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2010 CENSUS PLANNING MEMORANDA SERIES

No. 219

MEMORANDUM FOR The Distribution List

From: Burton Reist *[signed]*
 Acting Chief, Decennial Management Division

Subject: Assessment for the 2010 Census Coverage Measurement Final
 Housing Unit Matching and Followup Operations

Attached is the Assessment for the 2010 Census Coverage Measurement Final Housing Unit Matching and Followup Operations. The Quality Process for the 2010 Census Evaluations, Experiments, and Assessments was applied to the methodology development and the review process. The Assessment is sound and appropriate for completeness and accuracy, and it answers its intended study questions.

If you have questions or comments about this document, please contact Graciela Contreras at (301) 763-5284, Diane Cronkite at (301) 763-2537, Lora Rosenberger at (301) 763-3447, or Anne Wakim at (301) 763-4296.

Attachment

[July 24, 2012]

Assessment for the 2010 Census Coverage Measurement Final Housing Unit Matching and Followup Operations

U.S. Census Bureau standards and quality process procedures were applied throughout the creation of this report.

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EXECUTIVE SUMMARY

This report presents the results of the 2010 Census Coverage Measurement Final Housing Unit Matching and Followup Operations. These results are from an operational standpoint and are not the final Census Coverage Measurement estimates of coverage. These operations updated the address list to be used for Census Coverage Measurement housing unit estimation. There are three components to the Final Housing Unit Matching and Followup Operations – Final Housing Unit Computer Processing, Final Housing Unit Clerical Matching, and Final Housing Unit Followup. The 2010 Census Coverage Measurement survey operations were conducted in the sample areas in the United States, including Puerto Rico, but excluding Remote Alaska. The only living quarters in-scope for the survey operations were housing units, and group quarters were excluded.

In September 2009, the Census Bureau launched an initiative to reduce nonsampling error in the Census Coverage Measurement program. To do so, the sample size for operations *after* the 2010 Census Coverage Measurement Independent Listing operation was decreased and surplus funds resulting from the reduced workload were put towards approaches to reduce the nonsampling error. The addresses included in the Final Housing Unit Matching and Followup operations reflected this reduction in sample size, as well as the subsampling of the small block clusters, those with zero to two housing units per the survey sample design.

The Census Coverage Measurement Initial Housing Unit Listing, Matching and Followup operations resulted in the list of valid, unique Census Coverage Measurement housing units located within the Census Coverage Measurement sample block clusters. From this address list, a sample of the housing units eligible for the Census Coverage Measurement Survey, referred to as the Population sample, was selected and included in the subsequent Census Coverage Measurement Person and Final Housing Unit Operations. The Population sample consists of a subsample of housing units in large block clusters with 80 or more independently listed housing units, all housing units in block clusters with fewer than 80 housing units, and all housing units in American Indian Reservations and subsampled small block clusters.

After the Population sample was selected, a sample of census housing units on the Census Unedited File was selected for the Enumeration sample. Only census housing units located in the Census Coverage Measurement sample block clusters were eligible for the Enumeration sample. Enumeration sample units, together with the Population sample units, provided the data used for coverage estimation of housing units.

The first activity conducted for the Census Coverage Measurement Final Housing Unit Matching and Followup Operations was computer processing. Final Housing Unit Computer Processing created updated lists of Population sample and census addresses, for each sample block cluster, using information from the Census Coverage Measurement Initial Housing Unit operations and the Census Coverage Measurement Person operations, as well as the final census data obtained from the Census Unedited File. All census housing units and group quarters geocoded to the

sample block clusters plus those geocoded within one ring of surrounding blocks¹ were included in the census address list. Any changes to units resulting from census operations since the Initial Housing Unit survey operations, such as housing unit or group quarters additions, deletions, and updates, were flagged for a clerical review to be completed during Final Housing Unit Clerical Matching. Computer processing did not include regular computer matching operations. Instead, census addresses that were added to a block cluster or its surrounding blocks were coded as new nonmatches to be reviewed during clerical matching. Match codes from Initial Housing Unit Matching were updated for Population sample units and other census units, if warranted. Also, during computer processing, each census address was given an Enumeration sample indicator based on its Enumeration sample status, i.e., they were classified as being in the Enumeration sample, in the block cluster but not in the Enumeration sample, or in a surrounding block.

During Final Housing Unit Clerical Matching, the National Processing Center matching staff applied computer-assisted clerical matching techniques, using the Final Housing Unit Clerical Matching, Review, and Coding System software. In Before Followup Clerical Matching, they attempted to match addresses presented to them from the Final Housing Unit Computer Processing. In addition, they searched for duplicate addresses. They also attempted to determine the Census Day housing unit status and enumeration status for Population sample and census addresses that had undetermined statuses after computer processing. In their review, the matching staff used data and maps from previous Census Coverage Measurement operations, including Initial Housing Unit operations and the Person operations, as well as final address data from the Census Unedited File. Cases that remained unresolved following this operation were eligible for the field Final Housing Unit Followup activity. In After Followup Clerical Matching, the matching staff attempted to code the addresses from Final Housing Unit Followup using additional information obtained from the completed paper questionnaires. The result of this operation was a set of files containing Final Housing Unit match codes for the Population sample addresses and the census addresses in the sample block clusters and their surrounding blocks.

During Final Housing Unit Followup, interviewers collected additional information for addresses unresolved after the Before Followup Clerical Matching operations. The Final Housing Unit Followup operation attempted to collect additional information that might allow a resolution of match codes for any changes to units since Initial Housing Unit Matching. The Final Housing Unit Followup data collection forms were created via Docuprint technology. The questions included for each followup case varied depending upon the reason the case was being sent to followup.

A schedule change request was implemented before the start of the Final Housing Unit Matching and Followup operations to delay the start of the matching operations by about a week, due to Person Clerical Matching running late. The decision was made to delay the start of the field operation by two weeks, which would allow the majority of the work for Final Housing Unit Followup to be available at the start of the operation (instead of on a flow basis), because Before Followup Clerical Matching would almost be complete. Also, the duration of the field operations were reduced from six weeks to four weeks, since the workload was much smaller

¹ Surrounding blocks include all collection blocks that are in the first ring of blocks surrounding a block cluster. (Blocks in the first ring share one or more geographic points with the block cluster.) Any land block completely enclosed by blocks that are in the first ring, is also considered to be a surrounding block.

than expected and the majority of cases would be available at the start of the operation. The matching operations completed ahead of schedule, therefore these special arrangements did not negatively affect any later operations.

Final Housing Unit Computer Processing

Final Housing Unit Computer Processing prepared the lists of Population sample and census addresses for Final Housing Unit Clerical Matching, using data from the Initial Housing Unit operations, Person operations, and the final census data from the Census Unedited File. Match codes from Initial Housing Unit Matching were subject to update, and new match codes were assigned to census addresses that were added to the Census Coverage Measurement search areas² since Initial Housing Unit Matching. Final Housing Unit Computer Processing also identified records with specific changes and flagged them to be worked in Final Housing Unit Clerical Matching.

Addresses were flagged in a two-step process. Headquarters staff from the Decennial Statistical Studies Division's Coverage Measurement Design for Matching Operations Branch began reviewing and matching the preliminary output from Final Housing Unit Computer Processing before the scheduled start date for Final Housing Unit Clerical Matching at the National Processing Center. During this initial run of computer processing, 2,887 Population sample addresses were flagged; 20,319 census addresses were flagged in the sample block clusters; and 123,657 census addresses were flagged in the surrounding blocks. The clusters containing flagged addresses were reviewed at Headquarters using the Final Housing Unit Matching, Review, and Coding system. Headquarters staff was able to resolve many cases and make straight-forward address matches, such as a computer would be able to make. Consequently, the production workload for the matching staff was reduced. When Final Housing Unit Computer Processing was later run to identify the clerical workload for the production work, the number of flags was reduced to 1,736 Population sample addresses, 18,697 census addresses in the sample block clusters, and 120,057 census addresses in the surrounding blocks to the sample block clusters.

The National Processing Center clerical matching staff then reviewed the remaining flagged addresses and changed the match codes, as appropriate. Match codes could be changed for non-flagged addresses, as well.

To evaluate Final Housing Unit Computer Processing, the Decennial Statistical Studies Division analyzed how often the match codes from computer processing were changed by Headquarters or National Processing Center staff, during their clerical review. The results summarized below show that computer processing was successful in correctly assigning match codes to Population sample and Enumeration sample addresses.

There were 178,696 *Population sample* units in the U.S. (including Puerto Rico). Of those, only 4,429 (2.48 percent) had their Final Housing Unit Computer Processing match codes changed during clerical matching. There were 188,587 *Enumeration sample* units in the U.S. (including

² For each sample block cluster, there is a search area defined as the sample block cluster and one ring of surrounding blocks.

Puerto Rico). Of those, 8,605 (4.56 percent) had their Final Housing Unit Computer Processing match codes changed during clerical matching.

Clerical matchers made fewer changes to the match codes for *non Enumeration sample*³ census addresses. Of the 345,529 non Enumeration sample units in the sample block clusters, 1,292 (0.37 percent) had their Final Housing Unit Computer Processing match codes changed during clerical matching. In addition, only 1,432 (0.04 percent) of the non Enumeration sample census addresses in surrounding blocks had changes to their computer processing match codes.

Final Housing Unit Clerical Matching

A summary of the clerical matching results for the Population sample and census housing units is given below. All counts are unweighted and presented for the U.S., including Puerto Rico. Statements based on the unweighted data should be interpreted purely as an assessment of the clerical matching operation. No statistical testing was done, nor any inferences to the general population are intended.

Some nonmatched Enumeration sample addresses were not included in the Final Housing Unit Followup operation because they did not have enough address information to be located in the field. A total of 219 Enumeration sample addresses were coded as insufficient for followup, either during computer processing or Before Followup Clerical Matching. A summary of the progression of resolving the Population sample and census addresses, from Before Followup Clerical Matching to After Followup Clerical Matching is provided in the table below. The percentages are based on unweighted counts of the Population sample and census housing units, provided in the tables in Section 5 of this report.

The unweighted results of After Followup Clerical Matching show only a small increase in the percent of matched units as compared to Before Followup Clerical Matching. The percent of matched Population sample units increased from 94.48 percent in Before Followup to 94.77 percent in After Followup. The percent of matched Enumeration sample units increased from 87.76 in Before Followup to 88.03 percent in After Followup. Note that as a result of the Final Housing Unit Followup we had a slight increase in the proportion of Enumeration sample units classified as duplicates, increasing from 1.37 percent in Before Followup to 1.63 percent in After Followup. The percent of Enumeration sample units that are not housing units also went up slightly from 4.26 percent to 4.74 percent. The After Followup review was able to resolve some of the possible matches. For Population sample units the percent of possible matches went from 0.09 percent to 0.01 percent. And the percent of Enumeration sample possible matches went from 0.06 percent to 0.01 percent.

³ Non Enumeration sample refers to census addresses that are not in the Enumeration sample. Those addresses could be located in the sample block clusters or the surrounding blocks.

Results of Final Housing Unit Clerical Matching for Population Sample and Enumeration Sample Addresses – Unweighted Percents				
United States (including Puerto Rico)	Population Sample		Enumeration Sample	
	Before Followup	After Followup	Before Followup	After Followup
Matches	94.48	94.77	87.76	88.03
Possible Matches	0.09	0.01	0.06	0.01
Nonmatches	2.78	2.63	6.54	5.60
Duplicates	0.02	0.01	1.37	1.63
Not a Housing Unit	2.63	2.58	4.26	4.74

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History, Census Address, Cluster Control, IL Coding History, and IL Address.

Enumeration sample addresses may have duplicates that are in the Enumeration sample, duplicates that are in the sample block clusters but not in the Enumeration sample, and duplicates that are in the surrounding blocks. The duplicates in the preceding table refer only to those duplicates that are in the Enumeration sample. There are 3,065 Enumeration sample duplicates, 421 non Enumeration-sample duplicates in the sample areas, and 1,127 duplicates in the surrounding blocks.

To provide additional information on census duplicates, this assessment looks at the distribution of Enumeration sample addresses by the number of duplicates per Enumeration sample address. Based on results upon completion of Final Housing Unit Clerical Matching⁴, 98.16 percent of the 188,587 Enumeration sample addresses have no duplicates; 1.79 percent have one duplicate; and 0.05 percent have more than one duplicate.

Clerical matchers also reviewed the housing unit status of the Population sample addresses and the enumeration status of the Enumeration sample addresses. Each Population sample unit was classified as either a housing unit, not a housing unit, duplicate, geocoding error or unresolved, based on the match code assigned to the unit at the end of After Followup Clerical Matching. At the same time, each Enumeration sample unit from the Census Unedited File was given an enumeration status of correct enumeration, erroneous enumeration, duplicate, geocoding error, or unresolved. A unit was classified as unresolved if clerical matching could not confirm the unit's status as a housing unit, could not confirm that it was located in the sample block cluster, or could not confirm a possible match. The vast majority of Population sample units and Enumeration sample units were classified as housing units and correct enumerations, respectively, as shown in the results that follow.

The number of Population sample housing units in the U.S. (including Puerto Rico) is 178,696 of which 97.25 percent are housing units; 2.58 percent are not housing units; 0.01 percent are duplicates; 0.12 percent are geocoding errors; and 0.04 percent are unresolved housing units. The number of Enumeration sample units in the U.S. (including Puerto Rico) is 188,587 of which 93.43 percent are correct enumerations; 4.52 percent are erroneous enumerations; 1.63

⁴ Results include new duplicates to Enumeration sample addresses found in Final Housing Unit Clerical Matching, as well as duplicates from Initial Housing Unit Matching.

percent are duplicates; 0.22 percent are geocoding errors; and 0.20 percent are unresolved enumerations.

Final Housing Unit Followup

The Final Housing Unit Followup was estimated to cost \$2,616,426. The actual cost of the operation was under budget by \$892,408 (34.11 percent), costing only \$1,724,018. The Final Housing Unit Followup production and Quality Control operations were under budget by \$329,186 (26.37 percent) and \$563,222 (41.17 percent), respectively. These figures require some context because of workload uncertainty prior to matching. The Decennial Statistical Studies Division workload estimate for this operation prior to matching was 13,772 cases, while the actual Final Housing Unit Followup workload was 5,789 cases. The workload estimate for the Final Housing Unit Quality Control Operation prior to matching was 9,090 cases, while the actual Final Housing Unit Followup workload was 3,976 cases. Budget estimates were based on the 13,772 cases workload estimate for Final Housing Unit Followup production and 9,090 Quality Control, which were ultimately 42.03 percent and 43.74 percent more, respectively, than the actual workload. For this reason it is helpful to focus on the cost per case estimate compared to actual cost per case. A Final Housing Unit Followup case was expected to cost \$90.65 per case, while the actual cost was \$158.79, which is 75.17 percent more per case than expected. The Final Housing Unit Followup operation was not as efficient as planned in terms of time required to complete a case and the mileage associated with completing a case. We would hypothesize the reason for this is that the cases were much more geographically dispersed than expected as a result of the significantly reduced workload. This is supported by the fact that during the regional managers debriefing, regional managers discussed that often field staff had only one or two assignments within a reasonable distance, so their employment during this operation was very short. Because of this we could not realize any economies of scale that we had expected with a larger operation.

Of the 6,416 survey block clusters, only 1,535 block clusters (23.92 percent) required Final Housing Unit Followup. The total Final Housing Unit Followup workload of 5,789 cases unresolved after the Final Housing Unit Before Followup Matching was delivered to the 12 Regional Census Centers and Puerto Rico, on a flow basis. During Final Housing Unit Followup, 0.24 cases were completed per hour, which was 0.14 more cases per hour than expected.

Each Final Housing Unit Followup case form could contain one or more addresses to be followed up. Of the 10,044 addresses requiring Final Housing Unit Followup, 2,256 or 22.46 percent were Population sample addresses; 5,932 or 59.06 percent were census addresses in the block cluster; 290 or 2.89 percent were addresses census classified as group quarters in the block cluster; and 1,566 or 15.59 percent were census housing units in surrounding blocks.

Counting both Population sample and census housing units, a total of 809 addresses were corrected during Final Housing Unit Clerical Matching. As expected, most of the address corrections happened during After Followup Clerical Matching (84.92 percent, or 687 addresses) because the followup interviewers had indicated the address correction on the followup form. Note that these address changes/updates were only made in the clerical matching software. No

changes were made to any official 2010 Census data.

Recommendations

Final Housing Unit Computer Processing

Research how cost-effective it would be to conduct Final Housing Unit computer matching, and whether we could reduce or eliminate the clerical workload by adding this additional step.

Consider sending a block cluster through Final Housing Unit Computer Processing as soon as it finishes person matching, in order to start the Final Housing Unit operations sooner.

Final Housing Unit Clerical Matching

Review the differences between Final Housing Unit Before Followup and After Followup Clerical Matching results to determine if there is a need for the Final Housing Unit Followup and After Followup Clerical Matching operations, based on the impact the match code changes resulting from After Followup coding would have on the Census Coverage Measurement final housing unit estimates. From Before Followup Clerical Matching to After Followup Clerical Matching, the match codes changed for only 0.77 percent of all Population sample addresses and 2.47 percent of all Enumeration sample addresses.

Final Housing Unit Followup

Consider automating the Final Housing Unit Followup operation as paper handling was very cumbersome and the operation could be simplified for field staff if automated.

Paper maps proved difficult to use. Future discussions are encouraged to solicit ideas for making the various types of maps more manageable in size and number and more recognizable from one another. However, if the questionnaire were to be automated, the maps should also be automated, hopefully resolving this concern.

In talking with Regional Census Center office staff, they requested that in the future Quality Control should be a separate operation from production in the field tracking system (in 2010 this was the Coverage Measurement Operations Control System), as tracking block clusters' status between Final Housing Unit Followup production and Quality Control was difficult.

1. INTRODUCTION

1.1 Scope

The primary purpose of this assessment is to provide a record of the results of the 2010 Census Coverage Measurement (CCM) Final Housing Unit (FHU) operations and provide information on how well the staff implemented the data collection, computer processing, and clerical matching operations. This assessment will provide valuable data for the planning cycle for the 2020 Census and provide information on the successes and any issues encountered with the FHU operations and impacts to the 2010 CCM Program.

This assessment documents final volumes/rates and lessons learned for all aspects of the FHU operations, including field work data collection, Computer Processing, Clerical Matching at the National Processing Center (NPC), the Cost and Progress (C&P) Reporting, and the software and systems used for the FHU operations, including Coverage Measurement Operations Control System (CMOCS), FHU data output, and the Final Housing Unit Matching, Review, and Coding System (FHUMaRCS).

1.2 Intended Audience

This document is intended to be a review of the 2010 CCM FHU operations and should be used by anyone interested in the successes and issues that resulted from implementing the 2010 FHU operations. The program managers and staff responsible for planning the 2020 CCM should use this assessment for guidance on operational development for the 2020 FHU operations.

2. BACKGROUND

The purpose of the 2010 CCM program is to evaluate the 2010 Census by providing estimates of net coverage error and census coverage components, including omissions and erroneous enumerations, for persons and housing units in the United States (U.S.) (excluding Remote Alaska) and Puerto Rico in an effort to improve the 2020 Census, and censuses thereafter. Additionally, the CCM excludes coverage in group quarters (GQs) and persons residing in GQs. Since the CCM is an evaluation, its results will not affect the 2010 Census.

The 2010 CCM is a large, complex survey conducted independently of the 2010 Census. The CCM includes five sampling activities, five data collection activities, six matching activities, and separate estimation of the national housing unit coverage and coverage of the U.S. population as of April 1, 2010. There are seven separate operation and system plans that describe the entire CCM process:

- CCM Sample Design Operation
- CCM Independent Listing Operation
- CCM Initial Housing Unit Matching and Followup Operational Group
- CCM Person Interview Field Operation
- CCM Person Matching and Followup Operational Group
- CCM Final Housing Unit Matching and Followup Operational Group
- CCM Estimation Operation

The CCM FHU Matching and Followup Operational Group consist of FHU Computer Processing, FHU Clerical Matching, and Final Housing Unit Followup (FHUFU).

During CCM FHU Computer Processing, addresses in the Population (P) sample and Census Unedited File (CUF) were compared to the data from the CCM Initial Housing Unit (IHU) operations within each sample block cluster and one ring of surrounding blocks. Any changes to CUF units since the IHU operations, such as additions, deletions, and updates, were flagged for review.

During CCM FHU Clerical Matching, the NPC matching staff conducted computer-assisted clerical matching using the FHUMaRCS software. In the first phase of clerical matching, FHU Before Followup (BFU) Clerical Matching, the matching staff attempted to match P-sample and census addresses presented to them after the FHU Computer Processing. In addition, the NPC matching staff searched for duplicate addresses to housing units in the P sample and the Enumeration (E) sample. They also attempted to determine the Census Day housing unit status and enumeration status for P-sample and census address that were undetermined after computer processing. Staff used data from the IHU and Person operations, as well as CCM and census maps in their review. Cases that remained unresolved were eligible for the FHUFU field operation where additional data were gathered. During the FHU After Followup (AFU) Clerical Matching, the staff reviewed the results of the FHUFU, obtained from the completed paper questionnaires, to attempt to code the addresses that went to followup. The result of this operation is a set of files containing final match codes for P-sample and census addresses in the sample block clusters.

During CCM FHUFU, interviewers collected additional information for addresses unresolved after the FHU BFU Clerical Matching operations. The CCM FHUFU operation attempted to collect additional information that might allow a resolution of match codes for any changes to units since IHU Matching. The FHUFU data collection forms were created via Docuprint technology. The questions included for each followup case varied depending upon the reason(s) the cases were sent to followup.

2.1 The Recommendation to Reduce Nonsampling Error in the 2010 Census Coverage Measurement Program

In September 2009, we implemented an initiative to reduce nonsampling error in the CCM Program. To implement the required changes without requiring additional funds, the sample size for operations *after* the CCM Independent Listing (IL) was decreased and resulting surplus funds from the reduced workload were put towards approaches to reduce the nonsampling error. CCM IL was in the field at the time the initiative was put in place, and therefore no change was made to the Listing sample.

To appropriately reduce the sample while maintaining appropriate controls, the Decennial Statistical Studies Division (DSSD) recommended reducing the P sample from 300,000 housing units in the U.S. and 15,000 housing units in Puerto Rico to about 170,000 housing units and 7,500 housing units, respectively. Under this plan, the original sample sizes for Hawaii and for American Indian Reservations were unchanged to help the reliability of two relatively small race/origin domains: (a) Native Hawaiians and other Pacific Islanders, and (b) American Indians living on reservations. The remaining housing unit sample was reduced, with the restriction imposed of a minimum target sample size of 1,000 housing units per state, by dropping whole block clusters from the initial sample.

Based on the initiative, the proposed major changes to the CCM FHU operations included the following:

Extra Observations for FHUFU Interviewers –Initial Observations were a continuation of training, rather than a test of the interviewer’s ability. The Crew Leaders (CLs) or Crew Leader Assistants (CLAs) observed each interviewer perform all or part of the interviewing of a block cluster to ensure interviewers (both production and Quality Control (QC)) knew how to complete the FHUFU cases correctly and provide individual feedback to interviewers to correct erroneous actions and continue correct actions. An extra observation was to be conducted on each interviewer approximately two weeks after the Initial Observation.

Operationally, implementing the second observations did not work well, because most regions ran out of work before they could complete the extra observations. This was probably due to the smaller workload and short duration of FHUFU.

Smaller employee-to-supervisor ratios for field operations –The initial plan was to have eight interviewers/QC Checkers supervised by each (QC) CL, six CLs supervised by each Field Operations Supervisor (FOS), and four QC CLs supervised by each QC FOS. The revised plan was to have six interviewers supervised by each CL, four CLs supervised by each FOS, and two

QC CLs supervised by each QC FOS. This should have ensured greater control over the quality of the field work by allowing more monitoring of work at each level.

It is difficult to measure if this actually helped improve quality, but based on feedback from regional managers, it depended on the region and proximity of staff. If all the crew members were concentrated in one area, as in smaller geographic regions, it seemed to work because staff could meet daily. In the larger regions, the staff was very decentralized, so it made meeting difficult.

Paired interviewers for the FHUFU operation – FHUFU is a difficult task for the interviewers. Although there is a questionnaire with scripted interactions with the respondents, there is a large amount of spatial work to be done in reconciling the two lists of addresses (CCM and census) using the pairs of maps. In addition, locating units can be difficult since the interviewers are often following up on difficult units. The paired interviewers worked together in locating units and reconciling the addresses with the spatial data. This was offered as an option, especially in unsafe areas and on tribal areas. When used, regional managers seemed to think it was beneficial. For more information on the initiatives to reduce nonsampling error in CCM, please see Whitford, 2009.

2.2 Independence

A requirement to be able to use dual system estimation for producing the CCM coverage estimates is that census and CCM operations must be independent. Independence requires that the areas in the CCM sample remain unknown to the census. If those areas were to be known, and the census staff then treated those areas differently from the areas not selected for CCM, the CCM results would be compromised. Also, CCM staff cannot work for CCM in areas where they had previously worked in other similar census operations. For example, an interviewer in FHUFU could not work in the same block cluster they worked during census address canvassing.

All Regional Census Center (RCC) CCM staff had access to CCM sample information. However, once they had access to the sample information, these RCC CCM staff could not later work on any non-CCM census operations. This applied to field staff and office staff.

Strict procedures were followed during the CCM field operations to ensure independence was not violated. Please see Monaghan, 2008 for more information on the independence rules. The rules listed in this memorandum also include some provisions to ensure that CCM staff were not allowed to work QC operations in any geographical area where they had worked in the CCM production operation (e.g., a FHUFU interviewer could not work FHUFU and FHUFU QC in the same area.)

2.3 2010 Census Cycle Testing

CCM operations were not part of the 2004 or 2005 Census Tests. Testing for CCM began in the 2006 Census Test and continued with the 2008 Dress Rehearsal; however the amount of testing was limited. The sole purpose of the coverage measurement test in 2006 was to develop and test the CCM survey person phase operations – data collection and matching – with an aim at improving coverage measurement methods. The 2006 CCM plans included conducting an

evaluation on whether the new methods were successful in determining a person's Census Day residence. No testing of the CCM housing unit phase operations was conducted. The coverage measurement operations for the 2006 Census Test were not designed to evaluate coverage of the 2006 Census Test.

The CCM IHU Computer and BFU Clerical Matching operations were tested for the first time in the 2010 Census life cycle as part of the 2008 Census Dress Rehearsal during the spring of 2008. The IHUFU operation had not been previously tested in the 2010 Census lifecycle. The CCM Housing Unit data collection and matching activities for the 2010 Census were to be conducted in the 2008 Census Dress Rehearsal, but since this was descoped from Dress Rehearsal because of budgetary constraints, DSSD sponsored a reduced-scope field test for IHUFU instead. The only housing unit operation in the 2008 Census Dress Rehearsal was the IL, which was already in production by the time CCM was descoped from the dress rehearsal. This mini-IHUFU test was conducted to assess the appropriateness of the questionnaire changes from 2000 and to determine if any additional changes were required for the 2010 Census IHUFU questionnaire or for the 2010 IHUFU interviewer training and procedures. In addition, the forms were used to conduct a mini-operational test of the IHU AFU Clerical Matching Operation in July 2008. In the CCM IHU AFU Clerical Matching, the NPC matching staff used the results of the IHUFU (using the completed paper questionnaires) to attempt to match unresolved addresses. The result of this operation was a file containing match codes for CCM and census housing units in the sample block clusters. For more information on the findings of the IHUFU mini-operation test, see Donnalley, 2008a. The FHU operations were not tested as part of the Dress Rehearsal due to the budgetary constraints.

