorithm used five dimensions, including the front-end ratio, to evaluate the credit risk of loans. However, our finding does not question the risk assessments or evaluations of the Scorecard's algorithm. ███████████████████████████████

During the audit, HUD officials explained that when a loan was endorsed in the Computerized Homes Underwriting Management System, many edits were performed, including review rules that established values for front-end and back-end ratios that should not be exceeded in a loan approved through the automated underwriting process. Our audit questions why HUD increased these maximum ratio values over time without a process to evaluate the associated risk and without documenting authorization for the system changes that increased the ratios. HUD's response infers that the Scorecard results adequately evaluated any credit risk. However, HUD officials have retained the ratio review rules apparently as a safeguard over unexpected outcomes from the automated underwriting process. Because the review rules serve as a control over automated system outputs, management should not weaken them without an assessment of the impact on risk and without proper documentation of that assessment and any resulting changes. Moreover, HUD management did not monitor the effectivenes

of the ratio review rule control as demonstrated by the software problem that resulted in 368 data-truncation errors identified as a result of our audit. Accordingly, we stand by our conclusion that the 29,325 loans automatically approved despite having ratios exceeding the initital ratio review rule thresholds posed an unknown risk. We agree that the increased risk to the FHA Fund is not quantifiable in dollars without further assessment.

Comment 5   We acknowledge Single Family's effort to implement an interim process for requesting F17 system (Computerized Homes Underwriting Management System) modifications and its expressed intent to develop and issue written protocols to all Program Office staff once a final process methodology has been determined.

Comment 6   We disagree with Single Family's assertion that it is a fact that the 1,073 loans identified in the audit as referred loans were transactions that did not have a final "Refer" risk classification that would require manual underwriting. We note that HUD officials identified six of the loans as having been "Refers" that were overridden by authorized personnel. Additionally, the HUD contractor who managed the system stated that there was no field that indicated which cases were endorsed through an administrative override. We acknowedge that the draft report language incorrectly stated the 1,073 loans had been referred to manaul underwriting by the Scorecard. We have revised the final report to correctly indicate that these loans were flagged "R" as a result of Computerized Homes Underwriting Management System logic that included the possibility that an authorized individual either endorsed the loan with override authority or updated a previously endorsed loan. Specifically, HUD contractor officials informed us that the "misc_aus_dscn_cd" field in Single Family Data Warehouse was set as follows:

1) It will be set to "A" when a loan is endorsed if the underwriter is "ZFHA" (the ZFHA code indicates the loan was processed through the automated underwriting system with reduced credit documentation requirements), the latest TOTAL Scorecard scoring event is an Accept, and the data items are within tolerance so the loan does not need to be rescored.
2) It will be set to "A" when a loan is endorsed if the underwriter is "ZFHA", the latest TOTAL Scorecard scoring event is an Accept, and CHUMS rescores the loan and the loan receives an Accept.
3) It will be set to "R" if the loan is endorsed and the underwriter is not "ZFHA".
4) It will be set to "R" if a user with Administrative Override authority endorses the loan.
5) It will be set to "R" if a user with Administrative Override authority or Post Endorsement Change authority performs an update of a previously endorsed loan.

Accordingly, if the loan failed either step 1 or step 2 above, it did not receive an "R', rather the system returned an error message and the loan was not endorsed at

that time. However, Single Family's response acknowledged "[t]here is no field that indicates which cases were endorsed through an administrative override," and "[w]e do not know if the rescore logic was bypassed because the user had administrative override authority." As a result, we question whether the 1,073 loans were appropriately approved through the automated process because Single Family cannot provide assurance that the loans either passed the rescore logic or were overridden for proper reasons. We further note that Single Family had no ability to identify and therefore to monitor which cases were endorsed through an administrative override. The override function is part of the automated underwriting process[20] and Single Family should have written policies and procedures and required documentation regarding who is authorized to override automated referrals and under what circumstances.