3. METHODOLOGY

3.1 Questions to be answered

The following is the list of questions that will be answered by this assessment. The focus of this assessment is to document how efficient the FHU operations were and to indicate how well the operations did collecting the information needed to make CCM a success.

3.1.1 Schedule – How did actual start and completion dates compare to planned start and completion dates?

Data from the Decennial Master Activity Schedule were used to assess how the FHU operations actual dates compared to planned dates.

3.1.2 Costs – Were the field operations over or under budget?

The C&P system was used to assess how the actual field operational costs compared to the budgeted costs.

3.1.3 What was the single unit of work production rate (followup cases completed per hour)?

C&P data were used to analyze the effort required to complete a single unit of work (followup cases completed) in terms of work hours and mileage charged.

3.1.4 Staffing – What was the number of field staff authorized and trained?

Staffing authorizations provided an upper limit for hiring in each RCC. RCC staff was then able to hire for each position at their discretion based on regional implementation plans. We will present the difference between the staffing authorizations and hired staff.

3.1.5 Final Housing Unit Computer Processing

Data from the following file were used to analyze all FHU Computer Processing questions: 2010 CCM Sample Design File (Version 3) – One record for each block cluster in the original CCM sample which reflects the sampling results through the selection of the P-sample housing units (after the subsampling of housing units in large block clusters) and E-sample housing units. Record count: 12,364. We indicate for each question below what other information was used.

(a) How many final codes were assigned during Final Housing Unit Computer Processing?

Data from the following files were used to analyze these questions: 2010 FHUMaRCS database tables – IL Address, Census Address, IL Coding History, and Census Coding History.

Separate results are provided for P-sample units, E-sample units, non E-sample units in the CCM sample areas, and non E-sample units in the surrounding blocks⁵ to the CCM sample areas.

(b) How many records were flagged for clerical review during Final Housing Unit Computer Processing?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – IL Address, Census Address, Cluster Control, and Pre-fix Address Link; and an Excel spreadsheet H_only_clusters2a.xls created from FHU Computer Processing output.

Separate results are provided for P-sample and census addresses to show how many records were initially flagged during FHU Computer Processing. Initial work flags were cleared for some addresses prior to the NPC production work. Results are provided to show the reduced work load.

3.1.6 Final Housing Unit Clerical Matching

Data from the following file were used to analyze all FHU Clerical Matching questions: 2010 CCM Sample Design File (Version 3) – One record for each block cluster in the original CCM sample which reflects the sampling results through the selection of the P-sample housing units (after the subsampling of housing units in large block clusters) and E-sample housing units. Record count: 12,364.

- (a) How many units were clerically matched, possibly matched, or remained nonmatched between the Census Coverage Measurement P sample and the Census Unedited File?
How many duplicates did the clerical matchers find within the Census Coverage Measurement P sample, within block cluster?
How many duplicates did the clerical matchers find within the Census Unedited File, by whether the duplicate is located within the block cluster or the surrounding blocks?**

Data from the following files were used to analyze these questions: 2010 FHUMaRCS database tables – IL Address, Census Address, IL Coding History, Census Coding History, and Cluster Control.

The BFU and AFU results are given by type of structure for both the P sample and E sample for matches, nonmatches, possible matches, duplicates, and not a housing unit. The BFU and AFU results are also given for non E-sample duplicates in the CCM block clusters and non E-sample duplicates in the surrounding blocks to the CCM block clusters.

⁵ Surrounding blocks include all collection blocks that are in the first ring of blocks surrounding a block cluster. (Blocks in the first ring share one or more geographic points with the block cluster.) Any land block completely enclosed by blocks that are in the first ring, is also considered to be a surrounding block.

(b) What is the distribution of duplicates found per census address?

Data from the following file were used to analyze this question: 2010 FHUMaRCS database tables – Census Address.

The results are given for census housing units in the E sample by the count of duplicates per unit, i.e., units with one duplicate, two duplicates, or three or more duplicates.

(c) What is the housing unit/enumeration status assigned for each unit (e.g., housing unit, erroneous enumeration, duplicate, geocoding error, unresolved)?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – IL Address, Census Address, and the Cluster Control File.

The results are given by type of structure for both the P sample and E sample for housing units, potential housing units, not a housing unit, geocoding errors, unresolved housing units, and duplicates.

(d) How many block clusters skipped all matching, by size of block cluster?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – Cluster Control and Cluster Stage.

The results are given by block cluster size for the number of block clusters that skipped all matching.

(e) How many followup notes did clerical matchers enter?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – Cluster Control and Followup Note.

The results are given for both P-sample and census addresses, including E-sample and non E-sample addresses.

(f) How many block clusters went to outlier review?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – Cluster Control and Cluster Stage. The results are given by counts of block clusters that went to outlier review.

(g) How many census units were coded insufficient information for followup?

Data from the following files were used to analyze this question: 2010 FHUMaRCS database tables – Census Address and Census Coding History. The results are given for census housing units in the E sample.

Final Housing Unit Followup

3.1.7 How was the Final Housing Unit Followup workload distributed?

Using information from the FHUMaRCS block cluster control file on dates when cases were checked out and checked in at the NPC, we studied the distribution of when block clusters were completed and the duration of time to complete.

3.1.8 How many block clusters and units were sent to Final Housing Unit Followup?

Block clusters and addresses needing followup are determined in BFU Clerical Matching. Using data from the FHUMaRCS cluster control and FHUFU forms list history table, we provide the counts and distributions of block clusters and addresses that went to followup.

3.1.9 How many units required an address correction during Final Housing Unit Clerical Matching?

Using data from the IL Address and Census Address Tables, we provide counts of addresses that required updates in BFU or AFU Clerical Matching.

3.1.10 How many Final Housing Unit Followup case forms were created?

Addresses requiring followup were sent to followup on one of 51 forms containing questions tailored to resolve the discrepancies in the address lists. Using data from the FHUFU forms list history table, we present the distribution of cases by type of followup form.

3.2 Methods

Assessment questions listed in Section 3.1 were answered by gathering and/or tallying information from the FHU operations production files, C&P reports, Decennial Master Activity Schedule data, Staffing tallies, Lessons Learned, and operational debriefings. We provided overall totals and totals by Stateside and Puerto Rico. Some Stateside statistics are also disaggregated into RCC totals. When appropriate, results are also shown by Address Type Cluster Group (ATCG) Recode; type of structure (single unit, multiunit, mobile homes within and outside of a park, other); size of structure; stage of clerical matching (BFU and AFU); whether FHUFU was needed or not for a unit; and CCM units compared with census units. The ATCG recode consists of either city-style addresses or noncity-style addresses. A U.S. block cluster was coded as noncity-style based on the following definition: at least one collection block (1) is contained within a remote update/enumerate type of enumeration area, (2) contains rural route addresses, (3) contains location descriptions and incomplete records, (4) comes from mixed address areas with some delivery sequence file (DSF)⁶ coverage, (5) is 100 percent city-style but with no DSF coverage, (6) and/or contains business addresses with no DSF coverage (Whitford,

⁶ The DSF is a computerized file containing all delivery point addresses serviced by the United States Postal Service (Cross Country Computer, 2002).

2009a). The remaining U.S. block clusters were coded as city-style. All Puerto Rico block clusters were coded as noncity-style.

No weighted data were included in this report. No statistical testing was done, nor any inferences to the general population are intended. These results are from an operational standpoint and are not the final CCM estimates of coverage.

The Decennial Master Activity Schedule data were used to compare actual start dates to planned dates. The Decennial C&P System served as the primary management reporting system for all 2010 Decennial Census field operations monitoring progress and accounting for expenditures. The C&P provided high-level daily summary reporting for Headquarters and RCC staff to monitor the progress of the operation. The C&P retrieved, summarized, stored, and reported operational data from source systems, primarily the Decennial Applicant, Personnel and Payroll System and the Technologies Management Office's CMOCS. Source data also included the Decennial Management Division (DMD) cost model and the Field Division (FLD) progress goals. The FLD production progress goals, determined by the FLD Division after input from Regional Managers, were used to determine weekly "expected" percentages of workload and cost goals for the RCCs. C&P data were pulled into different systems at different times and depending on the system, the data may have been refreshed regularly, such as daily or weekly, or periodically at designated times. This variation required that algorithms be written to ensure that when the data were pulled into C&P, the data for all prior days were reflected in the reports. Upon release of the C&P system, the algorithm for 'Progress as of Date (from the NPC)' in the C&P system had to be corrected to ensure all data prior to the current date were captured.

C&P reports were used to provide updates to monitor the workloads, workflow, and costs of the operations. Details of the C&P reports used in this assessment are provided in Sections 3.2.3.1. Since FHUFU was a paper-based operation, automation implementation dealt only with the systems used to track and process the questionnaires.

3.2.1 Final Housing Unit Computer Processing

Several files were used to answer the FHU Computer Processing assessment questions. Each table in the FHU Computer Processing Results section has a data source listed in the footnote. A description of each of the data sources is given below.

- 2010 CCM Sample Design File (Version 3) – One record for each block cluster in the original CCM sample which reflects the sampling results through the selection of the P-sample housing units (after the subsampling of housing units in large block clusters) and E-sample housing units. Record count: 12,364.
- 2010 FHUMaRCS database tables – Cluster Control, IL Address, Census Address, IL Coding History, and Census Coding History. 2010 CCM and Census files sent to the computer processing.
- The Pre-fix Address Link File contains the census and IL address IDs of records that were coded at Headquarters prior to FHU Clerical Matching at the NPC. It contains the match code assigned by FHU Computer Processing and the recoded match code assigned by Headquarters staff.

- An Excel spreadsheet H_only_clusters2a.xls was created from FHU Computer Processing output. This file was used to identify clusters where the only addresses that were flagged for clerical review were census addresses in surrounding blocks to the CCM sample areas.

3.2.2 Final Housing Unit Clerical Matching

Several files were used to answer the FHU Clerical Matching assessment questions. Each table in the clerical matching results section has a data source listed in the footnote. A description of each of the data sources is given below.

- 2010 CCM Sample Design File (Version 3) – One record for each block cluster in the original CCM sample which reflects the sampling results through the selection of the P-sample housing units (after the subsampling of housing units large block clusters) and E-sample housing units. Record count: 12,364.
- 2010 FHUMaRCS database tables – Cluster Control, Cluster Stage, Followup Note, IL Address, Census Address, IL Coding History, and Census Coding History.

3.2.3 Final Housing Unit Followup

The FHUFU summary statistics presented in this report to answer the FHUFU assessment questions are based on the analysis of the FHUFU C&P Reports and four output files: the FHU Clerical Matching IL Output File, the FHU Clerical Matching Census Address Output File, the FHU Clerical Matching Cluster Control Output File, and the FHUMaRCS FHUFU Forms List History File. Each table in the Results section has a data source listed in a footnote.

3.2.3.1 Final Housing Unit Followup Cost and Progress Reports

The C&P system included eleven CCM FHUFU reports and one graph. The following reports were used to answer the questions in this assessment:

- *Preliminary Total Cost*
- *Current Employee Cost – Training*
- *Current Employee Cost – Field Work*

3.2.3.2 Final Housing Unit Clerical Matching Independent Listing Address Output File

This file contains one record for each IL address, with original data from IL keying verification plus the matching and linking outcomes, and updated address details from clerical matching.

3.2.3.3 Final Housing Unit Clerical Matching Census Address Output File

This file contains one record for each census address within the CCM sample with all clerical matching and linking outcomes from FHU.

3.2.3.4 Final Housing Unit Clerical Matching Cluster Control Output File

This file contains one record per block cluster in the original sample, with original block cluster data plus matching status or the FHUFU status and counts of followup cases for the block cluster.

3.2.3.5 Final Housing Unit Clerical Matching Final Housing Unit Followup Forms List History File

This file contains one record for each FHUFU case form generated by FHUMaRCS. It also provides information on the case form such as the time the form was generated, type of form generated, original block cluster data, case address data, and followup status.

Some FHUFU forms were regenerated. Since the FHUMaRCS FHUFU Forms List History File was a cumulative file, two records were created for each of the regenerated forms. The date and time variables were used to unduplicate the file so only one record existed for each FHUFU form.

4. LIMITATIONS

This section discusses the assumptions and limitations for this report.

- No weighted data were included in this report. No statistical testing was done, nor any inferences to the general population are intended. These results are from an operational standpoint and are not the final CCM estimates of coverage.
- The study plan for this assessment stated results would be provided by Type of Enumeration Area (TEA), however we used the ATCG recode, which is a grouping of the TEAs into city-style and noncity-style address areas. ATCG recodes were used to show results when appropriate rather than TEA. See section 3.2 for more on ATCG recodes.
- The study plan for this assessment stated results would be provided by sampling stratum (small, medium, large, American Indian Reservation, or military), however in assessing the results we decided not to present the data by sampling strata.

4.1 Final Housing Unit Computer Processing and Clerical Matching

The census addresses that were reviewed during FHU Clerical Matching included census addresses on the CUF geocoded to the CCM sample block clusters and their surrounding blocks. Clerical matchers could match a P-sample address to any census address in the sample block cluster or one of its surrounding blocks, regardless of whether or not the census address was in the E sample. However, when looking at the match status and enumeration status of census addresses, as well as the distribution of the number of duplicates per census address, the results presented in this assessment are limited to E-sample addresses. When answering the question "How many duplicates did the clerical matchers find within the CUF, by whether the duplicate is located within the block cluster or the surrounding blocks?", separate results are provided for the non E-sample addresses in the block clusters and the non E-sample addresses in the surrounding blocks that are duplicates to E-sample addresses.

All census results presented in the FHU Computer Processing and FHU Clerical Matching sections will be labeled to indicate that the results are for E-sample, non E-sample in the CCM sample areas, non E-sample in the surrounding blocks, or census addresses. Results labeled simply as "Census" include results for all census addresses, E-sample or non E-sample, in the CCM sample areas and surrounding blocks.

4.2 Final Housing Unit Followup

The FHUFU forms were not data captured because most data were captured in FHUMaRCS during the AFU matching. However, the respondent type for the case and whether a unit could not be located by an interviewer from the FHUFU form were not captured in FHUMaRCS. Therefore we cannot answer the following assessment questions:

1. What is the respondent type for each unit?
2. How many units could the interviewer not locate?

5. RESULTS

5.1 Schedule – How did actual start and completion dates compare to planned start and completion dates?

5.1.1 Final Housing Unit Matching Schedule

The CCM FHU Computer Processing started on time, but ended 11 days late, due to CCM Person Clerical Matching requiring extra time for completion. A schedule change request was implemented and approved to delay the planned start of FHU BFU and AFU Clerical Matching operations by a week and a half. The FHU BFU Clerical Matching start changed from April 18, 2011 to April 27, 2011 and the FHU AFU Clerical Matching start changed from May 18, 2011 to May 27, 2011. The FHU Clerical Matching operations started on time based on the approved change request, but completed early, as shown in Table 1.

Clerical Matching Operation	Planned		Actual	
	Start	End	Start	End
Final Housing Computer Processing	4/11/2011	4/15/2011	4/11/2011	4/26/2011
Final Housing Unit Before Followup Matching	4/27/2011	5/26/2011	4/27/2011	5/24/2011
Final Housing Unit After Followup Matching	5/27/2011	7/08/2011	5/27/2011	6/22/2011

Source: Decennial Master Activity Schedule

The FHUMaRCS was deployed and maintained for the clerical matching operations from March 28, 2011 through July 6, 2011. This started on time, but finished five days ahead of the July 11, 2011 schedule completion because of the early AFU matching completion. Since only analysts worked FHU Clerical Matching, no formal training was conducted for FHU Clerical Matching. The FHU matching was very similar to the IHU matching operation. The analysts had much of the skill and experience to perform FHU matching. Additional information needed specifically for FHU matching was documented in the FHU Clerical Matching specifications. Some analysts have worked other operations similar to CCM in past Censuses. Some of these analysts also helped in the development for CCM operations and matching software.

5.1.2 Final Housing Unit Followup Schedule

As in the FHU Clerical Matching Operations, a schedule change request was implemented and approved to delay the planned start of the FHU field operations. The decision was made to delay the start of the field operations by two weeks, which would allow the majority of the work for FHUFU to be available at the start of the operation, because BFU Clerical Matching would almost be complete. The duration of the field operations were also changed from six weeks to four weeks, since the workload was smaller than expected and would be mostly available at the start of the operation, rather than on a flow basis. The FHUFU Operation start changed from May 5, 2011 to May 19, 2011 and the FHUFU QC start changed from May 11, 2011 to

May 25, 2011.

Based on the schedule change request FHUFU was scheduled from May 19, 2011 through June 15, 2011. The FHUFU operation started early on May 9, 2011, and finished early on June 13, 2011.

FHUFU QC was scheduled from May 25, 2011 through June 18, 2011. The FHUFU QC operation started early on May 10, 2011, and finished ahead of time on June 16, 2011.

Please see Table 2 for the planned and actual dates the field training was conducted.

Table 2 The 2010 Census Coverage Measurement Final Housing Unit Followup Operation Production and Quality Control Training Schedule								
Training	FHUFU				FHUFU QC			
	Planned		Actual		Planned		Actual	
	Start	End	Start	End	Start	End	Start	End
Field Operations Supervisors	4/13/11	4/19/11	4/13/11	4/19/11	4/15/11	5/6/11	4/15/11	5/27/11
Crew Leaders	4/25/11	4/28/11	4/25/11	4/28/11	4/15/11	5/6/11	4/15/11	5/27/11
Interviewers/ Crew Leader Assistants	5/16/11	5/18/11	4/28/11	5/18/11	4/15/11	5/6/11	4/15/11	5/27/11

Source: Decennial Master Activity Schedule

There were 14 schedule change requests to the Master Activity Schedule implemented for the FHUFU operation. The change requests included date changes, duration changes, predecessor/successor changes, deletes, and logic corrections. Activity lines affected by the change requests were those of FHUFU, QC, FHU Matching, and FHUMaRCS. Also affected were docuprinting, geocoding, testing, and training. There were no known issues or risks associated with implementing these change requests.

5.2 Costs – Was the Final Housing Unit Followup field operations over or under budget?

The cost results presented in this assessment were generated by program office staff using methods predating the US Census Bureau's commitment to comply with Government Accounting Office's cost estimating guidelines and the Society of Cost Estimating and Analysis best practices. Hence, while the Census Bureau believes these cost results are accurate and will meet the needs for which they will be used, the methods used for estimating costs of 2010 Census operations may not meet all of these guidelines and best practices. The Census Bureau will adhere to these guidelines in producing 2020 Census cost estimates.

The CCM FHUFU operations were under budget. The operational budget estimates assumed various factors. These assumptions were based on the results of prior field operations, as well as standardized and operation specific factors.

Assumptions included in the budget estimates, that were based on prior field operation results included: production rate per hour, field work hours per day, field work miles per day, training hours per day, and training miles per day. Standardized factors included salary, salary application rates, and mileage reimbursement rates. Operation specific factors included workload estimates and number of production days. Combining these factors as follows, the budget proportions were estimated:

Total Cost = *Field Work Cost* + *Training Cost* + *Mileage Cost* + *Per Diem and Other Costs*

Field Work Cost is the cost of non-training wages and *Training Cost* is the cost of wages incurred during training hours, both excluding mileage. *Mileage Cost* is the total reimbursed mileage cost incurred during field work and training. *Per Diem and Other Costs* are the Meals and Incidental Expenses (M&IE), lodging cost, telephone costs and other expenses incurred during field work and training travel. *Data may vary slightly from sources due to rounding differences that may have occurred during calculations.*

As you can see from the above equations, costs depend on many factors. These factors must be considered when comparing budget estimates to actual costs. For instance, when comparing training budget estimates to actual training costs, differences could be caused by either differences in the number of training staff, number of training days, training hours per day, salary rate, salary applications, or combinations of these. This document will attempt to explain why actual cost components varied from the budget estimate, whenever possible. In some instances, the data required to identify precise reasons for variation were not available or do not exist.

The actual FHUFU QC workload was determined using adjudicated QC data. Field Office Staff keyed FHUFU QC results into CMOCS, the FHUFU QC forms were then sent to the NPC where the results were re-keyed, and then the CMOCS and the NPC keyed data were compared. Discrepancies between the CMOCS and NPC keyed data were then adjudicated at Headquarters by looking at the original FHUFU QC form to determine the correct data. The QC workload was determined by adding the number of followup cases included in the QC check for block clusters that passed the QC check and the total number of cases in FHUFU for any block clusters that failed the QC check.

Table 3 provides the total budget and actual expenditures for the four components of total cost. Discussion and a more detailed analysis of each cost component follows in the next sections.

Table 3				
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation				
Total Cost by Component				
Position	Budgeted Cost	Actual Cost	Difference of Budgeted to Actual Cost [†]	Percent Over (+) /Under Budget Spent [†]
Total	\$2,616,426	\$1,724,018	\$892,408	34.11%
Field Work Cost	\$1,228,373	\$738,345	\$490,028	39.89%
Training Cost	\$459,029	\$268,340	\$190,689	41.54%
Mileage Cost	\$519,950	\$539,449	(\$19,499)	(3.75%)
Per Diem and Other Costs	\$409,074	\$177,884	\$231,190	56.52%
*Data reflected are for both the FHUFU and FHUFU QC operations combined.				
†Values in parentheses denote values over budget.				
Source: Final Housing Unit Followup C&P Reports: Preliminary Total Cost ; Current Employee Cost – Field Work; Current Employee Cost – Training				

5.2.1 Cost by Position

In this section, total cost is defined as all costs incurred during the operation. These costs, as defined in following sections, are field work cost, training cost, mileage cost, and Per Diem and other costs.

Table 4 provides the total budgeted and actual costs by position for both FHUFU and FHUFU QC.

Table 4				
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation				
Cost by Position				
Position	Budgeted Cost	Actual Cost	Difference of Budgeted to Actual Cost†	Percent Over(+) /Under Budget Spent†
Total	\$2,616,426	\$1,724,018	\$892,408	34.11%
<i>Census Coverage Measurement Final Housing Unit Followup</i>				
<i>Subtotal - FHUFU</i>	\$1,248,445	\$919,259	\$329,186	26.37%
Interviewer	\$754,785	\$380,032	\$374,753	49.65%
Crew Leader Assistant	\$118,682	\$44,477	\$74,205	62.52%
Crew Leader	\$274,590	\$283,282	(\$8,692)	(3.17%)
Field Operations Supervisor	\$100,388	\$211,468	(\$111,080)	(110.65%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>				
<i>Subtotal – FHUFU QC</i>	\$1,367,981	\$804,759	\$563,222	41.17%
Interviewer	\$669,512	\$284,869	\$384,643	57.45%
Crew Leader Assistant	\$130,616	\$45,706	\$84,910	65.01%
Crew Leader	\$334,962	\$221,597	\$113,365	33.84%
Field Operations Supervisor	\$232,891	\$252,587	(\$19,696)	(8.46%)
Source: Final Housing Unit Followup C&P Reports: Preliminary Total Cost				
†Values in parentheses denote values over budget.				

Total Cost Summary

Overall, the 2010 CCM FHUFU operation was under budget by \$892,408 (34.11 percent). FHUFU was under budget by \$329,186 (26.37 percent) and FHUFU QC was under budget by \$563,222 (41.17 percent).

Total Cost by Position

The cost savings for FHUFU were primarily due to Interviewer costs being under budget. FHUFU displayed more efficiency than expected. Interviewer and CLA costs contributed to this efficiency. Interviewer cost was under budget by \$374,753 (49.65 percent) and CLA cost was under budget by \$74,205 (62.52 percent). These lesser costs were offset with cost overruns by CL and FOS. CL cost was over budget by \$8,692 (3.17 percent) and FOS was over budget by \$111,080 (110.65 percent).

FHUFU QC also showed cost savings primarily attributed to Interviewer costs being under budget. FHUFU QC also displayed more efficiency than expected. Interviewer, CLA, and CL costs contributed to this efficiency. Interviewer cost was under budget by \$384,643 (57.45

percent). CLA cost was under budget by \$84,910 (65.01 percent). CL cost was under budget by \$113,365 (33.84 percent). In contrast, FOS cost was over budget by \$19,696 (8.46 percent). However, this additional FOS cost had minimal effect on the overall cost for FHUFU QC.

5.2.2 Cost per Case

In this section, cost per case is defined as the total cost incurred for each followup case completed by a FHUFU Interviewer/QC Checker.

Table 5 provides the budgeted and actual cost per case by position for FHUFU and FHUFU QC.

Table 5
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation
Cost Per Case by Position

Position	Budgeted Cost	Actual Cost	Budgeted Cost per Case ¹	Actual Cost per Case ²	Difference of Budgeted to Actual Cost [†]	Percent Over(+)/Under Budget Spent [†]
Total	\$2,616,426	\$1,724,018	\$114.44	\$176.55	(\$62.11)	(54.27%)
<i>Census Coverage Measurement Final Housing Unit Followup</i>						
Subtotal - FHUFU	\$1,248,445	\$919,259	\$90.65	\$158.79	(\$68.14)	(75.17%)
Interviewer	\$754,785	\$380,032	\$54.81	\$65.65	(\$10.84)	(19.78%)
Crew Leader Assistant	\$118,682	\$44,477	\$8.62	\$7.68	\$0.94	10.90%
Crew Leader	\$274,590	\$283,282	\$19.94	\$48.93	(\$28.99)	(145.39%)
Field Operations Supervisor	\$100,388	\$211,468	\$7.29	\$36.53	(\$29.24)	(401.10%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>						
Subtotal – FHUFU QC	\$1,367,981	\$804,759	\$150.49	\$202.40	(\$51.91)	(34.49%)
Interviewer	\$669,512	\$284,869	\$73.65	\$71.65	\$2.00	2.72%
Crew Leader Assistant	\$130,616	\$45,706	\$14.37	\$11.50	\$2.87	19.97%
Crew Leader	\$334,962	\$221,597	\$36.85	\$55.73	(\$18.88)	(51.23%)
Field Operations Supervisor	\$232,891	\$252,587	\$25.62	\$63.53	(\$37.91)	(147.97%)
¹ Budgeted Final Housing Unit Followup Workload is 13,772 cases and Budgeted Final Housing Unit Followup Quality Control Workload is 9,090 cases. ² Actual Final Housing Unit Followup Workload is 5,789 cases and Actual Final Housing Unit Followup Quality Control Workload is 3,976 cases. 42.03 percent and 43.74 percent less than expected, respectively. [†] Values in parentheses denote values over budget.						
Source: Final Housing Unit Followup C&P Reports: Preliminary Total Cost						

Cost Per Case Summary

On a per case basis, FHUFU and FHUFU QC costs were over budget. The actual cost per case for FHUFU was \$158.79. This is \$68.14 more per case (75.17 percent) than expected. The actual cost per case for FHUFU QC was \$202.40. This is \$51.91 more per case (34.49 percent) than expected.

The FHUFU operation was not as efficient as planned in terms of time required to complete a case and the mileage associated with completing a case. We would hypothesize the reason for this is that the cases were much more geographically disparate as a result of the significantly reduced workload. This is supported by the fact that during the regional managers debriefing regional managers indicated that often, field staff had only one or two assignments within a reasonable distance, so their time employed during this operation was very short. Because of this we could not realize any economies of scale that we expected with a larger operation.

Cost Per Case by Position

FHUFU was less efficient than expected. Interviewers, CLs, and FOSs primarily contributed to this inefficiency. Interviewer cost was over budget by \$10.84 per case (19.78 percent). In contrast, CLAs were more efficient by \$0.94 per case (10.90 percent). CL cost was over budget by \$28.99 per case (145.39 percent), and FOS cost was over budget by \$29.24 per case (401.10 percent).

FHUFU QC was also less efficient than expected, with CLs and FOSs being less efficient and Interviewers and CLAs being more efficient. Interviewer cost was under budget by \$2.00 per case (2.72 percent), and CLA cost was under budget by \$2.87 per case (19.97 percent). In contrast, CL cost was over budget by \$18.88 per case (51.23 percent), and FOS cost was over budget by \$37.91 per case (147.97 percent).

5.2.3 Field Work Costs

In this section, field work cost is defined as the cost of non-training wages. For the purpose of this section, mileage costs are not included; however, they are discussed in a later section.

Table 6 provides the budgeted and actual field work costs by position for both FHUFU and FHUFU QC.

Table 6 The 2010 Census Coverage Measurement Final Housing Unit Followup Operation Field Work Cost by Position				
Position	Budgeted Field Work Hours Cost	Actual Field Work Hours Cost	Difference of Budgeted to Actual Cost†	Percent Over(+) /Under Budget Spent†
Total	\$1,228,373	\$738,345	\$490,028	39.89%
<i>Census Coverage Measurement Final Housing Unit Followup</i>				
Subtotal - FHUFU	\$594,416	\$398,817	\$195,599	32.91%
Interviewer	\$302,340	\$149,657	\$152,683	50.50%
Crew Leader Assistant*	\$94,809	\$19,268	\$75,541	79.68%
Crew Leader	\$147,541	\$131,200	\$16,341	11.08%
Field Operations Supervisor	\$49,726	\$98,692	(\$48,966)	(98.47%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>				
Subtotal – FHUFU QC	\$633,957	\$339,528	\$294,429	46.44%
Interviewer	\$253,932	\$99,609	\$154,323	60.77%
Crew Leader Assistant*	\$104,300	\$17,992	\$86,308	82.75%
Crew Leader	\$164,410	\$101,637	\$62,773	38.18%
Field Operations Supervisor	\$111,315	\$120,290	(\$8,975)	(8.06%)
*Crew Leaders Assistants were trained as Interviewers. †Values in parentheses denote values over budget. Source: Final Housing Unit Followup C&P Reports: Current Employee Cost – Field Work				

Field Work Cost Summary

Overall, the cost for field work associated with the 2010 CCM FHUFU operation was under budget by \$490,028 (39.89 percent). FHUFU field work cost was under budget by \$195,599 (32.91 percent). FHUFU QC field work cost was under budget by \$294,429 (46.44 percent).

Field Work Cost by Position

Lower Interviewer, CLA, and CL costs contributed to FHUFU being completed under budget. Interviewer field work cost was under budget by \$152,683 (50.50 percent). CLA field work cost was under budget by \$75,541 (79.68 percent). CL field work cost was under budget by \$16,341 (11.08 percent). However, FOS field work cost was over budget by \$48,966 (98.47 percent). FHUFU QC field work cost was also under budget. Interviewer field work cost was under budget by \$154,323 (60.77 percent). CLA field work cost was under budget by \$86,308 (82.75

percent). CL field work cost was under budget by \$62,773 (38.18 percent). However, FOS field work cost was over budget by \$8,975 (8.06 percent).

5.2.4 Training Costs

In this section, training cost is defined as the cost of wages incurred during training hours. For the purpose of this section, costs for mileage are not included; however, mileage costs are discussed in a later section.

Table 7 provides the budgeted and actual training cost by position for both FHUFU and FHUFU QC.

Table 7				
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation				
Training Hours Cost by Position				
Position	Budgeted Training Hours Cost	Actual Training Hours Cost	Difference of Budgeted to Actual Cost [†]	Percent Over(+) /Under Budget Spent [†]
Total	\$459,029	\$268,340	\$190,689	41.54%
<i>Census Coverage Measurement Final Housing Unit Followup</i>				
Subtotal - FHUFU	\$206,755	\$140,884	\$65,871	31.86%
Interviewer	\$151,292	\$61,355	\$89,937	59.45%
Crew Leader Assistant*	\$1,580	\$6,853	(\$5,273)	(333.74%)
Crew Leader	\$40,206	\$39,618	\$588	1.46%
Field Operations Supervisor	\$13,677	\$33,059	(\$19,382)	(141.71%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>				
Subtotal - FHUFU QC	\$252,274	\$127,456	\$124,818	49.48%
Interviewer	\$162,219	\$50,945	\$111,274	68.60%
Crew Leader Assistant*	\$1,795	\$8,598	(\$6,803)	(379.02%)
Crew Leader	\$54,848	\$33,899	\$20,949	38.19%
Field Operations Supervisor	\$33,412	\$34,014	(\$602)	(1.80%)
*Crew Leaders Assistants were trained as Interviewers.				
†Values in parentheses denote values over budget.				
Source: Final Housing Unit Followup C&P Reports: Current Employee Cost – Training				

Training Cost Summary

Overall, the cost for training associated with the 2010 CCM FHUFU operation was under budget by \$190,689 (41.54 percent). FHUFU production training cost was under budget by \$65,870 (31.86 percent). FHUFU QC training cost was under budget by \$124,818 (49.48 percent).

Training Cost by Position

FHUFU training cost was under budget, with Interviewer and CL training costs being under budget and CLA and FOS training costs being over budget. Interviewer training cost was under budget by \$89,937 (59.45 percent). CLA training cost was over budget by \$5,273 (333.74 percent). CL training cost was under budget by \$588 (1.46 percent). FOS training cost was over budget by \$19,382 (141.71 percent).

FHUFU QC training cost was also under budget, with Interviewer and CL training costs being under budget and CLA and FOS training costs being over budget. Interviewer training cost was under budget by \$111,274 (68.60 percent). CLA training cost was over budget by \$6,803 (379.02 percent). CL training cost was under budget by \$20,949 (38.19 percent). FOS training cost was over budget by \$602 (1.80 percent).

5.2.5 Mileage Costs

In this section, mileage costs are defined as the total reimbursed mileage costs incurred for field work and training. During FHUFU and FHUFU QC, field staff was reimbursed for use of their personal vehicles at a rate of \$0.50 per mile. Table 8 provides the budget and actual mileage costs by position for both FHUFU and FHUFU QC.

Table 8 The 2010 Census Coverage Measurement Final Housing Unit Followup Operation Mileage Cost by Position				
Position	Budgeted Miles Cost**	Actual Miles Cost**	Difference of Budgeted to Actual Cost†	Percent Over(+) /Under Budget Spent†
Total	\$519,950	\$539,449	(\$19,499)	(3.75%)
<i>Census Coverage Measurement Final Housing Unit Followup</i>				
Subtotal - FHUFU	\$266,716	\$289,051	(\$22,335)	(8.37%)
Interviewer	\$197,502	\$134,831	\$62,671	31.73%
Crew Leader Assistant*	\$22,293	\$13,627	\$8,666	38.87%
Crew Leader	\$36,216	\$84,860	(\$48,644)	(134.32%)
Field Operations Supervisor	\$10,705	\$55,734	(\$45,029)	(420.63%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>				
Subtotal – FHUFU QC	\$253,234	\$250,398	\$2,836	1.12%
Interviewer	\$161,066	\$104,483	\$56,583	35.13%
Crew Leader Assistant*	\$24,521	\$14,614	\$9,907	40.40%
Crew Leader	\$43,251	\$64,674	(\$21,423)	(49.53%)
Field Operations Supervisor	\$24,396	\$66,628	(\$42,232)	(173.11%)
*Crew Leaders Assistants were trained as Interviewers. **Mileage reflects miles cost for both field work and training. †Values in parentheses denote values over budget. Source: Final Followup C&P Reports: Current Employee Cost – Field Work				

Mileage Cost Summary

Overall, the mileage cost for the 2010 CCM FHUFU operation was over budget by \$19,499 (3.75 percent). Mileage cost for FHUFU was over budget by \$22,335 (8.37 percent). However, mileage cost for FHUFU QC was under budget by \$2,836 (1.12 percent).

Mileage Cost by Position

Mileage costs for Interviewers and CLAs were under budget, while mileage costs for CLs and FOSs were over budget, greatly contributing to the overall higher mileage expenditures for the operation. Mileage cost for Interviewers were under budget by \$62,671 (31.73 percent), and mileage cost for CLAs were under budget by \$8,666 (38.87 percent). In contrast, mileage cost for CLs were over budget by \$48,644 (134.32 percent), and mileage cost for FOSs were over budget by \$45,029 (420.63 percent).

Though overall 2010 FHUFU mileage cost was over budget, mileage cost for FHUFU QC was under budget. Interviewers and CLAs contributed to the lower mileage expenditures; however, CLs and FOSs exhibited differing cost trends through cost overruns. Interviewers were under budget by \$56,583 (35.13 percent), and mileage cost for CLAs were under budget by \$9,907 (40.40 percent). In contrast, mileage cost for CLs were over budget by \$21,423 (49.53 percent), and mileage cost for FOSs were over budget by \$42,232 (173.11 percent).

5.2.6 Per Diem and Other Costs

In this section, Per Diem and other costs are defined as the M&IE, lodging cost, telephone costs and other expenses incurred during field work and training. For the purpose of this section, mileage costs are not included.

Table 9 provides the budgeted and actual Per Diem costs by position for both FHUFU and FHUFU QC.

Table 9 The 2010 Census Coverage Measurement Final Housing Unit Followup Operation Per Diem and Other Costs by Position				
Position	Budgeted Per Diem Reimbursement	Actual Per Diem Reimbursement	Difference of Budgeted to Actual Cost†	Percent Over(+) /Under Budget Spent‡
Total	\$409,074	\$177,884	\$231,190	56.52%
<i>Census Coverage Measurement Final Housing Unit Followup</i>				
Subtotal - FHUFU	\$180,558	\$90,505	\$90,053	49.87%
Interviewer	\$103,651	\$34,189	\$69,462	67.02%
Crew Leader Assistant*	\$0	\$4,729	(\$4,729)	Not applicable
Crew Leader	\$50,627	\$27,604	\$23,023	45.48%
Field Operations Supervisor	\$26,280	\$23,983	\$2,297	8.74%
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>				
Subtotal – FHUFU QC	\$228,516	\$87,376	\$141,140	61.76%
Interviewer	\$92,295	\$29,832	\$62,463	67.68%
Crew Leader Assistant*	\$0	\$4,502	(\$4,502)	Not applicable
Crew Leader	\$72,453	\$21,387	\$51,066	70.48%
Field Operations Supervisor	\$63,768	\$31,655	\$32,113	50.36%
*Crew Leaders Assistants were trained as Interviewers. **Telephone budget rolled up into FHUFU operation Interviewers. ***Per Diem reflects Per Diem costs for both field work and training. †Values in parentheses denote values over budget. Source: Final Followup C&P Reports: Current Employee Cost – Training; Current Employee Cost – Field Work; Preliminary Total Cost				

Per Diem Cost Summary

Overall, the 2010 CCM FHUFU operation Per Diem costs were under budget by \$231,190 (56.52 percent). FHUFU Per Diem costs were under budget by \$90,053 (49.87 percent). FHUFU QC Per Diem costs were under budget by \$141,140 (61.76 percent).

Per Diem Cost by Position

Per Diem costs for FHUFU production were under budget for all positions, with the exception of CLAs. Per Diem costs for Interviewers were under budget by \$69,462 (67.02 percent); CLs were under budget by \$23,023 (45.48 percent); and FOSs were under budget by \$2,297 (8.74 percent). Since no budget was allocated for CLAs, the cost was over budget by \$4,729.

Like FHUFU, Per Diem costs for FHUFU QC were under budget for all positions, with the exception of CLAs. Per Diem costs for Interviewers were under budget by \$62,463 (67.68 percent); CLs were under budget by \$51,066 (70.48 percent); and FOSs were under budget by \$32,113 (50.36 percent). Since no budget was allocated for CLAs, the cost was over budget by \$4,502.

5.3 What was the single unit of work production rate (followup cases completed per hour)?

This section analyzes the effort required to complete a single unit of work (a follow-up case completed) in terms of field work (non-training) hours and mileage charged.

5.3.1 Production Rate of Completion for Final Housing Unit Followup Operations

Table 10 provides the budgeted and actual production rates by position for both FHUFU and FHUFU QC.

Table 10**The 2010 Census Coverage Measurement Final Housing Unit Followup Operation****Production Rate by Position**

Position	Budgeted Field Work Hours	Actual Field Work Hours	Budgeted Cases per Production Hour ¹	Actual Cases Per Production Hour ²	Difference of Budgeted to Actual Cases per hour [†]	Percent More/ Less(-) Efficient [†]
<i>Census Coverage Measurement Final Housing Unit Followup</i>						
Total - FHUFU	36,430	24,271	0.38	0.24	(0.14)	(36.84%)
Interviewer	19,285	9,982	0.71	0.58	(0.13)	(18.31%)
Crew Leader Assistant	6,049	1,259	2.28	4.60	2.32	101.75%
Crew Leader	8,478	7,992	1.62	0.72	(0.90)	(55.56%)
Field Operations Supervisor	2,618	5,038	5.26	1.15	(4.11)	(78.14%)
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>						
Total – FHUFU QC	38,015	19,802	0.24	0.20	(0.04)	(16.67%)
Interviewer	16,140	6,711	0.56	0.59	0.03	5.36%
Crew Leader Assistant	6,623	1,179	1.37	3.37	2.00	145.99%
Crew Leader	9,414	5,782	0.97	0.69	(0.28)	(28.87%)
Field Operations Supervisor	5,838	6,130	1.56	0.65	(0.91)	(58.33%)
¹ Budgeted Final Housing Unit Followup Workload is 13,772 cases and Budgeted Final Housing Unit Followup Quality Control Workload is 9,090 cases. ² Actual Final Housing Unit Followup Workload is 5,789 cases and Actual Final Housing Unit Followup Quality Control Workload is 3,976 cases. 42.03 percent and 43.74 percent less than expected, respectively. [†] Values in parentheses denote less efficiency for a case. Source: Final Housing Unit Followup C&P Reports: Current Employee Cost - Field Work						

Production Rate Summary

The 2010 CCM FHUFU operation was less efficient than expected, completing a lower number of cases per hour than budgeted. During FHUFU, 0.24 cases were completed per hour. This is 0.14 less cases per hour (36.84 percent less efficient) than expected. During FHUFU QC, 0.20

cases were completed per hour. This is 0.04 less cases per hour (16.67 percent less efficient) than expected.

Production Rate by Position

The production rate for FHUFU was less efficient than planned. Production rates for Interviewers were less efficient than planned by 0.13 less cases per hour (18.31 percent less efficient). However, CLAs were more efficient than planned by 2.32 more cases per hour (101.75 percent more efficient). Like Interviewers, production rates for CLs and FOSs were also less efficient than planned. CLs were less efficient than planned by 0.90 less cases per hour (55.56 percent less efficient), and FOSs by 4.11 less cases per hour (78.14 percent less efficient).

Though the production rate for FHUFU QC was less efficient than planned, the production rates for Interviewers and CLAs were more efficient than planned. Production rates for QC Interviewers were more efficient than planned by 0.03 more cases per hour (5.36 percent more efficient), and CLAs by 2.00 more cases per hour (145.99 percent more efficient). On the contrary, production rates for CLs were less efficient than planned by 0.28 less cases per hour (28.87 percent less efficient), and FOSs by 0.91 less cases per hour (58.33 percent less efficient).

5.3.2 Mileage Rate

In this section, mileage rate is defined as the mileage required to complete a single unit of work.

Table 11 provides the budgeted and actual mileage rates by position for both FHUFU and FHUFU QC.

Table 11
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation
Mileage Rate by Position

Position	Budgeted Miles	Actual Miles	Budgeted Miles per Case ¹	Actual Miles per Case ²	Difference of Budgeted to Actual Miles per Case †	Percent More/ Less(-) Efficient†
<i>Census Coverage Measurement Final Housing Unit Followup</i>						
Total - FHUFU	522,955	566,768	37.97	97.90	(59.93)	(157.84%)
Interviewer	387,250	264,375	28.12	45.67	(17.55)	(62.41%)
Crew Leader Assistant	43,716	26,719	3.17	4.62	(1.45)	(45.74%)
Crew Leader	71,004	166,392	5.16	28.74	(23.58)	(456.98%)
Field Operations Supervisor	20,985	109,282	1.52	18.88	(17.36)	(1142.11)%
<i>Census Coverage Measurement Final Housing Unit Followup Quality Control</i>						
Total- FHUFU QC	496,538	490,977	54.62	123.49	(68.87)	(126.09%)
Interviewer	315,820	204,868	34.74	51.53	(16.79)	(48.33%)
Crew Leader Assistant	48,083	28,655	5.29	7.21	(1.92)	(36.29%)
Crew Leader	84,802	126,811	9.33	31.89	(22.56)	(241.80%)
Field Operations Supervisor	47,833	130,643	5.26	32.86	(27.60)	(524.71%)
¹ Budgeted Final Housing Unit Followup Workload is 13,772 cases and Budgeted Final Housing Unit Followup Quality Control Workload is 9,090 cases. ² Actual Final Housing Unit Followup Workload is 5,789 cases and Actual Final Housing Unit Followup Quality Control Workload is 3,976 cases. The workload for Final Housing Unit Followup and Final Housing Unit Followup Quality Control was 42.03 percent and 43.74 percent less than expected, respectively. †Values in parentheses denote less efficiency for cases. Source: Final Housing Unit Followup C&P Reports: Preliminary Total Cost						

Mileage Rate Summary

The 2010 CCM FHUFU operation was less efficient than expected, using more miles per case than budgeted. During FHUFU, 97.90 miles were charged per case. This is 59.93 more miles per case (157.84 percent less efficient) than expected. During FHUFU QC, 123.49 miles were charged per case. This is 68.87 more miles per case (126.09 percent less efficient) than expected.

Mileage Rate by Position

The mileage rate for FHUFU was less efficient than expected, with greater mileage charged per case. The mileage rate for Interviewers was less efficient by 17.55 miles per case (62.41 percent less efficient). The mileage rate for CLAs was less efficient by 1.45 miles per case (45.74 percent less efficient). The mileage rate for CLs was less efficient by 23.58 miles per case (456.98 percent less efficient), and the mileage rate for FOSs was less efficient by 17.36 miles per case (1142.11 percent less efficient).

The mileage rate for FHUFU QC was also less efficient than expected, with a greater mileage charged per case. The mileage rate for Interviewers was less efficient by 16.79 miles per case (48.33 percent less efficient). The mileage rate for CLAs was less efficient by 1.92 miles per case (36.29 percent less efficient). The mileage rate for CLs was less efficient by 22.56 miles per case (241.80 percent less efficient), and the mileage rate for FOSs was less efficient by 27.60 miles per case (524.71 percent less efficient).

5.4 How did field staffing and training plans meet the needs for Final Housing Unit Followup?

The FLD Division provided a staffing authorization to each RCC. This authorization provided an upper limit for hiring in each RCC. RCC staff hired for each position at their discretion based on their regional implementation plans for the FHUFU Operation. Table 12 shows the staffing authorized and trained for FHUFU production and FHUFU QC, by field position. Authorized staffing levels were sufficient enough to perform and complete both FHUFU production and FHUFU QC; however, the amount of CLs authorized for FHUFU production was slightly inadequate.

Table 12 The 2010 Census Coverage Measurement Final Housing Unit Followup Operation Final Housing Unit Followup Field Staffing								
	Production Staff				Quality Control Staff			
	Interviewer	Crew Leader Assistant	Crew Leader	Field Operations Supervisor	Quality Control Interviewer	Crew Leader Assistant	Crew Leader	Field Operations Supervisor
Final Housing Unit Followup Staff Authorized	346	23	69	61	224	26	54	56
Final Housing Unit Followup Staff Trained	279	15	73	50	176	13	54	50

Source: Budget and Staffing Models from Decennial Management Division and Field Division and Weekly Staff Trained Reports from Assistant Regional Census Managers

To help plan future CCMs, Table 13 shows the ratio of Interviewers to CLs, CLAs to CLs, and CLs to FOSs for FHUFU production and QC. After RCC staff received staffing authorizations, they were able to discuss with FLD Division staffing level changes in order to implement the field operations. Generally, if the staffing level changes were cost neutral, they were approved. Due to the recommendation to reduce nonsampling error in the 2010 CCM, fewer interviewers than were initially planned were assigned to each CL and fewer CLs were assigned to each FOS. This should have ensured a greater control over the quality of the field work, by allowing more monitoring of work at each level. The initial plan was to have eight interviewers/QC Checkers supervised by each CL/QC CL, six CLs supervised by each FOS, and four QC CLs supervised by each QC FOS. The revised plan was to have six interviewers supervised by each CL, four CLs supervised by each FOS, and two QC CLs supervised by each QC FOS.

Table 13 The 2010 Census Coverage Measurement Final Housing Unit Followup Operations Field Staffing Ratios		
	Production Staff	QC Staff
Interviewer to Crew Leader	3.82	3.26
Crew Leader Assistant to Crew Leader	0.21	0.24
Crew Leader to Field Operations Supervisor	1.46	1.08

Source: Weekly Staff Trained Reports from Assistant Regional Census Managers

Final Housing Unit Computer Processing Results

Please note that the tables relating to computer processing and clerical matching operations provide unweighted results. No weighted data are included in this report. No statistical testing was done, nor any inferences to the general population are intended. Statements based on the unweighted data should be interpreted purely as an assessment of the operations.

The results from computer processing are presented in the following sections. These results are from an operational standpoint and are not the final CCM estimates of coverage.

5.5 How many final codes were assigned during Final Housing Unit Computer Processing?

The FHU Computer Processing operation updated housing unit records, using information from all previous stages of computer and clerical matching, including both housing unit and person operations, as well as final census data. Match codes from IHU Matching were updated, and match codes were assigned to census units that had been added to the CCM sample block clusters or their surrounding blocks. P-sample and census units that needed a FHU clerical review were identified and flagged. For example, an address may have been coded as a matched housing unit from IHU Matching. If data from the PI operation indicated that the address was not a housing unit on Census Day and no persons were living there, FHU Computer Processing updated the match code to indicate the address was not a housing unit on Census Day. On the other hand, if data from the PI operation indicated that the address was not a housing unit on

Census Day but there was contradictory information that someone was living there on Census Day, then the match code was not updated and FHU Computer Processing flagged the address for review. As another example, consider a census address from IHU that had a duplicate. If that census address was removed from the CUF but the duplicate address remained, FHU Computer made the duplicate a nonmatch. In this case, it was also flagged for review, so the clerical matchers could search for a match to the newly unlinked address.

Only those block clusters containing flagged addresses were included in the clerical matching operations. During BFU and AFU Clerical Matching, staff had the opportunity to recode the match codes assigned during FHU Computer Processing. They could change match codes for any P-sample unit or census unit in any block cluster that was reviewed. The majority of newly-added census addresses were coded as nonmatches by FHU Computer Processing and flagged for review, where the case could be recoded during BFU Clerical Matching. If the newly-added address was located within the CCM block cluster, the nonmatch code assigned during FHU Computer Processing is not a valid final match code. The match codes for these cases had to be updated. If necessary, the case was sent to FHUFU. If the case still was not resolved during AFU Clerical Matching, it was given a possible match code or an unresolved match code, whichever was appropriate.

This section looks at the changes that were made to the match codes coming out of the FHU Computer Processing operation. Results show how many units had final match codes that were different from their FHU Computer Processing match codes. The final match code refers to the code assigned to a unit as of the completion of FHU Clerical Matching; it could have been assigned during FHU Computer Processing, BFU Clerical Matching or AFU Clerical Matching. Results also show how many FHU Computer Processing match codes were changed during BFU Clerical matching. Note the code from BFU Clerical Matching is not necessarily the final match code; it may be changed during AFU Clerical Matching. Separate results show how many of the match codes from BFU Clerical Matching were changed during AFU Clerical Matching. Separate counts are provided for P-sample units, E-sample units, non E-sample units in the CCM sample areas, and non E-sample units in the surrounding blocks to the CCM sample areas.

The following tables show the number of P-sample units with match code changes and the percent of all P-sample units⁷ that were changed, in total and disaggregated into U.S. city-style block clusters, U.S. noncity-style block clusters and Puerto Rico.

Table 14 shows, as a result of the BFU clerical review, 2.01 percent (3,583) of all P-sample units had changes to their FHU Computer Processing match codes. It is interesting to note that noncity-style block clusters have a higher percentage of units with changes (4.28 percent) compared to city-style block clusters (1.52 percent). For Puerto Rico, 6.86 percent of the P-sample units had changes.

⁷ The counts for all units include units in clusters that skipped clerical matching, as well as those clusters that were part of the clerical review.

Table 14			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Match Code Changes from Computer Processing to Before Followup Clerical Matching for P-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	178,696	3,583	2.01
U.S. City-style Total	154,170	2,340	1.52
U.S. Noncity-style Total	17,047	730	4.28
Puerto Rico Total	7,479	513	6.86
Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Address and IL Coding History			

Table 15 shows that 0.77 percent (1,377) of all P-sample units had changes to their BFU match codes, as a result of the field followup and AFU clerical review. Again note that the percentage of units with changes is higher for noncity-style block clusters (2.79 percent) compared to city-style block clusters (0.43 percent). For Puerto Rico, 3.18 percent of the P-sample units had changes.

Table 15			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Match Code Changes from Before Followup Clerical Matching to After Followup Clerical Matching for P-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	178,696	1,377	0.77
U.S. City-style Total	154,170	663	0.43
U.S. Noncity-style Total	17,047	476	2.79
Puerto Rico Total	7,479	238	3.18
Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Address and IL Coding History			

Finally, Table 16 looks at the P-sample units with final match codes that differ from their FHU Computer Processing match codes. The final match codes could have been assigned during BFU or AFU clerical matching. As a result of all FHU clerical matching, 2.48 percent (4,429) P-sample units had final match codes that were different from their FHU Computer Processing match codes. In other words, FHU Computer Processing was able to assign the final match codes for 97.52 percent of all P-sample units. A larger percentage of P-sample units in noncity-style block clusters had match code changes compared to city-style block clusters. For noncity-style block clusters, 6.02 percent (1,026) of the P-sample units had different final match codes. In city-style block clusters, only 1.82 percent (2,811) had different final match codes. For all

P-sample units in Puerto Rico, 7.92 percent (592) had final match codes that differed from their FHU Computer Processing match codes.

Table 16			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Final Match Code Changes from Computer Processing for P-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	178,696	4,429	2.48
U.S. City-style Total	154,170	2,811	1.82
U.S. Noncity-style Total	17,047	1,026	6.02
Puerto Rico Total	7,479	592	7.92
Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Address and IL Coding History			

The remaining tables in this section show the number of census units with match code changes, separately for E-sample units, non E-sample units in the CCM sample areas and non E-sample units in the surrounding blocks to the CCM sample areas. Each table includes the number of units changed as well as the percent all units⁸ that were changed, in total and disaggregated into U.S. city-style block clusters, U.S. noncity-style block clusters and Puerto Rico.