Therefore, we maintain that if Single Family implements policies and procedures to control management override authority and maintains an audit trail to ensure that loans flagged with the "R" in Single Family Data Warehouse were properly endorsed, then the estimated losses associated with the 1,073 loans would be Funds to Be Put to Better Use. To be conservative, we used HUD's loss rates applicable to our audit period to estimate the probable loss of $1.8 million for the outstanding balance of $249 million insured by FHA for these loans

We acknowledge Single Family's expressed intent to evaluate the current protocols and expand or revise the monitoring standards as needed based on its review and evaluation.

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[20] Loans that have an automatic referral overridden are ultimately approved with the limited credit documentation allowed by the automated underwriting process.

Appendix C

CRITERIA

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1. Office of Management and Budget Circular A-123, "Management's Responsibility for Internal Control," effective fiscal year 2006.

Introduction
"Management is responsible for developing and maintaining effective internal control. Effective internal control provides assurances that significant weaknesses in the design or operation of internal control, that could adversely affect the agency's ability to meet its objectives, would be prevented or detected in a timely manner."

I. Introduction, A. Agency Implementation
"Internal control guarantees neither the success of agency programs, nor the absence of waste, fraud, and mismanagement, but is a means of managing the risk associated with Federal programs and operations. Managers should define the control environment (e.g., programs, operations, or financial reporting) and then perform risk assessments to identify the most significant areas within that environment in which to place or enhance internal control. The risk assessment is a critical step in the process to determine the extent of controls. Once significant areas have been identified, control activities should be implemented. Continuous monitoring and testing should help to identify poorly designed or ineffective controls and should be reported upon periodically. Management is then responsible for redesigning or improving upon those controls. Management is also responsible for communicating the objectives of internal control and ensuring the organization is committed to sustaining an effective internal control environment. Appropriate internal control should be integrated into each system established by agency management to direct and guide its operations. As stated earlier in this document, internal control applies to program, operational, and administrative areas as well as accounting and financial management."

"While the procedures may vary from agency to agency, management should have a clear, organized strategy with well-defined documentation processes that contain an audit trail, verifiable results, and specify document retention periods so that someone not connected with the procedures can understand the assessment process."

II. Standards
- Section B, Risk Assessment, states, "Management should identify internal and external risks that may prevent the organization from meeting its objectives. When identifying risks, management should take into account relevant interactions within the organization as well as with outside organizations. Management should also consider previous findings; e.g., auditor identified, internal management reviews, or noncompliance with laws and regulations when identifying risks. Identified risks should then be analyzed for their potential effect or impact on the agency."

- Section C, Control Activities, states, "Control activities include policies, procedures and mechanisms in place to help ensure that agency objectives are met. Several examples include: proper segregation of duties (separate personnel with authority to authorize a transaction, process the transaction, and review the transaction); physical controls over assets (limited access to inventories or equipment); proper authorization; and appropriate documentation and access to that documentation.

  Internal control also needs to be in place over information systems – general and application control. General control applies to all information systems such as the mainframe, network and end-user environments, and includes agency-wide security program planning, management, control over data center operations, system software acquisition and maintenance. Application control should be designed to ensure that transactions are properly authorized and processed accurately and that the data is valid and complete. Controls should be established at an application's interfaces to verify inputs and outputs, such as edit checks. General and application control over information systems are interrelated, both are needed to ensure complete and accurate information processing. Due to the rapid changes in information technology, controls must also adjust to remain effective."

- Section E, Monitoring, states, "Monitoring the effectiveness of internal control should occur in the normal course of business. In addition, periodic reviews, reconciliations or comparisons of data should be included as part of the regular assigned duties of personnel. Periodic assessments should be integrated as part of management's continuous monitoring of internal control, which should be ingrained in the agency's operations. If an effective continuous monitoring program is in place, it can level the resources needed to maintain effective internal controls throughout the year.

  Deficiencies found in internal control should be reported to the appropriate personnel and management responsible for that area. Deficiencies identified, whether through internal review or by an external audit, should be evaluated and corrected. A systematic process should be in place for addressing deficiencies."