Table 17 shows that, as a result of the BFU clerical review, 2.50 percent (4,716) of all E-sample units had changes to their FHU Computer Processing match codes. As was seen with the P-sample units, the noncity-style block clusters have a higher percentage of units with changes (5.07 percent) compared to city-style block clusters (2.02 percent). For Puerto Rico, 6.13 percent of the E-sample units had changes.

Table 17			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Match Code Changes from Computer Processing to Before Followup Clerical Matching for E-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	188,587	4,716	2.50
U.S. City-style Total	161,509	3,258	2.02
U.S. Noncity-style Total	19,019	964	5.07
Puerto Rico Total	8,059	494	6.13
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History			

⁸ The counts for all units include units in clusters that skipped clerical matching, as well as those clusters that were part of the clerical review.

Table 18 shows that 2.47 percent (4,657) of all E-sample units had changes to their BFU match codes, as a result of the field followup and AFU clerical review. Again note that the percentage of E-sample units with changes is higher for noncity-style block clusters (5.64 percent) compared to city-style block clusters (1.94 percent). For Puerto Rico, 5.61 percent of the E-sample units had changes.

Table 18			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Match Code Changes from Before Followup Clerical Matching to After Followup Clerical Matching for E-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	188,587	4,657	2.47
U.S. City-style Total	161,509	3,132	1.94
U.S. Noncity-style Total	19,019	1,073	5.64
Puerto Rico Total	8,059	452	5.61

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History

Finally, Table 19 shows E-sample units with final match codes that differ from their FHU Computer Processing match codes. The final match codes could have been assigned during either BFU or AFU clerical matching. As a result of all FHU clerical matching, 4.56 percent (8,605) E-sample units had final match codes that were different from their FHU Computer Processing match codes. In other words, FHU Computer Processing was able to assign the final match codes for 95.44 percent of all E-sample units. This is slightly lower than the corresponding percentage for P-sample units, which is 97.52 percent, as shown in Table 16. A larger percentage of E-sample units in noncity-style block clusters had match code changes compared to city-style block clusters. For noncity-style block clusters, 9.72 percent of the E-sample units had different final match codes. In city-style block clusters, only 3.67 percent had different final match codes. Of all E-sample units in Puerto Rico, 10.21 percent had final match codes that differed from their FHU Computer Processing match codes.

Table 19			
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation			
Final Match Code Changes from Computer Processing for E-sample Units: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	188,587	8,605	4.56
U.S. City-style Total	161,509	5,933	3.67
U.S. Noncity-style Total	19,019	1,849	9.72
Puerto Rico Total	8,059	823	10.21

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History

Clerical matchers could also change the match codes for non E-sample units in the CCM block clusters. Results are given in Table 20 through Table 22, below. Table 22 shows that of all 345,529 non E-sample units in the CCM sample areas, 0.37 percent had final match codes that differed from the match codes assigned in FHU Computer Processing.

Table 20			
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation			
Match Code Changes from Computer Processing to Before Followup Clerical Matching for Non E-sample Units in CCM Sample Areas: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	345,529	1,132	0.33
U.S. City-style Total	307,565	948	0.31
U.S. Noncity-style Total	13,590	52	0.38
Puerto Rico Total	24,374	132	0.54

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History

Table 21			
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation			
Match Code Changes from Before Followup Clerical Matching to After Followup Clerical Matching for Non E-sample Units in CCM Sample Areas: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	345,529	271	0.08
U.S. City-style Total	307,565	175	0.06
U.S. Noncity-style Total	13,590	27	0.20
Puerto Rico Total	24,374	69	0.28
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History			

Table 22			
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation			
Final Match Code Changes from Computer Processing for Non E-sample Units in CCM Sample Areas: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	345,529	1,292	0.37
U.S. City-style Total	307,565	1,068	0.35
U.S. Noncity-style Total	13,590	64	0.47
Puerto Rico Total	24,374	160	0.66
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History			

The last few tables show the changes to the FHU Computer Processing codes for non E-sample addresses located in surrounding blocks to the CCM sample areas. Per Table 25, only 0.04 percent (1,432) of these units were given different final match codes than those assigned in FHU Computer Processing.

Table 23			
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation			
Match Code Changes from Computer Processing to Before Followup Clerical Matching for Non E-sample Units in Surrounding Blocks to CCM Sample Areas: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	3,389,354	1,685	0.05
U.S. City-style Total	2,975,895	1,271	0.04
U.S. Noncity-style Total	190,609	196	0.10
Puerto Rico Total	222,850	218	0.10
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History			

Table 24			
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation			
Match Code Changes from Before Followup Clerical Matching to After Followup Clerical Matching for Non E-sample Units in Surrounding Blocks to CCM Sample Areas: Unweighted			
	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	3,389,354	631	0.02
U.S. City-style Total	2,975,895	448	0.02
U.S. Noncity-style Total	190,609	133	0.07
Puerto Rico Total	222,850	50	0.02
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History			

Table 25
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Computer Processing Operation
Final Match Code Changes from Computer Processing for Non E-sample Units in Surrounding Blocks to CCM Sample Areas: Unweighted

	All Units	Units with Changes	
	Count	Count	Percent of All Units
Total U.S. (including Puerto Rico)	3,389,354	1,432	0.04
U.S. City-style Total	2,975,895	1,057	0.04
U.S. Noncity-style Total	190,609	163	0.09
Puerto Rico Total	222,850	212	0.10

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Address and Census Coding History

5.6 How many records were flagged for clerical review during Final Housing Unit Computer Processing?

FHU Computer Processing assigned work flags to census and P-sample addresses that needed a clerical review. The types of flagged addresses are described below.

Census housing units and group quarters that were added to the CCM sample block clusters after IHU Matching were given work flags of W to be reviewed during FHU Clerical Matching. These added addresses, obtained from the CUF, were not available for matching in the IHU operation. They may be entirely new census units or they may have been geocoded to different block clusters during IHU Matching. Similarly, housing units and group quarters that were added to the surrounding blocks of the CCM block clusters were given work flags of H. Matchers reviewed the W-flagged addresses, to find new matches or possible matches. In order to finish their work in a cluster, the clerical matchers needed to enter match codes for all W-flagged addresses, even if the codes were the same as those from FHU Computer Processing. Addresses with H flags were also available for matching, but matchers were able to complete their work in a cluster, without entering a match code for each H-flagged address. Addresses flagged “W” or “H” that remained unlinked after matching, were included in a duplicate search, to identify any new duplicates to E-sample units in the block cluster.

A census address may have been linked to an IL address during IHU Matching, but later deleted from the CCM block clusters or their surrounding blocks. FHU Computer Processing identified any P-sample addresses that had been linked to these deleted census addresses and assigned W flags. Clerical matchers searched for new matches to these newly-unlinked P-sample addresses. Similarly, if the deleted census address had any duplicates from IHU Matching, the duplicate addresses were flagged “W” and reviewed for new matches.

Census and P-sample addresses were also given W flags if matchers needed to review their housing unit status or enumeration status as of Census Day. FHU Computer Processing

attempted to resolve status using data from PI and IHU operations and flagged any address it could not resolve.

Before FHU Clerical Matching, several steps occurred to reduce the number of cases that needed to be reviewed in the NPC. First of all, CCM staff in Headquarters reviewed clusters prior to the scheduled start date for FHU Clerical Matching in the NPC. The NPC staff at that time was still involved in completing the Person Matching activities. A preliminary run of computer processing was done to flag cases for review by Headquarters staff. Using data displayed in FHUMaRCS, they reviewed the flagged addresses and were able to make some matches. These matches were rather straightforward, and most likely would have been made by computer, if computer matching had been part of the process. Headquarters staff avoided all actions that would have generated a need for followup, such as matches to addresses in surrounding blocks. These more involved cases were left for review by the clerical matchers in the NPC, who would have access to additional data, including forms and maps from previous operations. Later, when FHU Computer Processing was run for production, the matches made in Headquarters were processed, and, as a result, work flags were cleared, causing some clusters to skip FHU Clerical Matching altogether. Secondly, some clusters skipped review, because there were no P-sample addresses, and the only census addresses were located in the surrounding blocks. Since there were no E-sample addresses in these clusters, a duplicate search was not needed. Any H flags that had been assigned were cleared and the cluster skipped all phases of FHU Clerical Matching. Finally, in some clusters, the only addresses flagged for review were census addresses in surrounding blocks, flagged "H." In many of these clusters the only work required was a duplicate search. These clusters were identified before production work began in the NPC and were assigned to staff in Headquarters, under the assumption that many of the flagged cases could be reviewed without the need for additional data other than what is displayed in FHUMaRCS. If more complicated cases were involved in the review, the cluster was worked in the NPC. Only a few clusters required additional clerical review in the NPC.

To show results for the number of addresses flagged for clerical review, two sets of counts are given in Table 26, one for the Initial Work Flags and the other for the Production Work Flags. The Initial Work Flags were assigned during the preliminary run of FHU Computer Processing, for review by Headquarters staff. The Production work flags were assigned during the production run of FHU Computer Processing, for review by the NPC Matching Staff. The differences between the Initial Work Flag Counts and the Production Work Flags Counts reflect the steps that were taken to reduce the FHU Clerical Matching workload, as described in the previous paragraph. In total, the preliminary work at Headquarters resolved 6,373 of the flagged addresses, 11.95 percent (2,773) of the W-flagged cases and 2.91 percent (3,600) of the H-flagged cases.

Table 26 shows the counts of Initial Work Flags assigned to P-sample addresses by FHU Computer Processing. A total of 2,887 W flags were initially assigned. After work flags were cleared as a result of the review in Headquarters, there was a 39.87 percent reduction in the number of work flags that needed to be reviewed in the NPC, as reflected in the Production Work Flags count of 1,736 flagged P-sample addresses.

Table 26 also shows the counts of W and H flags for census addresses in the CCM sample areas and surrounding blocks. From the Initial Work Flags, assigned by FHU Computer Processing,

there were 20,319 census addresses flagged as W and 123,657 census addresses flagged as H. After the reduction in work flags prior to production, there was a 7.98 percent reduction in the number of W flags and a 2.91 percent reduction in the number of H Flags, resulting in 18,697 Production W flags and 120,057 Production H flags, as shown in Table 26.

Table 26				
The 2010 Census Coverage Measurement Final Housing Unit Computer Processing Operation				
Counts of Initial Work Flags and Production Work Flags: Unweighted				
		P-sample W flags	Census W flags	Census H flags
Initial Work Flags	Total	2,887	20,319	123,657
	Puerto Rico Clusters	465	2,937	17,199
	U.S. City-style Clusters	1,833	15,331	94,391
	U.S. Noncity-style clusters	589	2,051	12,067
Production Work Flags	Total	1,736	18,697	120,057
	Puerto Rico Clusters	465	2,937	14,666
	U.S. City-style Clusters	815	13,930	93,589
	U.S. Noncity-style clusters	456	1,830	11,802
Source: Sample Design File version 3, Pre-fix Address Link, H_only_clusters2a.xls and FHUMaRCS dB tables: Census Address, IL Address, and Cluster Control.				

Final Housing Unit Clerical Matching Results

The results from clerical matching are presented in the following sections. These results are from an operational standpoint and are not the final CCM estimates of coverage.

5.7 How many units were clerically matched, possibly matched, or remained nonmatched between the Census Coverage Measurement P sample and the Census Unedited File?

How many duplicates did the clerical matchers find within the P sample, within block cluster?

How many duplicates did the clerical matchers find within the Census Unedited File, by whether the duplicate is located within the block cluster or the surrounding blocks?

The tables in this section present results, separately, for BFU and AFU Clerical Matching. Results are shown by type of structure. The tables provide unweighted counts of CCM P-sample and census housing units totaled for the U.S. (excluding Puerto Rico), Puerto Rico, and the U.S. (including Puerto Rico). Unweighted counts for the U.S. (excluding Puerto Rico) are further disaggregated into city-style and noncity-style block clusters.

Table 27 through Table 30 show the matching results at the end of BFU Clerical Matching. Addresses are classified as matches, possible matches, nonmatches, duplicates, or not housing units, based on their match codes at the end of BFU Clerical Matching. The match code assigned to a housing unit may be unchanged from computer processing, or it may have been changed based on the BFU clerical review. During the BFU clerical review of a block cluster, the matchers looked for any new matches that could be made to the census addresses that were added to the census matching universe in the block cluster search area, i.e., the block cluster and its surrounding blocks. These addresses, called census adds, are on the CUF and geocoded to the block cluster search area, but were not available for matching at the time of the IHU Matching operation. Census adds that were not linked to P-sample addresses were included in a duplicate search. When performing the duplicate search, matchers looked for any new duplicates to the E-sample addresses. In addition, matchers reviewed certain cases, flagged during computer processing, to determine whether or not they existed as housing units on Census Day. Data from IHU Matching as well as Person Matching were available to aid in their review. Matchers were able to change any match code from IHU Matching, if warranted by their review.

A unit is counted as “not a housing unit” if it did not exist as a housing unit on Census Day or if it is a census geocoding error⁹, in which case it did not exist within the sample block cluster. The unit could be matched or nonmatched, but is tabulated only as “not a housing unit.” If the housing unit status of the unit could not be determined, it was coded as unresolved and, for purposes of this assessment question, tabulated as either a match or a nonmatch, as appropriate.

Table 27 shows the unweighted BFU clerical matching results for P-sample units. Across all types of structures, the unweighted number of P-sample housing units in the U.S. (including Puerto Rico) is 178,696. Of that number, 94.48 percent (168,828) are matches, 0.09 percent (164) are possible matches, 2.78 percent (4,965) are nonmatches, 0.02 percent (33) are duplicates, and 2.63 percent (4,706) are not housing units. Within Puerto Rico, the unweighted number of P-sample housing units is 7,479, of which 87.50 percent (6,544) are matches, 0.49 percent are possible matches, 7.03 percent are nonmatches, 0.19 percent are duplicates, and 4.79 percent are not housing units.

The unweighted results by type of structure for P-sample units in the U.S. (excluding Puerto Rico), are shown in Table 27. Single units comprise the largest portion (66.91 percent) of the 171,217 housing units in the U.S. (excluding Puerto Rico), followed by multiunits at 25.95 percent. For single units, 95.72 percent (109,668) are matches. For multiunits, 94.41 percent (41,941) are matches. So, there is not much difference in the percent of matched units between single units and multiunits. When looking at multiunits by size of the multiunit structure, the percent of matched units range from a low of 93.10 percent (11,832) for the multiunits in structures with 2 - 4 units to a high of 96.54 percent (7,721) for multiunits in structures with 10-19 units. So there is not much variation by size of the structure. For mobile homes in a park, 86.71 percent (4,423) of the units are matches. For mobile homes not in a park, 88.64 percent (6,181) are matches. Only 47.02 percent (71) of the other structure type are matches. Also note that 26.49 percent (40) of the other structure type are not housing units.

⁹ A geocoding error means that the census unit was erroneously geocoded to the sample block cluster on the CUF; it actually exists outside of the block cluster and one ring of surrounding blocks.

The unweighted P-sample results for Puerto Rico, in Table 27, show that single units have the highest percent of matched units, followed by multiunits. For single units, 88.87 percent (4,321) are matches. For multiunits, 85.02 percent (2,219) are matches. And, for mobile homes not in a park, only 57.14 percent (4) are matches. When looking at multiunits in Puerto Rico by size of the multiunit structure, the percent of matched units range from a low of 78.18 percent (86) of the multiunits in structures with 20 - 49 units to a high of 97.40 percent (187) of the multiunits in structures with 10 - 19 units. Most of the multiunits (74.56 percent) are in structures with 2 - 4 units; 82.89 percent (1,613) of those are matched units.

Table 28 shows the unweighted counts for P-sample units in the U.S. (excluding Puerto Rico) disaggregated into city-style and noncity-style block clusters. The unweighted number of P-sample units in city-style block clusters is 154,170 of which 95.65 percent are matches. The unweighted number of P-sample units in noncity-style block clusters is 17,047 of which 86.95 percent are matches. So, over all structure types, the percent of matched units is more than 8 percentage points lower for noncity-style block clusters compared to city-style block clusters. Also, within each type of structure, the percent of matched housing units is lower in noncity-style block clusters compared to city-style block clusters. For noncity-style block clusters, 87.75 percent (11,109) of single units are matches; 83.91 percent (631) of multiunits are matches; 86.53 percent (2,416) of mobile homes not in a park are matches; 83.16 percent (632) of mobile homes in a park are matches; and 42.17 percent (35) of the other structure type are matches. Contrast this with city-style block clusters, where 96.71 percent (98,559) of single units are matches; 94.59 percent (41,310) of multiunits are matches; 90.05 percent (3,765) of mobile homes not in a park are matches; 87.33 percent (3,791) of mobile homes in a park are matches; and 52.94 percent (36) of the other structure type are matches.

Table 27																						
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation																						
Number of P-sample Units by Match Code and Type of Structure for the Before Followup Clerical Matching Operation: Unweighted																						
Clerical Match Code	Total of All Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
Total U.S. (excluding Puerto Rico)	171,217	100.00	114,569	100.00	44,423	100.00	12,709	100.00	8,940	100.00	7,998	100.00	7,649	100.00	7,127	100.00	6,973	100.00	5,101	100.00	151	100.00
Match	162,284	94.78	109,668	95.72	41,941	94.41	11,832	93.10	8,475	94.80	7,721	96.54	7,234	94.57	6,679	93.71	6,181	88.64	4,423	86.71	71	47.02
Possible match	127	0.07	86	0.08	3	0.01	2	0.02	0	0.00	0	0.00	1	0.01	0	0.00	32	0.46	4	0.08	2	1.32
Nonmatch	4,439	2.59	2,360	2.06	1,308	2.94	522	4.11	215	2.40	112	1.40	330	4.31	129	1.81	402	5.77	331	6.49	38	25.17
Duplicate	19	0.01	11	0.01	7	0.02	7	0.06	0	0.00	0	0.00	0	0.00	0	0.00	1	0.01	0	0.00	0	0.00
Not a Housing Unit	4,348	2.54	2,444	2.13	1,164	2.62	346	2.72	250	2.80	165	2.06	84	1.10	319	4.48	357	5.12	343	6.72	40	26.49
Total Puerto Rico	7,479	100.00	4,862	100.00	2,610	100.00	1,946	100.00	284	100.00	192	100.00	110	100.00	78	100.00	7	100.00	0	0.00	0	0.00
Match	6,544	87.50	4,321	88.87	2,219	85.02	1,613	82.89	255	89.79	187	97.40	86	78.18	78	100.00	4	57.14	0	0.00	0	0.00
Possible match	37	0.49	13	0.27	24	0.92	21	1.08	3	1.06	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Nonmatch	526	7.03	278	5.72	246	9.43	199	10.23	18	6.34	5	2.60	24	21.82	0	0.00	2	28.57	0	0.00	0	0.00
Duplicate	14	0.19	7	0.14	7	0.27	6	0.31	1	0.35	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Not a Housing Unit	358	4.79	243	5.00	114	4.37	107	5.50	7	2.46	0	0.00	0	0.00	0	0.00	1	14.29	0	0.00	0	0.00
Total U.S. (including Puerto Rico)	178,696	100.00	119,431	100.00	47,033	100.00	14,655	100.00	9,224	100.00	8,190	100.00	7,759	100.00	7,205	100.00	6,980	100.00	5,101	100.00	151	100.00
Match	168,828	94.48	113,989	95.44	44,160	93.89	13,445	91.74	8,730	94.64	7,908	96.56	7,320	94.34	6,757	93.78	6,185	88.61	4,423	86.71	71	47.02
Possible match	164	0.09	99	0.08	27	0.06	23	0.16	3	0.03	0	0.00	1	0.01	0	0.00	32	0.46	4	0.08	2	1.32
Nonmatch	4,965	2.78	2,638	2.21	1,554	3.30	721	4.92	233	2.53	117	1.43	354	4.56	129	1.79	404	5.79	331	6.49	38	25.17
Duplicate	33	0.02	18	0.02	14	0.03	13	0.09	1	0.01	0	0.00	0	0.00	0	0.00	1	0.01	0	0.00	0	0.00
Not a Housing Unit	4,706	2.63	2,687	2.25	1,278	2.72	453	3.09	257	2.79	165	2.01	84	1.08	319	4.43	358	5.13	343	6.72	40	26.49

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMARCS dB tables: IL Coding History and IL Address

Table 28

The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation

Number of P-sample Units by Address Type Cluster Group Recode, Match Code and Type of Structure for the Before Followup Clerical Matching Operation: Unweighted

Clerical Match Code	Total of all Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
U.S. City-style Total (excluding Puerto Rico)	154,170	100.00	101,909	100.00	43,671	100.00	12,310	100.00	8,772	100.00	7,896	100.00	7,566	100.00	7,127	100.00	4,181	100.00	4,341	100.00	68	100.00
Match	147,461	95.65	98,559	96.71	41,310	94.59	11,488	93.32	8,368	95.39	7,619	96.49	7,156	94.58	6,679	93.71	3,765	90.05	3,791	87.33	36	52.94
Possible match	33	0.02	17	0.02	3	0.01	2	0.02	0	0.00	0	0.00	1	0.01	0	0.00	9	0.22	4	0.09	0	0.00
Nonmatch	3,351	2.17	1,621	1.59	1,245	2.85	476	3.87	200	2.28	112	1.42	328	4.34	129	1.81	221	5.29	248	5.71	16	23.53
Duplicate	9	0.01	4	0.00	4	0.01	4	0.03	0	0.00	0	0.00	0	0.00	0	0.00	1	0.02	0	0.00	0	0.00
Not a Housing Unit	3,316	2.15	1,708	1.68	1,109	2.54	340	2.76	204	2.33	165	2.09	81	1.07	319	4.48	185	4.42	298	6.86	16	23.53
U.S. Noncity-style Total (excluding Puerto Rico)	17,047	100.00	12,660	100.00	752	100.00	399	100.00	168	100.00	102	100.00	83	100.00	0	0.00	2,792	100.00	760	100.00	83	100.00
Match	14,823	86.95	11,109	87.75	631	83.91	344	86.22	107	63.69	102	100.00	78	93.98	0	0.00	2,416	86.53	632	83.16	35	42.17
Possible match	94	0.55	69	0.55	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	23	0.82	0	0.00	2	2.41
Nonmatch	1,088	6.38	739	5.84	63	8.38	46	11.53	15	8.93	0	0.00	2	2.41	0	0.00	181	6.48	83	10.92	22	26.51
Duplicate	10	0.06	7	0.06	3	0.40	3	0.75	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Not a Housing Unit	1,032	6.05	736	5.81	55	7.31	6	1.50	46	27.38	0	0.00	3	3.61	0	0.00	172	6.16	45	5.92	24	28.92

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Coding History and IL Address

Table 29 through Table 30, below, contain results from BFU Clerical Matching for E-sample units, by type of structure.

Table 29 shows that the unweighted number of E-sample units in the U.S. (including Puerto Rico) is 188,587 of which 87.76 percent are matches; 0.06 percent are possible matches; 6.54 percent are nonmatches; 1.37 percent are duplicates; and 4.26 percent are not housing units. Within Puerto Rico, the unweighted number of E-sample units is 8,059. Of that number, 78.68 percent are matches; 0.41 percent are possible matches; 11.47 percent are nonmatches; 2.27 percent are duplicates; and 7.17 percent are not housing units.

Looking at the unweighted E-sample counts for the U.S. (excluding Puerto Rico) by type of structure, Table 29 shows that single units have the highest percentage of matched housing units, followed by multiunits. For single units, 93.78 percent (106,249) are matches; 86.43 percent (39,563) of multiunits are matches. For mobile homes, 82.53 percent (9,851) are matches. For units with a missing or other structure type, less than half of the units are matches. Only 37.23 percent (3,407) of the missing structure type are matches, and 25.68 percent (94) of the other structure type are matches. The missing structure type has the highest percentage of duplicates: 11.06 percent (1,012) of those units are duplicates. And, although missing structure types comprise only 5.07 percent (9,151) of the total number of unweighted E-sample units, 42.01 percent (1,012) of the total unweighted number of duplicates are classified as missing structure type. In the other structure type category, 59.02 percent (216) of the units are not housing units.

The unweighted E-sample counts for Puerto Rico in Table 29 show that a larger portion of single units are matches compared to multiunits. In Puerto Rico, 85.56 percent (4,208) of the single units are matches and 79.57 percent (2,017) of the multiunits are matches. The missing structure type category has the lowest percent of matched housing units in Puerto Rico; only 18.73 percent (112) are matches.

Table 30 shows the unweighted E-sample results for U.S. housing units (excluding Puerto Rico) split by city-style and noncity-style block clusters. The unweighted total of E-sample units in city-style block clusters is 161,509, of which 89.56 percent are matches. In noncity-style block clusters, there is an unweighted total 19,019 E-sample units and only 76.30 percent are matches. The percent of matched units within each type of structure is lower in noncity-style block clusters than in city-style block clusters. For noncity-style block clusters, 82.94 percent (10,879) of single units are matches; 76.36 percent (462) of multiunits are matches; 75.27 percent (2,767) of mobile homes are matches; 26.73 percent (374) of missing structure types are matches; and 13.06 percent (29) of other structure types are matches. Contrast this with city-style block clusters, where 95.19 percent (95,370) of single units are matches; 86.57 percent (39,101) of multiunits are matches; 85.76 percent (7,084) of mobile homes are matches; 39.13 percent (3,033) of missing structure types are matches; and 45.14 percent (65) of other structure types are matches. Also note, within each type of structure, the percent of units classified as duplicates is higher in the noncity-style block clusters compared to the city-style block clusters. In the missing structure type category especially, duplicates comprise 17.66 percent (247) of the missing structure types in noncity-style clusters compared to 9.87 percent (765) of the missing structure types in city-style block clusters.

Table 29												
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation												
Number of E-sample Units by Match Code and Type of Structure for the Before Followup Clerical Matching Operation: Unweighted												
Clerical Match Code	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	180,528	100.00	113,302	100.00	45,773	100.00	11,936	100.00	366	100.00	9,151	100.00
Match	159,164	88.17	106,249	93.78	39,563	86.43	9,851	82.53	94	25.68	3,407	37.23
Possible match	89	0.05	18	0.02	0	0.00	14	0.12	1	0.27	56	0.61
Nonmatch	11,409	6.32	3,393	2.99	3,239	7.08	816	6.84	50	13.66	3,911	42.74
Duplicate	2,409	1.33	616	0.54	621	1.36	155	1.30	5	1.37	1,012	11.06
Not a Housing Unit	7,457	4.13	3,026	2.67	2,350	5.13	1,100	9.22	216	59.02	765	8.36
Total Puerto Rico	8,059	100.00	4,918	100.00	2,535	100.00	7	100.00	1	100.00	598	100.00
Match	6,341	78.68	4,208	85.56	2,017	79.57	3	42.86	1	100.00	112	18.73
Possible match	33	0.41	16	0.33	2	0.08	0	0.00	0	0.00	15	2.51
Nonmatch	924	11.47	287	5.84	256	10.10	1	14.29	0	0.00	380	63.55
Duplicate	183	2.27	48	0.98	69	2.72	0	0.00	0	0.00	66	11.04
Not a Housing Unit	578	7.17	359	7.30	191	7.53	3	42.86	0	0.00	25	4.18
Total U.S. (including Puerto Rico)	188,587	100.00	118,220	100.00	48,308	100.00	11,943	100.00	367	100.00	9,749	100.00
Match	165,505	87.76	110,457	93.43	41,580	86.07	9,854	82.51	95	25.89	3,519	36.10
Possible match	122	0.06	34	0.03	2	0.00	14	0.12	1	0.27	71	0.73
Nonmatch	12,333	6.54	3,680	3.11	3,495	7.23	817	6.84	50	13.62	4,291	44.01
Duplicate	2,592	1.37	664	0.56	690	1.43	155	1.30	5	1.36	1,078	11.06
Not a Housing Unit	8,035	4.26	3,385	2.86	2,541	5.26	1,103	9.24	216	58.86	790	8.10
*Percents may not sum to totals due to rounding.												
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address.												

Table 30

The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation

Number of E-sample Units by Address Type Cluster Group Recode, Match Code and Type of Structure for the Before Followup Clerical Matching Operation: Unweighted

Clerical Match Code	Total of all Types of Structures		Single Unit		Multiunit		Mobile Homes		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
U.S. City-style Total (excluding Puerto Rico)	161,509	100.00	100,185	100.00	45,168	100.00	8,260	100.00	144	100.00	7,752	100.00
Match	144,653	89.56	95,370	95.19	39,101	86.57	7,084	85.76	65	45.14	3,033	39.13
Possible match	22	0.01	2	0.00	0	0.00	9	0.11	0	0.00	11	0.14
Nonmatch	9,380	5.81	2,445	2.44	3,179	7.04	462	5.59	16	11.11	3,278	42.29
Duplicate	1,926	1.19	460	0.46	608	1.35	92	1.11	1	0.69	765	9.87
Not a Housing Unit	5,528	3.42	1,908	1.90	2,280	5.05	613	7.42	62	43.06	665	8.58
U.S. Noncity-style Total (excluding Puerto Rico)	19,019	100.00	13,117	100.00	605	100.00	3,676	100.00	222	100.00	1,399	100.00
Match	14,511	76.30	10,879	82.94	462	76.36	2,767	75.27	29	13.06	374	26.73
Possible match	67	0.35	16	0.12	0	0.00	5	0.14	1	0.45	45	3.22
Nonmatch	2,029	10.67	948	7.23	60	9.92	354	9.63	34	15.32	633	45.25
Duplicate	483	2.54	156	1.19	13	2.15	63	1.71	4	1.80	247	17.66
Not a Housing Unit	1,929	10.14	1,118	8.52	70	11.57	487	13.25	154	69.37	100	7.15

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

During the FHU BFU clerical review of a CCM block cluster, the matchers searched for possible duplicates to E-sample addresses, to find new duplicates that were not identified during IHU Clerical Matching. New duplicates found in FHU BFU clerical matching were sent to FHUFU for confirmation. Although the matchers were only looking for duplicates to E-sample addresses, the duplicate itself may or may not be an E-sample address. Non E-sample duplicates include duplicates located in the CCM sample areas that were not selected for the E sample and duplicates located in surrounding blocks to the CCM sample areas. The preceding tables only show counts of the E-sample duplicates, i.e., those duplicates located in the CCM sample areas that were selected for the E sample.

The tables that follow show unweighted counts, by type of structure, for non E-sample duplicates located in the CCM sample areas and in the surrounding blocks. Duplicate status is based on the unit's match code upon completion of FHU BFU Clerical Matching. The duplicate may be a new duplicate found in FHU BFU Clerical Matching, or it could have been coded as a duplicate in IHU Matching.

NOTE: Some census duplicates from IHU Matching were erroneously coded as non-duplicates during FHU Computer Processing. This issue is limited to non E-sample duplicates located in the CCM sample areas. The error was discovered after FHU matching was complete. Most of these addresses were never flagged for a clerical review, and therefore kept the erroneous match codes assigned in computer processing. This impacts the BFU and AFU results shown in Table 31, Table 37 and Table 40. If these units had been coded correctly, there would be an additional 133 addresses, including 12 in Puerto Rico, counted as non E-sample duplicates in each of those tables. The results in Table 42 (distribution of duplicates) are also affected.

Per Table 31, there is an unweighted total of 287 duplicate, non E-sample housing units in the CCM sample areas within the U.S. (including Puerto Rico). Of that number, 13.24 percent are single units, 42.51 percent are multiunits, 1.05 percent are mobile homes, and 43.21 percent are missing structure types. There are no duplicates in the other structure type category. Within Puerto Rico there is an unweighted total of 44 duplicate, non E-sample housing units in the CCM sample areas. Within the U.S. (excluding Puerto Rico) there is an unweighted total of 243 duplicate, non E-sample housing units in the CCM sample areas.

Per Table 32, there is an unweighted total of 1,486 census duplicates within the U.S. (including Puerto Rico) that are located in surrounding blocks to the CCM sample areas. Of that number, 30.89 percent are single units, 34.12 percent are multiunits, 4.31 percent are mobile homes, 0.07 percent are other structure types, and 30.62 percent are missing structure types. Within Puerto Rico there is an unweighted total of 95 duplicates in surrounding blocks to the CCM sample areas. Within the U.S. (excluding Puerto Rico) there is an unweighted total of 1,391 duplicates in surrounding blocks to the CCM sample areas.

Table 31												
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation												
Number of Non E-sample Duplicate Census Housing Units in the CCM Sample Areas by Type of Structure for the Before Followup Clerical Matching Operation: Unweighted												
Duplicates	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	243	100.00	29	11.93	114	46.91	3	1.23	0	0.00	97	39.92
Total Puerto Rico	44	100.00	9	20.45	8	18.18	0	0.00	0	0.00	27	61.36
Total U.S. (including Puerto Rico)	287	100.00	38	13.24	122	42.51	3	1.05	0	0.00	124	43.21

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

Table 32												
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation												
Number of Duplicate Census Housing Units in Surrounding Blocks to CCM Sample Areas by Type of Structure for the Before Followup Clerical Matching Operation: Unweighted												
Duplicates	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	1,391	100.00	433	31.13	460	33.07	64	4.60	1	0.07	433	31.13
Total Puerto Rico	95	100.00	26	27.37	47	49.47	0	0.00	0	0.00	22	23.16
Total U.S. (including Puerto Rico)	1,486	100.00	459	30.89	507	34.12	64	4.31	1	0.07	455	30.62

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

The remaining tables in this section show the clerical matching results at the end of AFU Clerical Matching.

During AFU Clerical Matching, the results from FHUFU were reviewed, and the clerical matchers attempted to resolve the cases that went to followup. For the tables that follow, each P-sample and E-sample address was classified as a match, possible match, nonmatch, duplicate or not a housing unit, according to the unit's match code at the end of AFU Clerical Matching.

Per Table 33, the unweighted number of P-sample units in the U.S. (including Puerto Rico) is 178,696 of which 94.77 percent are matches; 0.01 percent are possible matches; 2.63 percent are nonmatches; 0.01 percent are duplicates; and 2.58 percent are not housing units. In Puerto Rico, the unweighted number of P-sample units is 7,479 of which 88.58 percent are matches; 0.07 percent are possible matches; 6.30 percent are nonmatches; 0.03 percent are duplicates; and 5.03 percent are not housing units.

The unweighted results by type of structure for P-sample units in the U.S. (excluding Puerto Rico), are shown in Table 33. For single units, 95.95 percent (109,928) are matches. The percent of matched units is slightly lower for multiunits; 94.70 percent (42,069) of the multiunits are matches. When looking at multiunits by size of the multiunit structure, the percents of matched units range from a low of 93.35 percent (11,864) of the multiunits in structures with 2 - 4 units to a high of 96.54 percent (7,721) of the multiunits in structures with 10 - 19 units. For mobile homes not in a park, 89.70 percent (6,255) are matches. For mobile homes in a park, 86.39 percent (4,407) of the units are matches. Only 47.68 percent (72) of the other structure type are matches.

The unweighted data for Puerto Rico, in Table 33, show that single units have the highest percent of matches; 89.59 percent (4,356) of the single units are matches. For multiunits, 86.78 percent (2,265) are matches. The percent of matches for mobile homes not in a park is low; only 57.14 percent (4) are matches.

Table 34 shows the unweighted counts for P-sample units in the U.S. (excluding Puerto Rico) by city-style block clusters and noncity-style block clusters. The unweighted number of P-sample units in city-style block clusters is 154,170 of which 95.80 percent (147,695) are matches. In noncity-style block clusters, the unweighted number of P-sample units is 17,047, of which 88.20 percent are matches. So the percent of matched units is about 7 percentage points lower in noncity-style block clusters than in city-style block clusters. Also, within each type of structure, the percent of matched units is lower in noncity-style block clusters than in city-style block clusters.

Table 33																						
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation																						
Number of P-sample Units by Match Code and Type of Structure for the After Followup Clerical Matching Operation: Unweighted																						
Clerical Match Code	Total of All Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
Total U.S. (excluding Puerto Rico)	171,217	100.00	114,569	100.00	44,423	100.00	12,709	100.00	8,940	100.00	7,998	100.00	7,649	100.00	7,127	100.00	6,973	100.00	5,101	100.00	151	100.00
Match	162,731	95.04	109,928	95.95	42,069	94.70	11,864	93.35	8,487	94.93	7,721	96.54	7,306	95.52	6,691	93.88	6,255	89.70	4,407	86.39	72	47.68
Possible match	9	0.01	8	0.01	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.01	0	0.00	0	0.00
Nonmatch	4,226	2.47	2,263	1.98	1,276	2.87	511	4.02	217	2.43	117	1.46	303	3.96	128	1.80	382	5.48	270	5.29	35	23.18
Duplicate	19	0.01	12	0.01	5	0.01	4	0.03	0	0.00	0	0.00	0	0.00	1	0.01	2	0.03	0	0.00	0	0.00
Not a Housing Unit	4,232	2.47	2,358	2.06	1,073	2.42	330	2.60	236	2.64	160	2.00	40	0.52	307	4.31	333	4.78	424	8.31	44	29.14
Total Puerto Rico	7,479	100.00	4,862	100.00	2,610	100.00	1,946	100.00	284	100.00	192	100.00	110	100.00	78	100.00	7	100.00	0	0.00	0	0.00
Match	6,625	88.58	4,356	89.59	2,265	86.78	1,654	84.99	260	91.55	187	97.40	86	78.18	78	100.00	4	57.14	0	0.00	0	0.00
Possible match	5	0.07	4	0.08	1	0.04	1	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Nonmatch	471	6.30	265	5.45	204	7.82	182	9.35	17	5.99	5	2.60	0	0.00	0	0.00	2	28.57	0	0.00	0	0.00
Duplicate	2	0.03	1	0.02	1	0.04	1	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Not a Housing Unit	376	5.03	236	4.85	139	5.33	108	5.55	7	2.46	0	0.00	24	21.82	0	0.00	1	14.29	0	0.00	0	0.00
Total U.S. (including Puerto Rico)	178,696	100.00	119,431	100.00	47,033	100.00	14,655	100.00	9,224	100.00	8,190	100.00	7,759	100.00	7,205	100.00	6,980	100.00	5,101	100.00	151	100.00
Match	169,356	94.77	114,284	95.69	44,334	94.26	13,518	92.24	8,747	94.83	7,908	96.56	7,392	95.27	6,769	93.95	6,259	89.67	4,407	86.39	72	47.68
Possible match	14	0.01	12	0.01	1	0.00	1	0.01	0	0.00	0	0.00	0	0.00	0	0.00	1	0.01	0	0.00	0	0.00
Nonmatch	4,697	2.63	2,528	2.12	1,480	3.15	693	4.73	234	2.54	122	1.49	303	3.91	128	1.78	384	5.50	270	5.29	35	23.18
Duplicate	21	0.01	13	0.01	6	0.01	5	0.03	0	0.00	0	0.00	0	0.00	1	0.01	2	0.03	0	0.00	0	0.00
Not a Housing Unit	4,608	2.58	2,594	2.17	1,212	2.58	438	2.99	243	2.63	160	1.95	64	0.82	307	4.26	334	4.79	424	8.31	44	29.14

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Coding History and IL Address

Table 34
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation
Number of P-sample Units by Address Type Cluster Group Recode, Match Code and Type of Structure for the After Followup Clerical Matching Operation: Unweighted

Clerical Match Code	Total of all Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
U.S. City-style Total (excluding Puerto Rico)	154,170	100.00	101,909	100.00	43,671	100.00	12,310	100.00	8,772	100.00	7,896	100.00	7,566	100.00	7,127	100.00	4,181	100.00	4,341	100.00	68	100.00
Match	147,695	95.80	98,657	96.81	41,436	94.88	11,518	93.57	8,380	95.53	7,619	96.49	7,228	95.53	6,691	93.88	3,790	90.65	3,776	86.98	36	52.94
Possible match	1	0.00	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Nonmatch	3,212	2.08	1,579	1.55	1,214	2.78	466	3.79	202	2.30	117	1.48	301	3.98	128	1.80	216	5.17	190	4.38	13	19.12
Duplicate	8	0.01	3	0.00	3	0.01	2	0.02	0	0.00	0	0.00	0	0.00	1	0.01	2	0.05	0	0.00	0	0.00
Not a Housing Unit	3,254	2.11	1,669	1.64	1,018	2.33	324	2.63	190	2.17	160	2.03	37	0.49	307	4.31	173	4.14	375	8.64	19	27.94
U.S. Noncity-style Total (excluding Puerto Rico)	17,047	100.00	12,660	100.00	752	100.00	399	100.00	168	100.00	102	100.00	83	100.00	0	0.00	2,792	100.00	760	100.00	83	100.00
Match	15,036	88.20	11,271	89.03	633	84.18	346	86.72	107	63.69	102	100.00	78	93.98	0	0.00	2,465	88.29	631	83.03	36	43.37
Possible match	8	0.05	7	0.06	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.04	0	0.00	0	0.00
Nonmatch	1,014	5.95	684	5.40	62	8.24	45	11.28	15	8.93	0	0.00	2	2.41	0	0.00	166	5.95	80	10.53	22	26.51
Duplicate	11	0.06	9	0.07	2	0.27	2	0.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Not a Housing Unit	978	5.74	689	5.44	55	7.31	6	1.50	46	27.38	0	0.00	3	3.61	0	0.00	160	5.73	49	6.45	25	30.12

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB tables: IL Coding History and IL Address

The next few tables show the AFU clerical matching results for E-sample units.

Per Table 35, the unweighted number of E-sample housing units in the U.S. (including Puerto Rico) is 188,587 of which 88.03 percent are matches; 0.01 percent are possible matches; 5.60 percent are nonmatches; 1.63 percent are duplicates; and 4.74 percent are not housing units. Within Puerto Rico, the unweighted number of E-sample housing units is 8,059. Of that number, 79.61 percent are matches; 0.06 percent are possible matches; 10.49 percent are nonmatches; 2.44 percent are duplicates; and 7.40 percent are not housing units.

Looking at the unweighted counts for the U.S. (excluding Puerto Rico) by type of structure, Table 35 shows that single units have the highest percent of matched housing units, followed by multiunits. For single units, 93.90 percent (106,388) are matches; 86.54 percent (39,613) of multiunits are matches. For mobile homes, 82.67 percent (9,868) are matches. In the missing and other structure type categories, less than half of the units are matches. Only 39.69 percent (3,632) of the units with missing structure type are matches, and 25.41 percent (93) of the units with other structure type are matches. Missing structure types have the highest percentage of duplicates; 14.18 percent (1,298) are duplicates. Although missing units comprise only 5.07 percent (9,151) of the total number of unweighted E-sample units, 45.26 percent (1,298) of the total unweighted duplicates are classified as missing. In the other structure type category, 59.84 percent (219) of the units are not housing units.

In Puerto Rico, single units have the highest percent of matched housing units. Per Table 35, 85.97 percent (4,228) of the single units are matches. The missing category has the lowest percent of matched housing units; only 26.76 percent (160) of the missing units are matches.

As shown in Table 36, the unweighted total of E-sample housing units in city-style block clusters is 161,509 of which 89.70 percent are matches. In noncity-style block clusters, there is an unweighted total of 19,019 E-sample housing units and only 77.38 percent of those are matches. So, across structure types, the percent of matched units is about 12 percentage points lower in noncity-style block clusters than in city-style block clusters. Also, when looking at the percent of matched units within each structure type, noncity-style block clusters are always lower than city-style block clusters. For noncity-style block clusters, 83.56 percent (10,961) of single units are matches; 76.36 percent (462) of multiunits are matches; 75.79 percent (2,786) of mobile homes are matches; 34.31 percent (480) of missing structure types are matches; and 12.61 percent (28) of other structure types are matches. Contrast this with city-style block clusters, where 95.25 percent (95,427) of single units are matches; 86.68 percent (39,151) of multiunits are matches; 85.74 percent (7,082) of mobile homes are matches; 40.66 percent (3,152) of missing structure types are matches; and 45.14 percent (65) of other structure types are matches. Also note, within each type of structure, the percent of units classified as duplicates is higher in the noncity-style block clusters than in the city-style block clusters. In the missing structure type category especially, duplicates comprise 21.37 percent (299) of the missing structure types in noncity-style block clusters compared to 12.89 percent (999) of the missing structure types in city-style block clusters.

Table 35**The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation****Number of E-sample Units by Match Code and Type of Structure for the After Followup Clerical Matching Operation: Unweighted**

Clerical Match Code	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	180,528	100.00	113,302	100.00	45,773	100.00	11,936	100.00	366	100.00	9,151	100.00
Match	159,594	88.40	106,388	93.90	39,613	86.54	9,868	82.67	93	25.41	3,632	39.69
Possible match	7	0.00	2	0.00	0	0.00	1	0.01	0	0.00	4	0.04
Nonmatch	9,716	5.38	3,279	2.89	3,123	6.82	784	6.57	49	13.39	2,481	27.11
Duplicate	2,868	1.59	670	0.59	718	1.57	177	1.48	5	1.37	1,298	14.18
Not a Housing Unit	8,343	4.62	2,963	2.62	2,319	5.07	1,106	9.27	219	59.84	1,736	18.97
Total Puerto Rico	8,059	100.00	4,918	100.00	2,535	100.00	7	100.00	1	100.00	598	100.00
Match	6,416	79.61	4,228	85.97	2,024	79.84	3	42.86	1	100.00	160	26.76
Possible match	5	0.06	3	0.06	1	0.04	0	0.00	0	0.00	1	0.17
Nonmatch	845	10.49	295	6.00	251	9.90	1	14.29	0	0.00	298	49.83
Duplicate	197	2.44	56	1.14	69	2.72	0	0.00	0	0.00	72	12.04
Not a Housing Unit	596	7.40	336	6.83	190	7.50	3	42.86	0	0.00	67	11.20
Total U.S. (including Puerto Rico)	188,587	100.00	118,220	100.00	48,308	100.00	11,943	100.00	367	100.00	9,749	100.00
Match	166,010	88.03	110,616	93.57	41,637	86.19	9,871	82.65	94	25.61	3,792	38.90
Possible match	12	0.01	5	0.00	1	0.00	1	0.01	0	0.00	5	0.05
Nonmatch	10,561	5.60	3,574	3.02	3,374	6.98	785	6.57	49	13.35	2,779	28.51
Duplicate	3,065	1.63	726	0.61	787	1.63	177	1.48	5	1.36	1,370	14.05
Not a Housing Unit	8,939	4.74	3,299	2.79	2,509	5.19	1,109	9.29	219	59.67	1,803	18.49

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

Table 36
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation
Number of E-sample Units by Address Type Cluster Group Recode, Match Code and Type of Structure for the After Followup Clerical Matching Operation:
Unweighted

Clerical Match Code	Total of all Types of Structures		Single Unit		Multiunit		Mobile Homes		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
U.S. City-style Total (excluding Puerto Rico)	161,509	100.00	100,185	100.00	45,168	100.00	8,260	100.00	144	100.00	7,752	100.00
Match	144,877	89.70	95,427	95.25	39,151	86.68	7,082	85.74	65	45.14	3,152	40.66
Possible match	1	0.00	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Nonmatch	8,104	5.02	2,385	2.38	3,064	6.78	449	5.44	16	11.11	2,190	28.25
Duplicate	2,283	1.41	480	0.48	705	1.56	98	1.19	1	0.69	999	12.89
Not a Housing Unit	6,244	3.87	1,892	1.89	2,248	4.98	631	7.64	62	43.06	1,411	18.20
U.S. Noncity-style Total (excluding Puerto Rico)	19,019	100.00	13,117	100.00	605	100.00	3,676	100.00	222	100.00	1,399	100.00
Match	14,717	77.38	10,961	83.56	462	76.36	2,786	75.79	28	12.61	480	34.31
Possible match	6	0.03	1	0.01	0	0.00	1	0.03	0	0.00	4	0.29
Nonmatch	1,612	8.48	894	6.82	59	9.75	335	9.11	33	14.86	291	20.80
Duplicate	585	3.08	190	1.45	13	2.15	79	2.15	4	1.80	299	21.37
Not a Housing Unit	2,099	11.04	1,071	8.16	71	11.74	475	12.92	157	70.72	325	23.23

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

The following tables provide unweighted counts, by type of structure, for the non E-sample duplicates in the CCM sample areas and in the surrounding blocks to the CCM sample areas. Duplicate status is based on the unit's match code at the end of FHU Clerical Matching.¹⁰ The duplicate may be a new duplicate found in FHU Clerical Matching, or it could have been coded as a duplicate in IHU Matching. Addresses that were identified as possible duplicates during FHU BFU Clerical Matching were sent to FHUFU for field confirmation.

Per Table 37, there is an unweighted total of 421 duplicate non E-sample housing units in the CCM sample areas within the U.S. (including Puerto Rico). Of that number, 33.49 percent are single units; 41.81 percent are multiunits; 2.85 percent are mobile homes; and 21.85 percent are missing a structure type. There are no duplicates in the other structure type category. Within Puerto Rico, there is an unweighted total of 67 duplicate non E-sample housing units in the CCM sample areas. Within the U.S. (excluding Puerto Rico), there is an unweighted total of 354 duplicate, non E-sample housing units in the CCM sample areas.

Per Table 38, there is an unweighted total of 1,127 duplicate housing units in the surrounding blocks to the CCM sample areas, within the U.S. (including Puerto Rico). Of that number, 28.22 are single units, 31.59 percent are multiunits, 4.44 percent are mobile homes, 0.09 percent are other structure types, and 35.67 percent are missing structure types. Within Puerto Rico, there is an unweighted total of 82 duplicate housing units in the surrounding blocks to the CCM sample areas. Within the U.S. (excluding Puerto Rico), there is an unweighted total of 1,045 duplicate housing units in the surrounding blocks to the CCM sample areas.

¹⁰ There are 133 non E-sample addresses in the CCM sample areas that are non-duplicates according to their match code at the end of FHU Clerical Matching, but were miscoded as a result of a computer processing error. For more details see the note on p. 51.

Table 37												
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation												
Number of Non E-sample Duplicate Census Housing Units in CCM Sample Areas by Type of Structure for the After Followup Clerical Matching Operation: Unweighted												
Duplicates	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	354	100.00	107	30.23	159	44.92	12	3.39	0	0.00	76	21.47
Total Puerto Rico	67	100.00	34	50.75	17	25.37	0	0.00	0	0.00	16	23.88
Total U.S. (including Puerto Rico)	421	100.00	141	33.49	176	41.81	12	2.85	0	0.00	92	21.85

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

Table 38												
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation												
Number of Duplicate Census Housing Units in Surrounding Blocks to CCM Sample Areas by Type of Structure for the After Followup Clerical Matching Operation: Unweighted												
Duplicates	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	1,045	100.00	304	29.09	309	29.57	50	4.78	1	0.10	381	36.46
Total Puerto Rico	82	100.00	14	17.07	47	57.32	0	0.00	0	0.00	21	25.61
Total U.S. (including Puerto Rico)	1,127	100.00	318	28.22	356	31.59	50	4.44	1	0.09	402	35.67

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB tables: Census Coding History and Census Address

This final table takes a further look at duplicates, upon completion of FHU Clerical Matching. There are different sources for the duplicate addresses. An address could have been a duplicate from IHU Matching that was unchanged during FHU Clerical Matching (IHU duplicate), or perhaps it changed from being a non-duplicate in IHU Matching to being a duplicate in FHU Clerical Matching (IHU non-duplicate). Another source for new duplicate addresses is the census adds, i.e., census addresses from the CUF that were added to the block cluster search area. These may be new addresses, i.e., they were not part of the census universe used for IHU Matching, or they may have been geocoded to a different CCM search area.

The following table provides duplicate counts by the source of the duplicate: IHU duplicate, IHU non-duplicate, and census add. Separate tables are shown for E-sample duplicates, non E-sample duplicates in the CCM sample areas, and duplicates in the surrounding blocks to the CCM sample areas.

Table 39 shows the unweighted results for E-sample duplicates, by source of duplicate. There are 3,065 duplicates in the U.S. (including Puerto Rico). Most of them (53.93 percent) were duplicates in IHU. A large percent were census adds (36.61 percent) and the rest (9.46 percent) were IHU non-duplicates. In Puerto Rico, of the 197 E-sample duplicates in the CCM sample areas, 36.55 were IHU duplicates; 35.53 percent were census adds; and 27.92 percent were IHU non-duplicates.

Table 39								
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation								
Number of E-sample Duplicate Census Housing Units by Source of Duplicate: Unweighted								
	Total Duplicates		Census Add		IHU Non-duplicate		IHU Duplicate	
	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*
Total U.S. Housing Units (including Puerto Rico)	3,065 (100.00)	100.00	1,122 (36.61)	100.00	290 (9.46)	100.00	1,653 (53.93)	100.00
U.S. Total	2,868 (100.00)	93.57	1,052 (36.68)	93.76	235 (8.19)	81.03	1,581 (55.13)	95.64
Puerto Rico Total	197 (100.00)	6.43	70 (35.53)	6.24	55 (27.92)	18.97	72 (36.55)	4.36

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

The next two tables provide unweighted counts, by source of duplicate, for non E-sample duplicates within the CCM sample areas and duplicates within the surrounding blocks.

Per Table 40, the majority of the 421 non E-sample duplicates in the CCM sample areas within the U.S. (including Puerto Rico), were IHU non-duplicates (78.62 percent), i.e., the match code from IHU Matching was not a duplicate match code. Only 0.71 percent were coded as duplicates in IHU Matching. The remaining 20.67 percent were census adds. In Puerto Rico, of the 67 non E-sample duplicates in the CCM sample areas, 76.12 percent were IHU non-duplicates; 23.88 percent were census adds; and none were IHU duplicates.