2. U.S. Department of Housing and Urban Development's "System Development Methodology" release 6.06.

- Introduction, page 3, states, "This SDM [System Development Methodology] presents a methodology applicable to the development and maintenance of all HUD information system projects. Systems that support HUD programs vary greatly in size, scope of application, complexity of processing, technologies used, and the methods and tools employed to support the evolution of the system from initial need statement through operation and eventual system termination. To accommodate the diversity of system development needs in HUD programs, this methodology offers a structured, disciplined approach."

- Appendix D, System Maintenance, states, "The purpose of system maintenance is to perform the activities required to keep a system operational and responsive to users'

changing needs after the system is accepted and placed into production... Any changes due to new needs or discrepancies are recorded through the appropriate change request reporting mechanism (i.e., Needs Statement [NS], Advanced Requirements Notice [ARN], or Service Ticket Action Resolution System [STARS])... These changes consist of corrections, insertions, deletions, extensions, and enhancements to the system hardware and software. Generally, these changes are made to keep the system functioning in an evolving, expanding user and operational environment. System maintenance involves many of the same activities associated with system development, but it also has unique characteristics of its own. Maintenance activities are performed within the context of an existing system framework..."

- Appendix D, paragraph D.1.1, Change Request Initiation, states, "Initiation of the maintenance process is the receipt of one or more software change requests (Needs Statement, ARN, or STAR) for a system. In general, the requests should contain the problem or need for change, type of maintenance requested (corrective, perfective, or adaptive), and priority level."

- Appendix D, paragraph D.3, Perform Change Control Activities, states, "Perform change control activities whenever any products being baselined under the project's CM [Configuration Management] function are revised. Change control activities include verifying changes made to the products, assigning a new version number to the revision, updating the logbook with the change information, updating the central library with the new version, distributing copies of the new version, and archiving the old version."

- Appendix D, paragraph D.3.1, Verify Changes Made to Product, states, "Review the updated product to ensure that changes have been made as described in the supporting documentation. The supporting documentation may be comments received from document reviews. The supporting documentation for software may be software change requests or discrepancy reports generated during testing."

- Appendix D, paragraph D.3.2, Assign New Version Number, states, "Assign a new version number to each updated technical deliverable (hardware or software configuration item) and document deliverable. The version number must follow conventions established by the project's CM function, within HUD guidelines, and enable monitoring of the distribution of official copies and of the removal of outdated versions from the workplace."

- Appendix D, paragraph D.3.3, Store Approved Product in Central Library, states, "After updating a baselined product, store the updated version in the project's central library. The library may be a physical storage space for hard copy documentation and program listings or an online subdirectory or partitioned data set where programs are stored. The central repository must be maintained in a manner that facilitates auditing the new version and all prior versions of a baselined product."

3. Internal HUD Program Office policy, "TOTAL Mortgage Scorecard Policies and Procedures for Updating the Scorecard," dated August 2006.

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- Paragraph 1.1, Purpose, states, "The TOTAL (Technology Open to Approved Lenders) Mortgage Scorecard (the 'Scorecard') Update Procedures are the ongoing process for identifying and managing updates and changes to the Scorecard. These procedures are designed to document and control changes to the Scorecard... The procedures apply to changes to software used for rendering a risk-classification by the Scorecard. Only changes approved by FHA management (as specified in this plan) will be made to the Scorecard code. By establishing a process for documenting FHA management's approvals of these changes, a record of the Department's decision-making process with regard to these models and their specific applications will be available for audit and other purposes."

- Paragraph 1.3, Update Controls, states, "Once a change to the Scorecard is recommended by FHA or PD&R [Policy Development and Research] and agreed to by the Office of Program Development, a memorandum from that office is prepared instructing PD&R to furnish or produce such changes, modifications, or cutpoint resets. Program Development will in turn communicate with its implementation contractor to determine an appropriate date for implementing new versions, and 'grandfathering' needs, and whether industry partners including the automated underwriting system providers, need to be advised in advance."

- Paragraph 1.4, Documentation of Changes Approved by Program Development, states, "FHA, through its Scorecard contractor, will keep a permanent record of all versions of the Scorecard, as well as the results of all re-estimations, cutpoint resets, and the results of all studies."

- Paragraph 1.5, Version Control, states, "The Office of Program development saves the official copies of change orders to the Scorecard."