Table 40								
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation								
Number of Non E-sample Duplicate Census Housing Units in CCM Sample Areas by Source of Duplicate: Unweighted								
	Total Duplicates		Census Add		IHU Non-duplicate		IHU Duplicate	
	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*
Total U.S. Housing Units (including Puerto Rico)	421 (100.00)	100.00	87 (20.67)	100.00	331 (78.62)	100.00	3 (0.71)	100.00
U.S. Total	354 (100.00)	84.09	71 (20.06)	81.61	280 (79.10)	84.59	3 (0.85)	100.00
Puerto Rico Total	67 (100.00)	15.91	16 (23.88)	18.39	51 (76.12)	15.41	0 (0.00)	0.00

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

Per Table 41, the unweighted total of duplicates in surrounding blocks within the U.S. (including Puerto Rico) is 1,127. Of that number, 32.39 percent were census adds; 56.52 percent were IHU duplicates; and 11.09 percent were IHU non-duplicates. Of the 82 duplicates in surrounding blocks within Puerto Rico, 25.61 percent were census adds; 20.73 percent were IHU duplicates; and 53.66 percent were IHU non-duplicates.

Table 41								
The 2010 Census Coverage Measurement (CCM) Final Housing Unit Clerical Matching Operation								
Number of Non E-sample Duplicate Census Housing Units in Surrounding Blocks to CCM Sample Areas by Source of Duplicate: Unweighted								
	Total Duplicates		Census Add		IHU Non-duplicate		IHU Duplicate	
	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*
Total U.S. Housing Units (including Puerto Rico)	1,127 (100.00)	100.00	365 (32.39)	100.00	125 (11.09)	100.00	637 (56.52)	100.00
U.S. Total	1,045 (100.00)	92.72	344 (32.92)	94.25	81 (7.75)	64.80	620 (59.33)	97.33
Puerto Rico Total	82 (100.00)	7.28	21 (25.61)	5.75	44 (53.66)	35.20	17 (20.73)	2.67

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

5.8 What is the distribution of duplicates found by clerical matching per census address?

This question looks at the E-sample housing units with duplicate addresses, upon the completion of FHU Clerical Matching. The duplicates may have been identified in IHU or FHU Clerical Matching. The duplicates may be located in the sample block clusters or the surrounding blocks.

Table 42 presents unweighted counts of E-sample housing units, showing how many were identified as having no duplicate addresses, one duplicate address, two duplicate addresses, or three or more duplicate addresses upon completion of FHU Clerical Matching. The total number of census housing units in the E sample with one or more duplicate addresses is 3,474 or 1.84 percent of all E-sample census housing units in the U.S. (including Puerto Rico). When there is duplication for E-sample units, the majority had only one duplicate; only 2.88 percent had two or more duplicates.

Table 42										
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation										
Number of E-sample Units by Count of Duplicates Per Unit: Unweighted										
	Total HUs		No Duplicates		1 Duplicate		2 Duplicates		3 or More Duplicates	
	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*	Count (Row %)	Percent of Total*
Total U.S. (including Puerto Rico)	188,587 (100.00)	100.00	185,113 (98.16)	100.00	3,374 (1.79)	100.00	99 (0.05)	100.00	1 (0.00)	100.00
U.S. City-style Total	161,509	85.64	158,983	85.88	2,453	72.70	73	73.74	0	0.00
U.S. Noncity-style Total	19,019	10.09	18,389	9.93	621	18.41	9	9.09	0	0.00
Puerto Rico Total	8,059	4.27	7,741	4.18	300	8.89	17	17.17	1	100.00

*Percents may not sum to totals due to rounding.
Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

5.9 What is the housing unit/enumeration status assigned for each unit (e.g., housing unit, erroneous enumeration, duplicate, geocoding error, and unresolved)?

The housing unit status for each P-sample unit is based on the unit’s match code at the end of AFU Clerical Matching. A P-sample unit is a housing unit unless classified as one of the following:

- Not a housing unit: The P-sample address did not refer to a housing unit on Census Day, but is correctly geocoded in the sample block cluster. It could have been a business, an empty lot in a trailer park, unfit for habitation, burned down or demolished, under construction or the site of future construction, used for the storage of non-household goods, or merged with another housing unit. A P-sample unit that was determined to be a GQ is also classified as not a housing unit.

- Geocoding error: The P-sample unit was actually located in a block outside of the sample block cluster in which it was listed.
- Duplicate: The P-sample address refers to the same unit as another P-sample address.
- Unresolved: There was not enough information from FHUFU to confirm that the unit was a housing unit or to confirm that it was located in the sample block cluster.

The enumeration status for each E-sample unit is based on the unit’s match code at the end of AFU Clerical Matching. An E-sample unit is a correct enumeration unless classified as one of the following:

- Geocoding Error: The E-sample unit is geocoded to the sample block cluster on the CUF, but was actually located in a block beyond the sample block cluster and its surrounding blocks. (Note: An E-sample unit located in a surrounding block but geocoded in the sample block cluster is not considered a geocoding error.)
- Erroneous Enumeration: The census unit did not exist as a housing unit on Census Day. It could have been a business, an empty lot in a trailer park, unfit for habitation, burned down or demolished, under construction or the site of future construction, used for the storage of non-household goods, or merged with another housing unit. An E-sample unit that was determined to be a GQ is also classified as not a housing unit.
- Duplicate: The census address refers to the same unit as another census address on the CUF, within the sample block cluster or its surrounding blocks.
- Unresolved: There was not enough information from FHUFU to confirm that the E-sample unit was a housing unit or to confirm that it was located in the sample block cluster or its surrounding blocks.

Table 43 and Table 44 below present the unweighted results of housing unit status for P-sample units, by type of structure.

Looking at the unweighted results for the U.S. (including Puerto Rico) provided in Table 43, 97.25 percent of the 178,696 P-sample units are classified as housing units; 2.58 percent are not housing units; 0.12 percent are geocoding errors; 0.04 percent are unresolved; and 0.01 percent are duplicates. Within the different structure types, the percentages of P-sample units classified as housing units are, from lowest to highest: 70.20 percent (106) of the “Other”; 91.51 percent (4,668) of “Mobile Home in a Park”; 94.94 percent (6,627) of “Mobile Home Not in a Park”; 97.36 percent (45,791) of “All Multiunits”; and 97.63 percent (116,597) of “Single Unit.” The “Other” category has the highest percentage of units classified as not a housing unit, at 29.14 percent (44).

Table 44 disaggregates the unweighted P-sample counts for the U.S. (excluding Puerto Rico) into city-style and noncity-style block clusters. In city-style block clusters, 97.83 percent of the 154,170 P-sample units are housing units. This is not very different from noncity-style block

clusters, where 93.81 percent of the 17,047 P-sample units are housing units. For city-style block clusters, the percentages of total P-sample units within the different structure types that are classified as housing units are, from lowest to highest: 70.59 percent (48) of “Other”; 91.15 percent (3,957) of “Mobile Home in a Park”; 95.60 percent (3,997) of “Mobile Home Not in a Park”; 97.64 percent (42,640) of “All Multiunits”; and 98.30 percent (100,177) of “Single Unit”. Within the different structure types, the percentages of total P-sample units in noncity-style block clusters that are housing units are: 69.88 percent (58) of “Other”; 92.42 percent (695) of “All Multiunits”; 93.55 percent (711) of “Mobile Home in a Park”; 93.98 percent (2,624) of “Mobile Home Not in a Park”; and 94.02 percent (11,903) of “Single Unit”.

Housing Unit Status	Total of All Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
Total U.S. (excluding Puerto Rico)	171,217	100.00	114,569	100.00	44,423	100.00	12,709	100.00	8,940	100.00	7,998	100.00	7,649	100.00	7,127	100.00	6,973	100.00	5,101	100.00	151	100.00
Housing Unit	166,810	97.43	112,080	97.83	43,335	97.55	12,371	97.34	8,701	97.33	7,835	97.96	7,609	99.48	6,819	95.68	6,621	94.95	4,668	91.51	106	70.20
Unresolved Housing Unit	65	0.04	49	0.04	6	0.01	2	0.02	1	0.01	3	0.04	0	0.00	0	0.00	7	0.10	2	0.04	1	0.66
Not a Housing Unit	4,232	2.47	2,358	2.06	1,073	2.42	330	2.60	236	2.64	160	2.00	40	0.52	307	4.31	333	4.78	424	8.31	44	29.14
Duplicate	19	0.01	12	0.01	5	0.01	4	0.03	0	0.00	0	0.00	0	0.00	1	0.01	2	0.03	0	0.00	0	0.00
Geocoding Error	91	0.05	70	0.06	4	0.01	2	0.02	2	0.02	0	0.00	0	0.00	0	0.00	10	0.14	7	0.14	0	0.00
Total Puerto Rico	7,479	100.00	4,862	100.00	2,610	100.00	1,946	100.00	284	100.00	192	100.00	110	100.00	78	100.00	7	100.00	0	0.00	0	0.00
Housing Unit	6,979	93.31	4,517	92.90	2,456	94.10	1,823	93.68	277	97.54	192	100.00	86	78.18	78	100.00	6	85.71	0	0.00	0	0.00
Unresolved Housing Unit	6	0.08	5	0.10	1	0.04	1	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Not a Housing Unit	376	5.03	236	4.85	139	5.33	108	5.55	7	2.46	0	0.00	24	21.82	0	0.00	1	14.29	0	0.00	0	0.00
Duplicate	2	0.03	1	0.02	1	0.04	1	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Geocoding Error	116	1.55	103	2.12	13	0.50	13	0.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total U.S. (including Puerto Rico)	178,696	100.00	119,431	100.00	47,033	100.00	14,655	100.00	9,224	100.00	8,190	100.00	7,759	100.00	7,205	100.00	6,980	100.00	5,101	100.00	151	100.00
Housing Unit	173,789	97.25	116,597	97.63	45,791	97.36	14,194	96.85	8,978	97.33	8,027	98.01	7,695	99.18	6,897	95.73	6,627	94.94	4,668	91.51	106	70.20
Unresolved Housing Unit	71	0.04	54	0.05	7	0.01	3	0.02	1	0.01	3	0.04	0	0.00	0	0.00	7	0.10	2	0.04	1	0.66
Not a Housing Unit	4,608	2.58	2,594	2.17	1,212	2.58	438	2.99	243	2.63	160	1.95	64	0.82	307	4.26	334	4.79	424	8.31	44	29.14
Duplicate	21	0.01	13	0.01	6	0.01	5	0.03	0	0.00	0	0.00	0	0.00	1	0.01	2	0.03	0	0.00	0	0.00
Geocoding Error	207	0.12	173	0.14	17	0.04	15	0.10	2	0.02	0	0.00	0	0.00	0	0.00	10	0.14	7	0.14	0	0.00

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: IL Address

Table 44
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation
Housing Unit Status for P-sample Units by Address Type Cluster Group Recode and Type of Structure for the Clerical Matching Operation: Unweighted

Housing Unit Status	Total of all Types of Structures		Single Unit		All Multiunits		Multiunit										Mobile Home Not in a Park		Mobile Home in a Park		Other	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	2-4 units		5-9 units		10-19 units		20-49 units		50+ units		Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
							Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*						
U.S. City-style Total (excluding Puerto Rico)	154,170	100.00	101,909	100.00	43,671	100.00	12,310	100.00	8,772	100.00	7,896	100.00	7,566	100.00	7,127	100.00	4,181	100.00	4,341	100.00	68	100.00
HU	150,819	97.83	100,177	98.30	42,640	97.64	11,980	97.32	8,579	97.80	7,733	97.94	7,529	99.51	6,819	95.68	3,997	95.60	3,957	91.15	48	70.59
Unresolved HU	28	0.02	18	0.02	6	0.01	2	0.02	1	0.01	3	0.04	0	0.00	0	0.00	1	0.02	2	0.05	1	1.47
Not a HU	3,254	2.11	1,669	1.64	1,018	2.33	324	2.63	190	2.17	160	2.03	37	0.49	307	4.31	173	4.14	375	8.64	19	27.94
Duplicate	8	0.01	3	0.00	3	0.01	2	0.02	0	0.00	0	0.00	0	0.00	1	0.01	2	0.05	0	0.00	0	0.00
Geocoding Error	61	0.04	42	0.04	4	0.01	2	0.02	2	0.02	0	0.00	0	0.00	0	0.00	8	0.19	7	0.16	0	0.00
U.S. Noncity-style Total (excluding Puerto Rico)	17,047	100.00	12,660	100.00	752	100.00	399	100.00	168	100.00	102	100.00	83	100.00	0	0.00	2,792	100.00	760	100.00	83	100.00
HU	15,991	93.81	11,903	94.02	695	92.42	391	97.99	122	72.62	102	100.00	80	96.39	0	0.00	2,624	93.98	711	93.55	58	69.88
Unresolved HU	37	0.22	31	0.24	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	6	0.21	0	0.00	0	0.00
Not a HU	978	5.74	689	5.44	55	7.31	6	1.50	46	27.38	0	0.00	3	3.61	0	0.00	160	5.73	49	6.45	25	30.12
Duplicate	11	0.06	9	0.07	2	0.27	2	0.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Geocoding Error	30	0.18	28	0.22	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.07	0	0.00	0	0.00

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: IL Address

Table 45 and Table 46 below present the unweighted results of enumeration status for E-sample units, by type of structure.

Looking at the unweighted results for the U.S. (including Puerto Rico) in Table 45, 93.43 percent of the 188,587 E-sample units are classified as correct enumerations; 4.52 percent are classified as erroneous enumerations; 1.63 percent are duplicates; 0.22 percent are geocoding errors; and 0.20 percent are unresolved enumerations. Within the different structure types, the percentages of E-sample units classified as correct enumerations are, from lowest to highest: 38.69 percent (142) of “Other”; 64.93 percent (6,330) of “Missing”; 89.07 percent (10,638) of “Mobile Home”; 93.14 percent (44,995) of “Multiunit”; and 96.51 percent (114,093) of “Single Unit.” Erroneous enumerations comprise 59.67 percent (219) of the “Other” structure types. The percent of duplicates is much higher for “Missing” structure types compared to other structure types; 14.05 percent (1,370) compared to the next highest percent of 1.63 percent (787) for multiunits.

Table 46 disaggregates the unweighted E-sample counts for the U.S. (excluding Puerto Rico) into city-style and noncity-style block clusters. In city-style block clusters, 97.61 percent of the 161,509 E-sample units are correct enumerations. However, in noncity-style block clusters, only 89.93 percent of the 19,019 E-sample units are correct enumerations. The percentage of erroneous enumerations is more than double in noncity-style block clusters compared to city-style block clusters; 10.63 percent compared to 3.68 percent. Also, the percentage of duplicates is more than double in noncity-style block clusters compared to city-style block clusters; 3.08 percent compared to 1.41 percent. Within each type of structure, the percentage of correct enumerations is lower when comparing noncity-style block clusters to city-style block clusters. For noncity-style block clusters, the percentages of units classified as correct enumerations, range from 27.03 percent (60) of “Other” to 89.93 percent (11,796) of “Single Unit.” Whereas, for city-style block clusters, the percentages of correct enumerations range from 56.25 percent (81) of “Other” to 97.61 percent (97,794) of “Single Unit.”

Table 45**The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation****Enumeration Status for E-sample Units by Type of Structure for the Clerical Matching Operation: Unweighted**

Enumeration Status	Total of All Types of Structures		Single Unit		Multiunit		Mobile Homes		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	180,528	100.00	113,302	100.00	45,773	100.00	11,936	100.00	366	100.00	9,151	100.00
Correct Enumeration	169,019	93.62	109,590	96.72	42,727	93.35	10,634	89.09	141	38.52	5,927	64.77
Erroneous Enumeration	7,958	4.41	2,899	2.56	2,309	5.04	1,094	9.17	219	59.84	1,437	15.70
Unresolved Enumeration	298	0.17	79	0.07	9	0.02	19	0.16	1	0.27	190	2.08
Duplicate	2,868	1.59	670	0.59	718	1.57	177	1.48	5	1.37	1,298	14.18
Geocoding Error	385	0.21	64	0.06	10	0.02	12	0.10	0	0.00	299	3.27
Total Puerto Rico	8,059	100.00	4,918	100.00	2,535	100.00	7	100.00	1	100.00	598	100.00
Correct Enumeration	7,179	89.08	4,503	91.56	2,268	89.47	4	57.14	1	100.00	403	67.39
Erroneous Enumeration	569	7.06	333	6.77	190	7.50	3	42.86	0	0.00	43	7.19
Unresolved Enumeration	86	1.07	22	0.45	8	0.32	0	0.00	0	0.00	56	9.36
Duplicate	197	2.44	56	1.14	69	2.72	0	0.00	0	0.00	72	12.04
Geocoding Error	28	0.35	4	0.08	0	0.00	0	0.00	0	0.00	24	4.01
Total U.S. (including Puerto Rico)	188,587	100.00	118,220	100.00	48,308	100.00	11,943	100.00	367	100.00	9,749	100.00
Correct Enumeration	176,198	93.43	114,093	96.51	44,995	93.14	10,638	89.07	142	38.69	6,330	64.93
Erroneous Enumeration	8,527	4.52	3,232	2.73	2,499	5.17	1,097	9.19	219	59.67	1,480	15.18
Unresolved Enumeration	384	0.20	101	0.09	17	0.04	19	0.16	1	0.27	246	2.52
Duplicate	3,065	1.63	726	0.61	787	1.63	177	1.48	5	1.36	1,370	14.05
Geocoding Error	413	0.22	68	0.06	10	0.02	12	0.10	0	0.00	323	3.31

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

Table 46
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation
Enumeration Status for E-sample Units by Address Type Cluster Group Recode and Type of Structure for the Clerical Matching Operation: Unweighted

Housing Unit Status	Total of All Types of Structures		Single Unit		Multiunit		Mobile Homes		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
U.S. City-style Total (excluding Puerto Rico)	161,509	100.00	100,185	100.00	45,168	100.00	8,260	100.00	144	100.00	7,752	100.00
Correct Enumeration	152,839	94.63	97,794	97.61	42,207	93.44	7,526	91.11	81	56.25	5,231	67.48
Erroneous Enumeration	5,937	3.68	1,841	1.84	2,238	4.95	623	7.54	62	43.06	1,173	15.13
Unresolved Enumeration	143	0.09	19	0.02	8	0.02	5	0.06	0	0.00	111	1.43
Duplicate	2,283	1.41	480	0.48	705	1.56	98	1.19	1	0.69	999	12.89
Geocoding Error	307	0.19	51	0.05	10	0.02	8	0.10	0	0.00	238	3.07
U.S. Noncity-style Total (excluding Puerto Rico)	19,019	100.00	13,117	100.00	605	100.00	3,676	100.00	222	100.00	1,399	100.00
Correct Enumeration	16,180	85.07	11,796	89.93	520	85.95	3,108	84.55	60	27.03	696	49.75
Erroneous Enumeration	2,021	10.63	1,058	8.07	71	11.74	471	12.81	157	70.72	264	18.87
Unresolved Enumeration	155	0.81	60	0.46	1	0.17	14	0.38	1	0.45	79	5.65
Duplicate	585	3.08	190	1.45	13	2.15	79	2.15	4	1.80	299	21.37
Geocoding Error	78	0.41	13	0.10	0	0.00	4	0.11	0	0.00	61	4.36

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

Table 47 and Table 48 below present the unweighted results of enumeration status for census adds in the E-sample, by type of structure.

Census adds were identified during FHU Computer Processing for each of the CCM sample block clusters. A census add is a census housing unit or GQ that is on the CUF and geocoded to a block within the CCM search area, but was not available in IHU Matching within that search area. It may be a new census unit or it may have been geocoded to a block outside of the CCM search area during IHU Matching. Census adds that are listed on the CUF as GQs were not eligible for the E sample. Census adds that are listed as housing units were eligible for the E sample. The following tables include only census adds that are in the E sample.

Looking at the unweighted results for the U.S. (including Puerto Rico) provided in Table 47, 58.11 percent of the 6,693 E-sample census added units are classified as correct enumerations; 16.96 percent are erroneous enumerations; 16.76 percent are duplicates; 4.68 percent are geocoding errors; and 3.50 percent are unresolved enumerations. Contrast these percentages with those for all E-sample addresses, for which 93.43 percent are correct enumerations, and only 1.63 percent are duplicates. Also, note that the vast majority of E-sample census adds (98.74 percent) have a missing structure type.

Table 48 disaggregates the unweighted counts for the U.S. (excluding Puerto Rico) into city-style and noncity-style block clusters. In city-style block clusters, 58.84 percent of the 4,823 E-sample census adds are correct enumerations. In noncity-style block clusters, 51.07 percent of the 1,306 E-sample census adds are correct enumerations. Also note that the percent of units with a missing structure type is high in both the city-style and noncity-style block clusters: 98.61 percent (4,756) of the units in city-style block clusters are classified as a missing structure type; and 98.70 percent (1,289) of the units in noncity-style block clusters are missing a structure type.

Table 47												
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation												
Enumeration Status for E-sample Census Adds by Type of Structure for the Clerical Matching Operation: Unweighted												
Enumeration Status	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total U.S. (excluding Puerto Rico)	6,129	100.00	31	100.00	30	100.00	23	100.00	0	0.00	6,045	100.00
Correct Enumeration	3,505	57.19	7	22.58	26	86.67	10	43.48	0	0.00	3,462	57.27
Erroneous Enumeration	1,100	17.95	10	32.26	3	10.00	2	8.70	0	0.00	1,085	17.95
Unresolved Enumeration	183	2.99	0	0.00	0	0.00	0	0.00	0	0.00	183	3.03
Duplicate	1,052	17.16	4	12.90	1	3.33	5	21.74	0	0.00	1,042	17.24
Geocoding Error	289	4.72	10	32.26	0	0.00	6	26.09	0	0.00	273	4.52
Total Puerto Rico	564	100.00	0	0.00	0	0.00	0	0.00	0	0.00	564	100.00
Correct Enumeration	384	68.09	0	0.00	0	0.00	0	0.00	0	0.00	384	68.09
Erroneous Enumeration	35	6.21	0	0.00	0	0.00	0	0.00	0	0.00	35	6.21
Unresolved Enumeration	51	9.04	0	0.00	0	0.00	0	0.00	0	0.00	51	9.04
Duplicate	70	12.41	0	0.00	0	0.00	0	0.00	0	0.00	70	12.41
Geocoding Error	24	4.26	0	0.00	0	0.00	0	0.00	0	0.00	24	4.26
Total U.S. (including Puerto Rico)	6,693	100.00	31	100.00	30	100.00	23	100.00	0	0.00	6,609	100.00
Correct Enumeration	3,889	58.11	7	22.58	26	86.67	10	43.48	0	0.00	3,846	58.19
Erroneous Enumeration	1,135	16.96	10	32.26	3	10.00	2	8.70	0	0.00	1,120	16.95
Unresolved Enumeration	234	3.50	0	0.00	0	0.00	0	0.00	0	0.00	234	3.54
Duplicate	1,122	16.76	4	12.90	1	3.33	5	21.74	0	0.00	1,112	16.83
Geocoding Error	313	4.68	10	32.26	0	0.00	6	26.09	0	0.00	297	4.49

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

Table 48
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation
Enumeration Status for E-sample Census Adds by Address Type Cluster Group Recode and Type of Structure for the Clerical Matching Operation: Unweighted

Enumeration Status	Total of All Types of Structures		Single Unit		Multiunit		Mobile Home		Other		Missing	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
U.S. City-style Total (excluding Puerto Rico)	4,823	100.00	26	100.00	29	100.00	12	100.00	0	0.00	4,756	100.00
Correct Enumeration	2,838	58.84	4	15.38	25	86.21	1	8.33	0	0.00	2,808	59.04
Erroneous Enumeration	880	18.25	10	38.46	3	10.34	1	8.33	0	0.00	866	18.21
Unresolved Enumeration	109	2.26	0	0.00	0	0.00	0	0.00	0	0.00	109	2.29
Duplicate	768	15.92	4	15.38	1	3.45	4	33.33	0	0.00	759	15.96
Geocoding Error	228	4.73	8	30.77	0	0.00	6	50.00	0	0.00	214	4.50
U.S. Noncity-style Total (excluding Puerto Rico)	1,306	100.00	5	100.00	1	100.00	11	100.00	0	0.00	1,289	100.00
Correct Enumeration	667	51.07	3	60.00	1	100.00	9	81.82	0	0.00	654	50.74
Erroneous Enumeration	220	16.85	0	0.00	0	0.00	1	9.09	0	0.00	219	16.99
Unresolved Enumeration	74	5.67	0	0.00	0	0.00	0	0.00	0	0.00	74	5.74
Duplicate	284	21.75	0	0.00	0	0.00	1	9.09	0	0.00	283	21.96
Geocoding Error	61	4.67	2	40.00	0	0.00	0	0.00	0	0.00	59	4.58

*Percents may not sum to totals due to rounding.

Source: Sample Design File version 3 and FHUMaRCS dB table: Census Address

5.10 How many block clusters skipped all matching, by size of block cluster?

During FHU Computer Processing, addresses were flagged for review in FHU Clerical Matching (See Section 5.6). If there were no addresses flagged for review in a cluster, that cluster skipped all stages of FHU Clerical Matching. Most review flags resulted from addresses being added to or removed from the CUF. In order for a cluster to skip clerical matching, there must be 1) no census addresses on the CUF that were added to the block cluster search area, and 2) no P-sample or census addresses linked or duplicated in IHU Matching to census addresses that had been listed but were removed from the CUF in the block cluster search area.

Table 49 below shows that a total of 1,897 block clusters in the U.S. (including Puerto Rico) skipped FHU Clerical Matching.

Table 49								
The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation								
Number of Block Clusters that Skipped Final Housing Unit Clerical Matching by Block Cluster Size: Unweighted								
	Block Cluster Size ⁺							
	All Sizes		Small (0 – 2 housing units)		Medium (3 – 79 housing units)		Large (80+ housing units)	
	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*	Count	Percent of Total*
Total Block Clusters	1,897	100.00	437	100.00	1,194	100.00	266	100.00
U.S. City-style Total	1,695	89.35	365	83.52	1,070	89.61	260	97.74
U.S. Noncity-Style Total	188	9.91	65	14.87	120	10.05	3	1.13
Puerto Rico Total	14	0.74	7	1.60	4	0.34	3	1.13

*Percents may not sum to totals due to rounding.
⁺ Block cluster size is obtained from Sample Design File version 3.
 Source: Sample Design File version 3 and FHUMaRCS dB tables: Cluster Stage and Cluster Control

5.11 How many followup notes did clerical matchers enter?

Clerical matchers working in BFU Clerical Matching could enter followup notes for individual addresses in FHUMaRCS to be included as special questions on the FHUFU forms.

Per Table 50, clerical matchers entered 21 followup notes for P-sample addresses. Per Table 51, clerical matchers entered 38 followup notes for census addresses. Although clerical matchers could enter followup notes for Puerto Rico addresses, none were entered.

Table 50 The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation Number of Followup Notes Entered by Clerical Matchers for P-sample Units: Unweighted		
Address Type Cluster Group Recode	Count	Percent of Total
Total U.S. (excluding Puerto Rico)	21	100.00
U.S. City-style Total	12	57.14
U.S. Noncity-style Total	9	42.86

Source: Sample Design File version 3 and FHUMaRCS dB Tables: Cluster Control and Followup Note

Table 51 The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation Number of Followup Notes Entered by Clerical Matchers for Census Units: Unweighted		
Address Type Cluster Group Recode	Count	Percent of Total
Total U.S. (excluding Puerto Rico)	38	100.00
U.S. City-style Total	33	86.84
U.S. Noncity-style Total	5	13.16

Source: Sample Design File version 3 and FHUMaRCS dB Tables: Cluster Control and Followup Note

5.12 How many block clusters went to outlier review?

Selected block clusters were included in a FHU After Followup Outlier (AFO) review, after they completed AFU Clerical Matching. The matching system calculated an Outlier Priority for each block cluster based on weighted counts of certain match codes. Block clusters with an Outlier Priority exceeding a specified parameter were sent for an outlier review. In addition, some block clusters were flagged for review by Headquarters staff.

As shown in Table 52, 314 block clusters were sent to AFO for clerical review, the majority of those (79.94 percent) being U.S. city-style block clusters.

Table 52 The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation Number of Block Clusters in Outlier Review: Unweighted		
	Count	Percent of Total
Total Block Clusters	314	100.00
U.S. City-style Total	251	79.94
U.S. Noncity-style Total	43	13.69
Puerto Rico Total	20	6.37

Source: Sample Design File version 3 and FHUMaRCS dB Tables: Cluster Stage and Cluster Control

5.13 How many units were coded insufficient information for followup in the census?

During FHU Computer Processing, E-sample units were coded insufficient for followup if they had no map spot numbers and no data in these address fields: house number, street name, unit designation, physical location, rural box, Post Office Box, rural route, and zip code. There are 128 E-sample census adds that had no address information and no map spot number. During the BFU review, clerical matchers coded additional census units as insufficient for followup if they had no map spot numbers and no unique address information. For example, the address data provided may indicate that the unit is a “white house” but there are six other “white houses” in the same area and no other uniquely identifying address data available.

As shown in Table 53, 219 E-sample units were coded as insufficient information for followup. The majority of those (48.40 percent) are in U.S. city-style block clusters.

Table 53 The 2010 Census Coverage Measurement Final Housing Unit Clerical Matching Operation Number of E-sample Units Coded Insufficient for Followup: Unweighted		
	Count	Percent of Total
Total U.S. (including Puerto Rico)	219	100.00
U.S. City-style Total	106	48.40
U.S. Noncity-style Total	84	38.36
Puerto Rico Total	29	13.24
Source: Sample Design File version 3 and FHUMaRCS dB Tables: Census Address and Census Coding History		

Final Housing Unit Followup Results

The results from housing unit followup are presented in the following sections. These results are from an operational standpoint and are not the final CCM estimates of coverage.

5.14 How was the Final Housing Unit Followup workload distributed?

The 2010 FHUFU workload of 1,535 block clusters with 5,789 cases was delivered to the 12 RCCs and Puerto Rico, on a flow basis starting on May 3, 2011 through May 25, 2011, as block clusters completed BFU Clerical Matching. Prior to the start of IHU Computer Matching, RCCs were given the opportunity to prioritize block clusters, allowing the RCCs to influence the order in which the work arrived to better plan staffing and training and help to complete the operation on schedule. The same prioritization from IHU was used for FHU operations because of the small expected workload.

All block clusters were prioritized as follows:

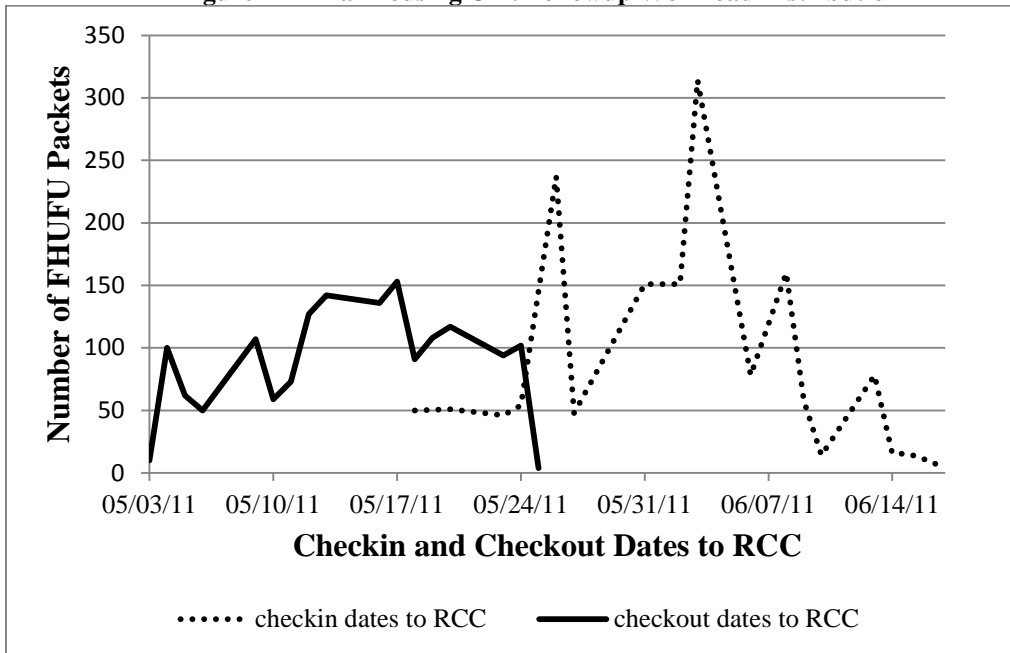
“Must do first” block cluster (Priority 0)– In the event that a special circumstance existed that made it imperative that a block cluster be returned before any others, there was a “must do first” priority code. The RCC had to send a description of the special situation via email to the FLD Division for approval. It was planned for no more than one of these block clusters per RCC and Puerto Rico.

“Smaller Block Clusters” (Priority 1) – The NPC required 1,300 smaller block clusters (no fewer than three housing units and no more than 40 housing units per block cluster) from the 12 RCCs and Puerto Rico, for their matchers to start work in order to gain expertise and to expedite the matching process. Each RCC and Puerto Rico placed approximately 10 percent of their block clusters into priority group code “1.”

Remaining Priority Block Cluster Groups (Priority 2 +) – Each of the subsequent priority block cluster groups contained approximately 100 block clusters. One-half of these priority groups were comprised of block clusters with an expected housing unit count of 40 or fewer until block clusters of that size were exhausted. Larger block clusters take more time to match. Regions could not place all their large block clusters in the highest priority group because this scenario would slow down matching for all regions. To ensure that the matching process did not become bottlenecked and that matched block clusters were sent to all RCCs on a flow basis, one-half of priority groups 2+ had to be comprised of block clusters with an expected housing unit count of 40 or fewer until block clusters of that size were exhausted.

FHUFU packets (which contained the cover page for tracking, case forms, QC form, reference list of P-sample housing units in the block cluster, and surrounding block maps needed for FHUFU), were printed, assembled, checked for printing quality and assembly at the NPC as block clusters completed BFU Clerical Matching each night. Once assembly QC was completed, the FHUFU packets were checked out to the FLD using FHUMaRCS and then shipped to the RCCs. Once the FHUFU packet had completed all field work and arrived back at the NPC, clerks at the NPC checked the block cluster back in. Figure 1 shows the workload distribution based on checkout and check-in dates.

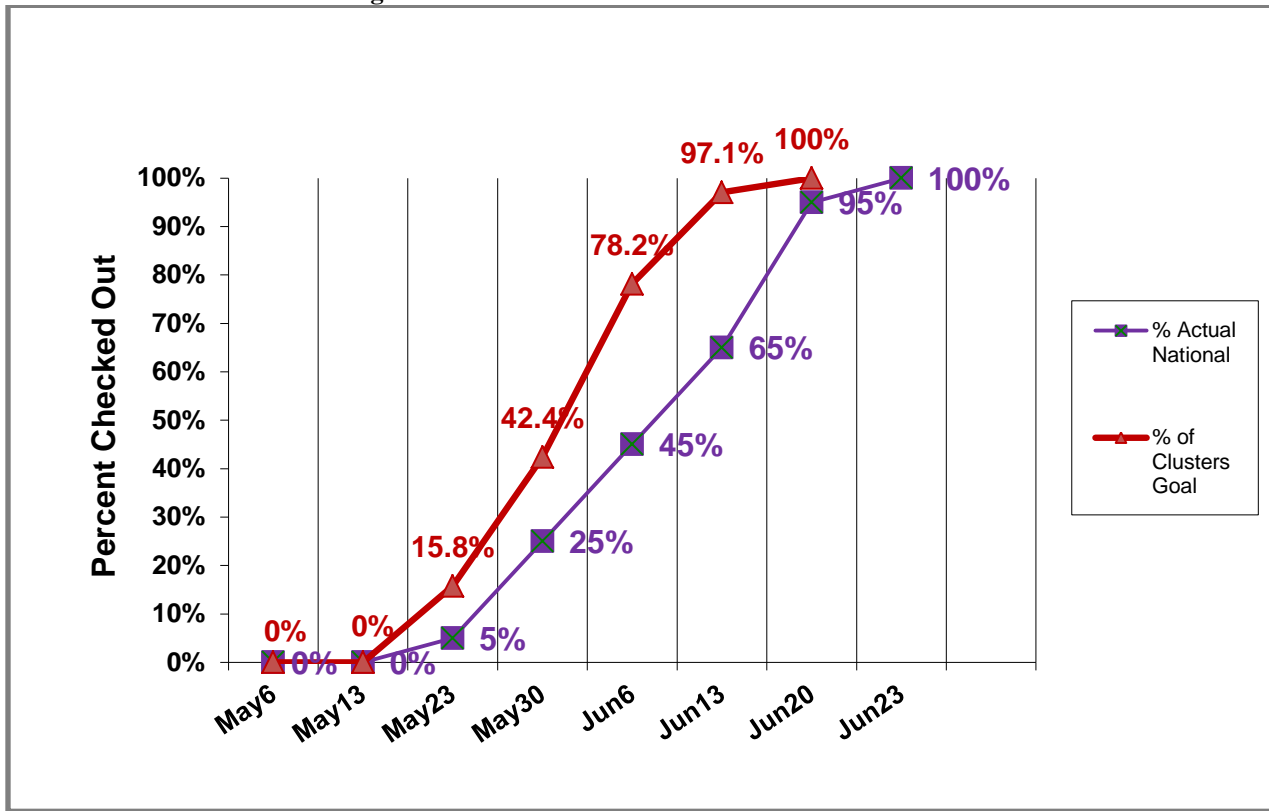
Figure 1 – Final Housing Unit Followup Workload Distribution



Source: Final Housing Unit Clerical Matching Cluster Control Output File

RCCs were provided weekly goals on the number of block clusters that should be checked out to the NPC, meaning the block cluster had completed field work (both FHUFU and FHUFU QC). Figure 2 shows the National weekly goals compared to the actual block clusters checked out to the NPC for FHUFU. All weekly goals for the FHUFU operation were either met or exceeded.

Figure 2 – Census Coverage Measurement Final Housing Unit Followup Clusters Checked Out to the National Processing Center



Sources: Coverage Measurement Operations Control System and Field Division Coverage Measurement Branch

5.15 How many block clusters and units were sent to Final Housing Unit Followup?

The workload for FHUFU was determined after FHU BFU Clerical Matching. Each night during the BFU Clerical Matching operation, several files were created to determine new cases identified for followup based on the days processing. The workload for FHUFU continued to increase throughout the BFU clerical operation, which continued for five days after FHUFU began.

Table 54 shows the Number of Block Clusters by Address Type Recode in FHUFU and Table 55 shows the information by RCC.

Table 54**The 2010 Census Coverage Measurement Final Housing Unit Followup Operation****Number of Block Clusters by Address Type Recode in Final Housing Unit Followup: Unweighted**

Address Type Recode	Total Block Clusters	Percent of Total ⁺	Block Clusters			
			Requiring Followup		Not Requiring Followup	
			Count	Row Percent ⁺	Count	Row Percent ⁺
U.S. Total.....	6,148	95.82	1,411	22.95	4,737	77.05
U.S. City-style.....	5,356	87.12	1,076	20.09	4,280	79.91
U.S. Noncity-style.....	792	12.88	335	42.30	457	57.70
Puerto Rico.....	268	4.18	124	46.27	144	53.73
Total (U.S. and Puerto Rico).....	6,416	100.00	1,535	23.92	4,881	76.08

+Percentages may not sum to totals due to rounding.

Source: Final Housing Unit Clerical Matching Cluster Control Output File

Table 55
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation
Number of Block Clusters by Regional Census Centers in Final Housing Unit Followup: Unweighted

	Total Block Clusters	Percent of Total ⁺	Block Clusters			
			Requiring Followup		Not Requiring Followup	
			Count	Row Percent ⁺	Count	Row Percent ⁺
U.S. Total.....	6,148	95.82	1,411	22.95	4,737	77.05
Atlanta.....	590	9.20	145	24.58	445	75.42
Boston	472	7.36	138	29.24	334	70.76
Charlotte.....	548	8.54	166	30.29	382	69.71
Chicago.....	416	6.48	84	20.19	332	79.81
Dallas.....	583	9.09	123	21.10	460	78.90
Denver.....	941	14.67	255	27.10	686	72.90
Detroit.....	410	6.39	81	19.76	329	80.24
Kansas City.....	501	7.81	88	17.56	413	82.44
Los Angeles.....	510	7.95	111	21.76	399	78.24
New York.....	231	3.60	47	20.35	184	79.65
Philadelphia.....	424	6.61	100	23.58	324	76.42
Seattle.....	522	8.14	73	13.98	449	86.02
Puerto Rico.....	268	4.18	124	46.27	144	53.73
Total (U.S. and Puerto Rico).....	6,416	100.00	1,535	23.92	4,881	76.08

+Percentages may not sum to totals due to rounding.
Source: Final Housing Unit Clerical Matching Cluster Control Output File

As shown in Table 54, there were 23.92 percent of the 6,416 block clusters in sample, or 1,535 block clusters, requiring followup overall (U.S. and Puerto Rico). There was a lower percent of followup block clusters in the U.S. city-style block clusters, 20.09 percent (or 1,076 block clusters), than in U.S. noncity-style block clusters, 42.30 percent (or 335 block clusters). In Puerto Rico, 46.27 percent (or 124 block clusters) required followup. Other than Puerto Rico, at the RCC level, the Charlotte and Boston regions had the highest percentage of block clusters requiring followup at 30.29 percent, or 166 block clusters, and 29.24 percent, or 138 block clusters, respectively, as shown in Table 55. The Seattle region had the lowest percentage of block clusters requiring followup at 13.98 percent, or 73 block clusters.

Table 56 displays the overall number of FHUFU cases in each block cluster for the U.S. and Puerto Rico separately. Overall, 66.84 percent or 1,026 of the block clusters had one to two

followup cases. This includes 68.60 percent or 968 block clusters in the U.S., while only 46.77 percent or 58 block clusters in Puerto Rico. The largest FHUFU packet for Puerto Rico contained 53 followup cases and for the U.S., the largest packet contained 107 followup cases.

Table 56						
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation						
Number of Followup Cases in Each Final Housing Unit Followup Form: Unweighted						
Number of Followup Cases	Total Block Clusters		U.S. Block Clusters		Puerto Rico Block Clusters	
	Count	Percent of Total+	Count	Percent of Total+	Count	Percent of Total+
Total	1,535	100.00	1,411	100.00	124	100.00
1 – 2	1,026	66.84	968	68.60	58	46.77
3 – 5	276	17.98	245	17.36	31	25.00
6 – 9	117	7.62	93	6.59	24	19.35
10 – 19	65	4.23	60	4.25	5	4.03
20 – 49	43	2.80	38	2.69	5	4.03
50 – 99	7	0.46	6	0.43	1	0.81
100+	1	0.07	1	0.07	0	0.00

+Percentages may not sum to totals due to rounding.
Source: FHUMaRCS Output Files: FHUFU Forms List History

As an indicator of how well the CCM listing and census operations did in properly listing housing units, the results of the FHUFU operation were analyzed. Each FHUFU case form could contain one or more addresses that required followup. Table 57 shows the number of addresses in FHUFU.

Table 57		
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation		
Number of Addresses in Final Housing Unit Followup by Address Type Record: Unweighted		
Address Type Record	Count	Percent of Total⁺
Total U.S. Addresses.....	8,929	88.90
CCM Addresses*.....	1,958	21.93
Census Address in Block Cluster.....	5,332	59.72
Census Group Quarters in Block Cluster.....	248	2.78
Census Housing Unit in Surrounding Block.....	1,391	15.58
Total Puerto Rico Addresses.....	1,115	11.10
CCM Addresses.....	298	26.73
Census Address in Block Cluster.....	600	53.81
Census Group Quarters in Block Cluster.....	42	3.77
Census Housing Unit in Surrounding Block.....	175	15.70
Total Addresses Requiring Followup (U.S. and Puerto Rico).....	10,044	100.00
CCM Addresses.....	2,256	22.46
Census Address in Block Cluster.....	5,932	59.06
Census Group Quarters in Block Cluster.....	290	2.89
Census Housing Unit in Surrounding Block.....	1,566	15.59

⁺Percentages may not sum to totals due to rounding.
*The sample of CCM addresses is also referred to as the Population sample, and that is how the information from this table is referred to in the executive summary.
Sources: FHUMaRCS Independent Listing Address Output File and Census Address Output File

Table 57 shows that there were 10,044 addresses requiring followup in the U.S. and Puerto Rico. Of the addresses requiring followup, 2,256 or 22.46 percent were CCM addresses, 5,932 or 59.06 percent were Census Addresses in the Block cluster, 290 or 2.89 percent were Census GQs in the Block cluster, and 1,566 or 15.59 percent were Census Housing Units in the Surrounding Block.

Table 58 shows the number of addresses in FHUFU by RCC.

Table 58
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation
Number of Addresses in Final Housing Unit Followup by Regional Census Center: Unweighted

	Total		CCM		Census	
	Count	Percent of Total ⁺	Count	Row Percent ⁺	Count	Row Percent ⁺
U.S. Total.....	8,929	88.90	1,958	21.93	6,971	78.08
Atlanta.....	987	9.83	231	23.40	756	76.60
Boston	801	7.97	160	19.98	641	80.02
Charlotte.....	1,321	13.15	269	20.36	1,052	79.64
Chicago.....	346	3.44	73	21.10	273	78.90
Dallas.....	699	6.96	128	18.31	571	81.69
Denver.....	1,644	16.37	375	22.81	1,269	77.19
Detroit.....	364	3.62	81	22.25	283	77.75
Kansas City.....	453	4.51	98	21.63	355	78.37
Los Angeles.....	1,042	10.37	283	27.16	759	72.84
New York.....	155	1.54	29	18.71	126	81.29
Philadelphia.....	673	6.70	140	20.80	533	79.20
Seattle.....	444	4.42	91	20.50	353	79.50
Puerto Rico.....	1,115	11.10	298	26.73	817	73.27
Total	10,044	100.00	2,256	22.46	7,788	77.54

+Percentages may not sum to totals due to rounding.
Sources: FHUMaRCS Clerical Matching Independent Listing Address Output File, Census Address Output File, and Final Housing Unit Followup Forms List History File

The Denver region had the highest percentage of addresses requiring followup with 1,644, or 16.37 percent of all addresses requiring followup. The Charlotte region had the second highest percentage of addresses requiring followup within the U.S. at 1,321 addresses or 13.15 percent of addresses requiring followup, followed by Puerto Rico with 1,115 addresses or 11.10 percent of the total addresses requiring followup.

5.16 How many units required an address correction during Final Housing Unit Clerical Matching?

Table 59 shows how many units required an address correction. Address corrections to CCM addresses and census housing units in the block cluster could be made by analysts during BFU Clerical Matching or during AFU Clerical Matching. Changes to census addresses only updated

the data in FHUMaRCS and did not affect 2010 Census data files. Note an address correction is any change to any address component. This could include changing the apartment designation to a unit, changing the actual house number, changing street designations for example from road to street, or updates to spelling. No address corrections were made in FHUMaRCS to census GQs or housing units in surrounding blocks.

Table 59
The 2010 Census Coverage Measurement Final Housing Unit Followup Operation
Number of Address Corrections by Clerical Matching Stage: Unweighted

Address Corrections	Total	Percent of Total+	CCM*				Census			
			Requiring Followup		Not Requiring Followup		Requiring Followup		Not Requiring Followup	
			Count	Row Percent ⁺	Count	Row Percent ⁺	Count	Row Percent ⁺	Count	Row Percent ⁺
U.S. Total.....	472	58.34	171	36.23	77	16.31	211	44.70	13	2.75
Before Followup.....	43	5.32	4	9.30	26	60.47	6	13.95	7	16.28
After Followup.....	429	53.03	167	38.93	51	11.89	205	47.79	6	1.40
Puerto Rico.....	337	41.66	36	10.68	11	3.26	224	66.47	66	19.58
Before Followup.....	79	9.77	0	0.00	8	10.13	7	8.86	64	81.01
After Followup.....	258	31.89	36	13.95	3	1.16	217	84.11	2	0.78
Total (U.S. and Puerto Rico).....	809	100.00	207	25.59	88	10.88	435	53.77	79	9.77
Before Followup.....	122	15.08	4	3.28	34	27.87	13	10.66	71	58.20
After Followup.....	687	84.92	203	29.55	54	7.86	422	61.43	8	1.16

+Percentages may not sum to totals due to rounding.

*The sample of CCM addresses is also referred to as the Population sample, and that is how the information from this table is referred to in the executive summary.

Sources: FHUMaRCS Independent Listing Address Output File, Census Address Output File, and Final Housing Unit Followup Forms List History File

Counting both CCM and census housing units, a total of 809 addresses were corrected. As expected, most of the address corrections happened during AFU (84.92 percent, or 687 addresses) using FHUFU questionnaire information that indicated the address correction. Note that these address changes/updates were only made in the clerical matching software. No changes were made to any official 2010 Census data.

5.17 How many Final Housing Unit Followup case forms were created?

Table 60 shows the count and percentages of each type of follow-up form in descending order of the overall form count. There were a total of 51 form types available for the FHUFU operation that contained questions tailored to resolve the discrepancy in the address list. The list of the case forms along with a brief description of the form's purpose is located in Appendix A. Twenty-eight of the forms were not used during the FHUFU operation, because they did not have any units fitting the code during FHU clerical matching. The forms not used in FHUFU appear in bold in Appendix A.

Table 60**The 2010 Census Coverage Measurement Final Housing Unit Followup Operation****Distribution of Final Housing Unit Followup Case Forms: Unweighted**

Final Housing Unit Followup Case Forms	Overall		U.S		Puerto Rico	
	Count	Percent of Total ⁺	Count	Row Percent ⁺	Count	Row Percent ⁺
Census Nonmatched Address (NE)	2,828	48.85	2,551	90.21	277	9.79
CCM-Census Match/Duplicate Census Address (M/DE)	1,200	20.73	1093	91.08	107	8.92
Census Nonmatched and Duplicate Address (NE/DE)	713	12.32	643	90.18	70	9.82
Surrounding Block Match (M*SB)	582	10.05	499	85.74	83	14.26
Unit Status Update/Possible CCM-Census Match (P*)	128	2.21	92	71.88	36	28.13
CCM Nonmatched Address (NI)	85	1.47	65	76.47	20	23.53
Unit Status Update (M*)	45	0.78	36	80.00	9	20.00
Surrounding Block Match/Duplicate Census Address (M*SB/DE)	35	0.60	31	88.57	4	11.43
Census not a housing unit/Duplicate Census Address (EE/DE)	33	0.57	31	93.94	2	6.06
CCM-Census Match/Two Duplicate Census Addresses (M/DE/DE)	31	0.54	26	83.87	5	16.13
Possible CCM-Census Match (P*USSB)	31	0.54	31	100.00	0	0.00
CCM-Census Match/Duplicate CCM Address (M/DI)	28	0.48	14	50.00	14	50.00
Unit Status Update and Surrounding Block Match (M*USSB)	17	0.29	12	70.59	5	29.41
Census Nonmatched/Two Duplicate Census Addresses (NE/DE/DE)	10	0.17	7	70.00	3	30.00
Unit Status Update/Duplicate Census Address (M*/DE)	7	0.12	7	100.00	0	0.00
Unit Status Update/Possible CCM-Census Match / Duplicate Census Address (P*/DE)	4	0.07	3	75.00	1	25.00
Surrounding Block Match/Two Duplicate Census Addresses (M*SB/DE/DE)	3	0.05	3	100.00	0	0.00
CCM not a housing unit/Duplicate CCM Address (XI/DI)	3	0.05	3	100.00	0	0.00
CCM Nonmatched and Duplicate Address (NI/DI)	2	0.03	2	100.00	0	0.00
Census not a housing unit/Two Duplicate Census Addresses (EE/DE/DE)	1	0.02	1	100.00	0	0.00
Group Quarters (GQ)	1	0.02	1	100.00	0	0.00
Group Quarters with Census Address Match (GQ*)	1	0.02	1	100.00	0	0.00
Unit Status Update/Possible CCM-Census Match/Two Duplicate Census Addresses (P*/DE/DE)	1	0.02	1	100.00	0	0.00
Total Followup Case Forms	5,789	100.00	5,153	89.01	636	10.99

+Percentages may not sum to totals due to rounding.

Source: FHUMaRCS Final Housing Unit Followup Forms List History File

As Table 60 shows, four forms accounted for 91.95 percent of all forms generated for FHUFU. The Census Nonmatched Address (NE) Form accounted for 2,828 cases or 48.85 percent of all follow-up forms; 1,200 cases or 20.73 percent were the CCM-Census Match/Duplicate Census Address (M/DE) Form; 713 cases or 12.32 percent were the Census Nonmatched and Duplicate Address (NE/DE) Form; and 582 cases or 10.05 percent were the Surrounding Block Match (M*SB) Form.

6. RELATED EVALUATIONS, EXPERIMENTS, AND/OR ASSESSMENTS

Information on the other CCM Operations can be found in the following Assessments:

- 2010 CCM Initial Housing Unit Independent Listing, Matching, and Followup Operations Assessment
- 2010 CCM Person Interview Operation Assessment
- 2010 CCM Person Matching and Followup Operations Assessment

7. LESSONS LEARNED, CONCLUSIONS, AND RECOMMENDATIONS

7.1 Lessons Learned

This section compiles the key lessons learned from the FHU operations based on observations by Headquarters staff during the field operations, debriefing sessions held in each RCC for office and field staff, and discussions with Headquarters and the NPC staff that worked on the operations.

7.1.1 Final Housing Unit Computer Processing

- Research how cost-effective it would be to conduct FHU computer matching, and whether we could reduce or eliminate the clerical workload by adding this additional step. Prior to the completion of CCM Person Matching and before the scheduled production start of FHU Matching, a preliminary run of the FHU Computer Processing was conducted at the request of the CCM matching staff at Headquarters. With these early results, Headquarters staff reviewed census adds with CCM nonmatches to see if any matches could be found. Headquarters staff found a significant number of matches that were resolved before NPC started FHU BFU Clerical Matching. These matches created no followup, and most of them were straightforward matches that could have been done by computer. The early run of computer processing flagged 2,887 P-sample addresses for work. As a result of the Headquarters review and clearing of work flags, the run of the production computer processing resulted in only 1,736 records flagged for work at the NPC. For census addresses in the block clusters, the number of work flags dropped from 20,319 flagged addresses in the early run to 18,697 flagged addresses in the production run. For census addresses in surrounding blocks, the number of work flags dropped from 123,657 in the early run to 120,057 in the production run. Based on those results, it may be worthwhile to program computer matching as part of the FHU Computer Processing operations, in place of the clerical work that was done at Headquarters.
- Tighten the computer processing logic. The FHU requirements called for a duplicate search of all census adds even when those additions were in surrounding blocks. If a cluster contains zero P-sample and zero E-sample addresses, then there is no effect on estimation. These clusters should not be in consideration for FHU matching.

7.1.2 Final Housing Unit Clerical Matching

- Consider whether FHU operations should be combined with person matching operations or run concurrently to streamline the CCM.

- Consider combining the followup and matching teams for this operation – it is much smaller than the IHU operations and having it all under the supervision of one person would streamline the interactions between operations.

7.1.3 Final Housing Unit Followup

- In the future, we should plan to have more of the workload available at the start of the followup operation. This will require a larger schedule gap between the start of the BFU Clerical Matching and the FHUFU Operations.
- A flag indicating if a case went to IHUFU was applied to only the primary address of the case that went to IHUFU. This flag should be applied to all addresses in a case and not just the primary address.
- The reference list was confusing for field staff because it only contained P-sample units. Should consider using the same reference list from IHUFU, which contained all addresses listed in the block cluster, so that the interviewers have a reference to everything that was supposed to be on the ground.

7.2 Conclusions

In this section we summarize the results of the FHU operations. These results are from an operational standpoint and are not the final CCM estimates of coverage.

A schedule change request was implemented before the start of the 2010 Census Coverage Measurement Final Housing Unit Matching and Followup operations to delay the start of the matching operations by about a week, due to CCM Person Clerical Matching requiring extra time for completion. The decision was made to delay the start of the FHUFU field operations by two weeks, which would allow the majority of the work for FHUFU to be available at the start of the operation, because BFU Clerical Matching would almost be complete. Also, the duration of the field operations was changed from six weeks to four weeks, since the workload was smaller than expected and would be mostly available at the start of the operation, rather than on a flow basis. The matching operations completed ahead of schedule, therefore these special arrangements did not negatively affect any later operations.

7.2.1 Final Housing Unit Computer Processing

FHU Computer Processing prepared the lists of P-sample and census addresses for FHU Clerical Matching, using data from the IHU operations, Person operations, and the final census data from the CUF. Match codes from IHU Matching were subject to update, and new match codes were assigned to census addresses that were added to the CCM search areas since IHU Matching. FHU Computer Processing also identified records with specific changes and flagged them to be worked in FHU Clerical Matching.

Addresses were flagged in a two-step process. Headquarters staff from the DSSD Coverage Measurement Design for Matching Operations Branch began reviewing and matching the

preliminary output from FHU Computer Processing before the scheduled start date for FHU Clerical Matching at the NPC. During this initial run of computer processing, 2,887 P-sample addresses were flagged; 20,319 census addresses were flagged in the CCM block clusters; and 123,657 were flagged in the surrounding blocks. The clusters containing flagged addresses were reviewed at Headquarters using FHUMaRCS. Headquarters staff was able to resolve many cases and make straight-forward address matches, such as a computer would be able to make. Consequently, the production workload for the matching staff was reduced. When FHU Computer Processing was later run to identify the clerical workload for the production work, the number of flagged cases was reduced to 1,736 P-sample addresses, 18,697 census addresses in the CCM block clusters, and 120,057 census addresses in the surrounding blocks to the sample block clusters.

The NPC clerical matching staff then reviewed the remaining flagged addresses and changed the match codes, as appropriate. Match codes could be changed for non-flagged addresses, as well.

To evaluate FHU Computer Processing, DSSD analyzed how often the match codes from computer processing were changed by Headquarters or NPC staff, during their clerical review. The results, summarized below, show that computer processing was successful in correctly assigning match codes to P-sample and E-sample addresses.

There were 178,696 *P-sample* units in the U.S. (including Puerto Rico). Of those, only 4,429 (2.48 percent) had their FHU Computer Processing match codes changed during clerical matching. There were 188,587 *E-sample* units in the U.S. (including Puerto Rico). Of those, 8,605 (4.56 percent) had their FHU Computer Processing match codes changed during clerical matching.

Clerical matchers changed the match codes for *non E-sample* census addresses to a much lesser extent. Of the 345,529 non E-sample units in the sample block clusters, 1,292 (0.37 percent) had their FHU Computer Processing match codes changed during clerical matching. In addition, only 1,432 (0.04 percent) of the non E-sample census addresses in surrounding blocks had changes to their computer processing match codes.

7.2.2 Final Housing Unit Clerical Matching

A summary of the clerical matching results for the P-sample and census housing units is given below. All counts are unweighted and presented for the U.S., including Puerto Rico.

Certain block clusters skipped clerical matching, since they did not contain any addresses that required a review, as determined by FHU Computer Processing. There were 1,897 block clusters that skipped FHU Clerical Matching

Some nonmatched E-sample addresses were not included in the followup operation because they did not have enough address information to be located in the field. A total of 219 E-sample addresses were coded as insufficient for followup, either during computer processing or BFU Clerical Matching. A summary of the progression of resolving the P-sample and census addresses, from BFU Clerical Matching to AFU Clerical Matching is provided in the table

below. The percentages are based on unweighted counts of the P-sample and census housing units, provided in the tables in Section 5.

As shown in Table 61, the unweighted results of AFU Clerical Matching show only a small increase in the percent of matched units as compared to BFU Clerical Matching. The percent of matched P-sample units increased from 94.48 percent in BFU to 94.77 percent in AFU. The percent of matched E-sample units increased from 87.76 percent in BFU to 88.03 percent in AFU. Note that as a result of FHUFU we had a slight increase in the proportion of E-sample units classified as duplicates, increasing from 1.37 percent in BFU to 1.63 percent in AFU. The percent of E-sample units that are not housing units also went up slightly from 4.26 percent to 4.74 percent. The AFU review was able to resolve some of the possible matches. For P-sample units the percent of possible matches went from 0.09 percent to 0.01 percent. The percent of E-sample possible matches went from 0.06 percent to 0.01 percent.

Table 61				
Results of Final Housing Unit Clerical Matching for P-sample and E-sample Addresses – Unweighted Percents				
United States (including Puerto Rico)	P-sample		E-sample	
	Before Followup	After Followup	Before Followup	After Followup
Matches	94.48	94.77	87.76	88.03
Possible Matches	0.09	0.01	0.06	0.01
Nonmatches	2.78	2.63	6.54	5.60
Duplicates	0.02	0.01	1.37	1.63
Not a Housing Unit	2.63	2.58	4.26	4.74

Source: Sample Design File version 3, Replicates dataset and FHUMaRCS dB tables: Census Coding History, Census Address, Cluster Control, IL Coding History, and IL Address.

E-sample addresses may have duplicates that are in the E sample, duplicates that are in the CCM sample block clusters but not in the E sample, and duplicates that are in the surrounding blocks. The duplicates in the preceding table refer only to those duplicates that are in the E sample. There are 3,065 E-sample duplicates, 421 non E-sample duplicates in the CCM sample areas, and 1,127 duplicates in the surrounding blocks.

To provide additional information on census duplicates, this assessment looks at the distribution of E-sample addresses by the number of duplicates per E-sample address. Based on results upon completion of FHU Clerical Matching¹¹, 98.16 percent of the 188,587 E-sample addresses have no duplicates; 1.79 percent have one duplicate; and 0.05 percent have more than one duplicate.

Clerical matchers also reviewed the housing unit status of the P-sample addresses and the enumeration status of the E-sample addresses. Each P-sample unit was classified as either a housing unit, not a housing unit, duplicate, geocoding error or unresolved, based on the match code assigned to the unit at the end of AFU Clerical Matching. At the same time, each E-sample

¹¹ Results include new duplicates to E-sample addresses found in Final Housing Unit Clerical Matching, as well as duplicates from Initial Housing Unit Matching.

unit from the CUF was given an enumeration status of correct enumeration, erroneous enumeration, duplicate, geocoding error, or unresolved. A unit was classified as unresolved if clerical matching could not confirm the unit's status as a housing unit, could not confirm that it was located in the sample block cluster, or could not confirm a possible match. The vast majority of P-sample units and E-sample units were classified as housing units and correct enumerations, respectively, as shown in the unweighted results that follow.

The number of P-sample housing units in the U.S. (including Puerto Rico) is 178,696 of which 97.25 percent are housing units; 2.58 percent are not housing units; 0.01 percent are duplicates; 0.12 percent are geocoding errors; and 0.04 percent are unresolved housing units. The number of E-sample units in the U.S. (including Puerto Rico) is 188,587 of which 93.43 percent are correct enumerations; 4.52 percent are erroneous enumerations; 1.63 percent are duplicates; 0.22 percent are geocoding errors; and 0.20 percent are unresolved enumerations.

7.2.3 Final Housing Unit Followup

The FHUFU was estimated to cost \$2,616,426. The actual cost of the operation was under budget by \$892,408 (34.11 percent), costing only \$1,724,018. The FHUFU production and QC operations were under budget by \$329,186 (26.37 percent) and \$563,222 (41.17 percent), respectively. These figures do require some context because of workload uncertainty prior to matching. The DSSD workload estimate prior to matching was 13,772 cases, the actual FHUFU workload was 5,789 cases. Budget estimates were based on the 13,772 cases workload estimate for FHUFU production and 9,090 QC, which were ultimately 42.03/43.74 percent more, respectively, than the actual workload. A FHUFU case was expected to cost \$90.65 per case, while actual cost was \$158.79 which is 75.17 percent more per case than expected. The FHUFU operation was not as efficient as planned in terms of time required to complete a case and the mileage associated with completing a case. We would hypothesize the reason for this is that the cases were much more geographically dispersed than expected as a result of the significantly reduced workload. This is supported by the fact that during regional managers debriefing we heard regional managers' observations that often field staff had only one or two assignments within a reasonable distance, so their time employed during this operation was very short. Because of this we could not realize any economies of scale that we expected in a larger operation.

Of the 6,416 survey block clusters, only 1,535 block clusters required FHUFU. The total followup workload of 5,789 cases unresolved after BFU Clerical Matching was delivered to the 12 RCCs and Puerto Rico, on a flow basis. During FHUFU, 0.24 cases were completed per hour, which was 0.14 more cases per hour than expected.

There was a lower percentage of followup block clusters in the U.S. city-style block clusters, 20.09 percent (or 1,076 block clusters), than in the U.S. noncity-style block clusters, 42.30 percent (or 335 block clusters), or in all of Puerto Rico, 46.27 percent (or 124 block clusters).

Each FHUFU case form could contain one or more addresses that required followup. Of the 10,044 addresses requiring FHUFU, 2,256 or 22.46 percent were P-sample addresses; 5,932 or

59.06 percent were census addresses in the block cluster; 290 or 2.89 percent were census GQs in the block cluster; and 1,566 or 15.59 percent were census housing units in surrounding blocks.

Counting both P-sample and census housing units, a total of 809 addresses were corrected during FHU Clerical Matching. As expected, most of the address corrections happened during AFU Clerical Matching (84.92 percent, or 687 addresses) because FHUFU interviewers had indicated the address correction on the FHUFU form. Note that these address changes/updates were only made in the clerical matching software. No changes were made to any official 2010 Census data.

There were a total of 51 followup form types available that contained questions tailored to resolve the specific discrepancy in the address list. Overall, most (91.95 percent) of the followup cases required one of four major form types. The Census Nonmatched Address Form accounted for 48.85 percent of all followup forms; 20.73 percent of the cases required the CCM-Census Match/Duplicate Census Address Form; 12.32 percent required the Census Nonmatched and Duplicate Address Form; and 10.05 percent required the Surrounding Block Match Form.

7.3 Recommendations

In this section we provide recommendations for improving future CCM Programs.

7.3.1 Final Housing Unit Computer Processing

- Research how cost-effective it would be to conduct FHU computer matching, and whether we could reduce or eliminate the clerical workload by adding this additional step.
- Consider sending a block cluster through FHU Computer Processing as soon as it finishes person matching, in order to start the FHU operations sooner.

7.3.2 Final Housing Unit Clerical Matching

- Review the differences between match codes in FHU BFU Clerical Matching and those in FHU AFU Clerical Matching to determine if there is a need for the FHUFU and FHU AFU Clerical Matching operations, based on the impact the match code changes would have on the CCM estimates. From BFU Clerical Matching to AFU Clerical Matching, the match codes changed for only 0.77 percent of all P-sample addresses and 2.47 percent of all E-sample addresses.
- If we determine that FHUFU and AFU Clerical Matching are required, consider computer processing of the keyed FHUFU data (or captured if automated instrument) before AFU Clerical Matching.

7.3.3 Final Housing Unit Followup

Consider automating the FHUFU operation as paper handling was very cumbersome and the operation could be simplified for field staff if automated.

Paper maps proved difficult to use. Future discussions are encouraged to solicit ideas for making the various types of maps more manageable in size and number and more recognizable from one another. However, if the questionnaire were to be automated, the maps should also be automated, hopefully resolving this concern.

In talking with RCC office staff, they requested that for future operations, QC should be a separate operation from production in the field tracking system (in 2010 this was the CMOCS), as tracking block clusters' status between FHUFU and QC was difficult.

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Appendix A – List of Final Housing Unit Case Forms

Final Housing Unit Followup (FHUFU) Case Forms	FHUFU Form Code	FHUFU Form Description
CCM Nonmatched Address	NI	The CCM listed an address that the Census did not. Determine if the CCM address is a housing unit.
CCM Nonmatched and Duplicate Address	NI/DI	The CCM listed an address that the Census did not. The CCM address is a possible duplicate with another CCM address. Determine if the CCM address is a housing unit and if the addresses on the CCM list are the same.
CCM Nonmatched/Two Duplicate CCM Addresses¹	NI/DI/DI	The CCM listed an addresses that the Census did not. The CCM addresses are possible duplicates with other CCM addresses. Determine if the CCM address is a housing unit and if the addresses on the CCM list are the same.
CCM-Census Match/Duplicate CCM Address	M/DI	The CCM and Census addresses match. The CCM address is a possible duplicate with another CCM address. Determine if the addresses on the CCM list are the same.
CCM-Census Match/Duplicate Census Address	M/DE	The CCM and Census addresses match. The Census address is a possible duplicate with another Census address. Determine if the addresses on the Census list are the same.
CCM-Census Match/Two Duplicate CCM Addresses¹	M/DI/DI	The CCM and Census addresses match. The CCM addresses are possible duplicates with other CCM addresses. Determine if the addresses on the CCM list are the same.
CCM-Census Match/Two Duplicate Census Addresses	M/DE/DE	The CCM and Census addresses match. The Census addresses are possible duplicates with other Census addresses. Determine if the addresses on the Census list are the same.
CCM not a housing unit/Duplicate CCM Address	XI/DI	The CCM address did not refer to a housing unit at the time of the Initial HUFU. For example, the structure was still under construction, future construction, unfit for habitation, demolished or burned down, business, used for the storage of non-household goods, empty trailer lot/site or trailer/house has been moved, GQ, or the address did not exist. The CCM address is a possible duplicate with another CCM address. Determine if the addresses on the CCM list are the same.
CCM not a housing unit/Two Duplicate CCM Addresses¹	XI/DI/DI	The CCM address did not refer to a housing unit at the time of the Initial HUFU. For example, the structure was still under construction, future construction, unfit for habitation, demolished or burned down, business, used for the storage of non-household goods, empty trailer lot/site or trailer/house has been moved, GQ, or the address did not exist. The CCM addresses are possible duplicates with other CCM addresses. Determine if the addresses on the CCM list are the same.
Census Nonmatched Address	NE	The Census listed an address that CCM did not. Determine if the Census address is a housing unit.
Census Nonmatched and Duplicate Address	NE/DE	The Census listed an address that CCM did not. The Census address is a possible duplicate with another Census address. Determine if the Census address is a housing unit and if the addresses on the Census list are the same.

¹Form not used in FHUFU

Final Housing Unit Followup (FHUFU) Case Forms	FHUFU Form Code	FHUFU Form Description
Census Nonmatched/Two Duplicate Census Addresses	NE/DE/DE	The Census listed an address that CCM did not. The Census addresses are possible duplicates with other Census addresses. Determine if the Census address is a housing unit and if the addresses on the Census list are the same.
Census not a housing unit/Duplicate Census Address	EE/DE	The Census address did not refer to a housing unit at the time of the Initial HUFU. For example, the structure was still under construction, future construction, unfit for habitation, demolished or burned down, business, used for the storage of non-household goods, empty trailer lot/site or trailer/house has been moved, GQ, or the address did not exist. The Census address is a possible duplicate with another Census address. Determine if the addresses on the Census list are the same.
Census not a housing unit/Two Duplicate Census Addresses	EE/DE/DE	The Census address did not refer to a housing unit at the time of the Initial HUFU. For example, the structure was still under construction, future construction, unfit for habitation, demolished or burned down, business, used for the storage of non-household goods, empty trailer lot/site or trailer/house has been moved, GQ, or the address did not exist. The Census addresses are possible duplicates with other Census addresses. Determine if the addresses on the Census list are the same.
Group Quarters	GQ	CCM listed the address as a housing unit, but Census listed it as a GQ. Determine if the CCM address is a housing unit or a GQ.
Group Quarters with Census Address Match	GQ*	
Possible CCM-Census Match¹	P	The CCM and Census addresses are possible matches. Determine if the CCM and Census addresses are the same.
Possible CCM-Census Match/Duplicate CCM Address¹	P/DI	The CCM and Census addresses are possible matches. The CCM address is a possible duplicate with another CCM address. Determine if the CCM and Census addresses are the same and if the addresses on the CCM list are the same.
Possible CCM-Census Match/Duplicate Census Address¹	P/DE	The CCM and Census addresses are possible matches. The Census address is a possible duplicate with another Census address. Determine if the CCM and Census addresses are the same and if the addresses on the Census list are the same.
Possible CCM-Census Match/Two Duplicate CCM Addresses¹	P/DI/DI	The CCM and Census addresses are possible matches. The CCM addresses are possible duplicate with other CCM address. Determine if the CCM and Census addresses are the same and if the addresses on the CCM list are the same.
Possible CCM-Census Match/Two Duplicate Census Addresses¹	P/DE/DE	The CCM and Census addresses are possible matches. The Census addresses are possible duplicates with other Census addresses. Determine if the CCM and Census addresses are the same and if the addresses on the Census list are the same.
Surrounding Block Match	M*SB	The CCM and Census addresses were matched, but the blocks for the two addresses are different. Determine the correct block.
Surrounding Block Match/Duplicate CCM Address¹	M*SB/DI	The CCM and Census addresses were matched, but the blocks for the two addresses are different. The CCM address is a possible duplicate with another CCM address. Determine the correct block and if the addresses on the CCM list are the same.

¹Form not used in FHUFU

Final Housing Unit Followup (FHUFU) Case Forms	FHUFU Form Code	FHUFU Form Description
Surrounding Block Match/Duplicate Census Address	M*SB/DE	The CCM and Census addresses were matched, but the blocks for the two addresses are different. The census address is a possible duplicate with another census address. Determine the correct block and if the addresses on the Census list are the same.
Surrounding Block Match/Two Duplicate Census Addresses	M*SB/DE/DE	The CCM and Census addresses were matched, but the blocks for the two addresses are different. The census addresses are possible duplicates with other census addresses. Determine the correct block and if the addresses on the Census list are the same.
Surrounding Block Match/Possible CCM-Census Match¹	P*SB	The CCM and Census addresses are possible matches, and the blocks for the two addresses are different. Determine if the addresses are the same and the correct block.
Surrounding Block Match/Possible CCM-Census Match/Duplicate CCM Address¹	P*SB/DI	The CCM and Census addresses are possible matches, and the blocks for the two addresses are different. Determine if the addresses are the same, the correct block, and if the addresses on the CCM list are the same.
Surrounding Block Match/Possible CCM-Census Match/Two Duplicate CCM Addresses¹	P*SB/DI/DI	
Surrounding Block Match/Possible CCM-Census Match/Duplicate Census Address¹	P*SB/DE	The CCM and Census addresses are possible matches, and the blocks for the two addresses are different. Determine if the addresses are the same, the correct block, and if the addresses on the Census list are the same.
Surrounding Block Match/Possible CCM-Census Match/Two Duplicate Census Addresses¹	P*SB/DE/DE	
Surrounding Block Match/Two Duplicate CCM Addresses¹	M*SB/DI/DI	The CCM and Census addresses were matched, but the blocks for the two addresses are different. The CCM addresses are possible duplicates with other CCM addresses. Determine the correct block and if the addresses on the CCM list are the same.
Unit Status Update	M*	The CCM and Census addresses match, but the unit status was listed by CCM as something other than occupied or vacant. Determine the unit status of the CCM address.
Unit Status Update /Two Duplicate Census Addresses¹	M*/DE/DE	The CCM and Census addresses match, but the unit status was listed by CCM as something other than occupied or vacant. The Census addresses are possible duplicates with other Census addresses. Determine the unit status of the CCM address and if the addresses on the Census list are the same.
Unit Status Update and Surrounding Block Match	M*USSB	The CCM and Census addresses were matched, but the unit status was listed by CCM as something other than occupied or vacant and the blocks for the two addresses are different. Determine the unit status and the correct block.
Unit Status Update and Surrounding Block Match/Duplicate CCM Address¹	M*USSB/DI	The CCM and Census addresses were matched, but the unit status was listed by CCM as something other than occupied or vacant and the blocks for the two addresses are different. The CCM address is a possible duplicate with another CCM address. Determine the unit status, the correct block, and if the addresses on the CCM list are the same.

¹Form not used in FHUFU

Final Housing Unit Followup (FHUFU) Case Forms	FHUFU Form Code	FHUFU Form Description
Unit Status Update and Surrounding Block Match/Duplicate Census Address ¹	M*USSB/DE	The CCM and Census addresses were matched, but the unit status was listed by CCM as something other than occupied or vacant and the blocks for the two addresses are different. The census address is a possible duplicate with another census address. Determine the unit status, the correct block, and if the addresses on the Census list are the same.
Unit Status Update and Surrounding Block Match/Two Duplicate Census Address ¹	M*USSB/DE/DE	The CCM and Census addresses were matched, but the unit status was listed by CCM as something other than occupied or vacant and the blocks for the two addresses are different. The census addresses are possible duplicates with other census addresses. Determine the unit status, the correct block, and if the addresses on the Census list are the same.
Unit Status Update and Surrounding Block Match/Possible CCM-Census Match	P*USSB	The CCM and Census addresses are possible matches, the unit status was listed by CCM as something other than occupied or vacant, and the blocks for the two addresses are different. Determine if the addresses are the same, the unit status, and the correct block.
Unit Status Update and Surrounding Block Match/Possible CCM-Census Match/Duplicate CCM Address ¹	P*USSB/DI	The CCM and Census addresses are possible matches, the unit status was listed by CCM as something other than occupied or vacant, and the blocks for the two addresses are different. Determine if the addresses are the same, the unit status, the correct block, and if the addresses on the CCM list are the same.
Unit Status Update and Surrounding Block Match/Possible CCM-Census Match/Two Duplicate CCM Addresses ¹	P*USSB/DI/DI	
Unit Status Update and Surrounding Block Match/Possible CCM-Census Match/Duplicate Census Address ¹	P*USSB/DE	The CCM and Census addresses are possible matches, the unit status was listed by CCM as something other than occupied or vacant, and the blocks for the two addresses are different. Determine if the addresses are the same, the unit status, the correct block, and if the addresses on the Census list are the same.
Unit Status Update and Surrounding Block Match/Possible CCM-Census Match/Two Duplicate Census Addresses ¹	P*USSB/DE/DE	
Unit Status Update and Surrounding Block Match/Two Duplicate CCM Addresses ¹	M*USSB/DI/DI	The CCM and Census addresses were matched, but the unit status was listed by CCM as something other than occupied or vacant and the blocks for the two addresses are different. The CCM addresses are possible duplicates with other CCM addresses. Determine the unit status, the correct block, and if the addresses on the CCM list are the same.
Unit Status Update/Duplicate CCM Address ¹	M*/DI	The CCM and Census addresses match, but the unit status was listed by CCM as something other than occupied or vacant. The CCM address is a possible duplicate with another CCM address. Determine the unit status of the CCM address and if the addresses on the CCM list are the same.

¹Form not used in FHUFU

Final Housing Unit Followup (FHUFU) Case Forms	FHUFU Form Code	FHUFU Form Description
Unit Status Update/Duplicate Census Address	M*/DE	The CCM and Census addresses match, but the unit status was listed by CCM as something other than occupied or vacant. The Census address is a possible duplicate with another Census address. Determine the unit status of the CCM address and if the addresses on the Census list are the same.
Unit Status Update/Possible CCM-Census Match	P*	The CCM and Census addresses are possible matches, and the unit status was listed by CCM as something other than occupied or vacant. Determine if the addresses are the same and the unit status of the CCM address.
Unit Status Update/Possible CCM-Census Match/Duplicate CCM Address¹	P*/DI	The CCM and Census addresses are possible matches, and the unit status was listed by CCM as something other than occupied or vacant. Determine the unit status of the address and if the addresses on the CCM list are the same.
Unit Status Update/Possible CCM-Census Match/Duplicate Census Address	P*/DE	The CCM and Census addresses are possible matches, and the unit status was listed by CCM as something other than occupied or vacant. Determine if the addresses are the same, the unit status of the CCM address, and if the addresses on the Census list are the same.
Unit Status Update/Possible CCM-Census Match/Two Duplicate CCM Addresses¹	P*/DI/DI	The CCM and Census addresses are possible matches, and the unit status was listed by CCM as something other than occupied or vacant. Determine if the addresses are the same, the unit status of the CCM address, and if the addresses on the CCM list are the same.
Unit Status Update/Possible CCM-Census Match/Two Duplicate Census Addresses	P*/DE/DE	The CCM and Census addresses are possible matches, but the unit status was listed by CCM as something other than occupied or vacant. Determine if the addresses are the same, the unit status of the CCM address, and if the addresses on the Census list are the same.
Unit Status Update/Two Duplicate CCM Addresses¹	M*/DI/DI	The CCM and Census addresses match, but the unit status was listed by CCM as something other than occupied or vacant. The CCM addresses are possible duplicates with other CCM addresses. Determine the unit status of the CCM address and if the addresses on the CCM list are the same.

¹Form not used in FHUFU

Appendix B - List of Acronyms

Acronym	Definition
AFO	After Followup Outlier
AFU	After Followup
ATCG	Address Type Cluster Group
BFU	Before Followup
C&P	Cost and Progress
CCM	Census Coverage Measurement
CL	Crew Leader
CLA	Crew Leader Assistant
CMOCS	Coverage Measurement Operations Control System
CUF	Census Unedited File
DAPPS	Decennial Applicant, Personnel and Payroll System
DMD	Decennial Management Division
DSF	Delivery Sequence File
DSSD	Decennial Statistical Studies Division
E Sample	Enumeration Sample
FHU	Final Housing Unit
FHUFU	Final Housing Unit Followup
FHUMaRCS	Final Housing Unit Matching, Review, and Coding System
FLD	Field Division
FOS	Field Operations Supervisor
GQ	Group Quarters
HU	Housing Unit
IHU	Initial Housing Unit
IHUFU	Initial Housing Unit Followup
IL	Independent Listing
M&IE	Meals and Incidental Expenses
NPC	National Processing Center
PI	Person Interview
P Sample	Population Sample
QC	Quality Control
RCC	Regional Census Center
TEA	Type of Enumeration Area