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No. 158

MEMORANDUM FOR The Distribution List

From: Arnold Jackson *[signed]*
Acting Chief, Decennial Management Division

Subject: 2010 Census Coverage Measurement Initial Housing Unit Followup
Quality Profile

Attached is the 2010 Census Coverage Measurement Initial Housing Unit Followup Quality Profile. The Quality Process for the 2010 Census Test Evaluations, Experiments, and Assessments was applied to the methodology development and review process. The report is sound and appropriate for completeness and accuracy.

If you have questions about this study plan, please contact Ryan Cecchi at (301) 763-0301.

Attachment

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2010 Census Coverage Measurement Initial Housing Unit Followup Quality Profile

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

FINAL

Ryan Cecchi

Decennial Statistical Studies Division

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Executive Summary

This quality profile presents the results of the 2010 Census Coverage Measurement Initial Housing Unit Followup Quality Assurance Program. Before the Initial Housing Unit Followup Operation began, the Census Coverage Measurement sample size was reduced. This operational sample reduction was a result of an initiative from the Director of the U.S. Census Bureau to reduce nonsampling error in the Census Coverage Measurement Program.

The Initial Housing Unit Followup field operation, along with its Quality Assurance components, occurred from March 4, 2010 to May 5, 2010 after the Census Coverage Measurement Initial Housing Unit Computer Matching and Before Followup Clerical Matching operations. Its purpose was to reconcile inconsistencies found between the Census Coverage Measurement and Census address lists during these initial matching operations. Inconsistencies included:

- Census Coverage Measurement addresses that did not match to a Census address,
- Census addresses that did not match to a Census Coverage Measurement address,
- possible duplications of addresses within either list,
- Census Coverage Measurement housing units with an unresolved unit status,
- Census Coverage Measurement housing units that matched or possibly matched a housing unit in a surrounding block of the block cluster¹, and
- Census group quarters or other living quarters that matched or possibly matched to a Census Coverage Measurement housing unit.

Each inconsistency required a specific followup interview of the housing unit(s) in disagreement. The interview for each followup housing unit or group of housing units, if the units were possible matches/duplications, made up a followup case form. A block cluster's Initial Housing Unit Followup packet was comprised of all followup case forms in that block cluster. The objectives of the followup interview were to collect additional information meant to facilitate the After Followup Clerical Matching to create an accurate listing of Census Coverage Measurement housing units in a block cluster, and to link different versions of an address appearing on the Census Coverage Measurement and/or Census lists. The result of the Initial Housing Unit Followup field operation was updated information on the followup cases to reconcile identified discrepancies, and after further clerical matching, an updated listing of Census Coverage Measurement housing units in the sample areas. This updated list comprised the Census Coverage Measurement's sample and was used as the basis for the inventory of Census Coverage Measurement housing units to interview for the Census Coverage Measurement Person Interview field operation. Of the 6,416 block clusters remaining in the reduced Census Coverage Measurement sample, 4,932 block clusters had one or more housing units that were sent to Initial Housing Unit Followup for resolution.

The objective of the Initial Housing Unit Followup Quality Assurance program was to ensure that interviewers correctly collected information for the addresses that were sent out for Initial

¹ A sample block cluster is a small geographic area consisting of a single census block or group of census blocks that is included in the Census Coverage Measurement program. It is the basic unit for data collection by Census Coverage Measurement interviewers or other field staff.

Housing Unit Followup. This objective was accomplished through the following quality assurance activities:

- Initial Observation of interviewers and quality control checkers
- Extra Observation of interviewers and quality control checkers
- Crew leader edit of interviewers' work and quality control crew leader edit of quality control checkers' work
- Quality Control Check of interviewers' work by quality control checkers
- Office edit of interviewers' and quality control checkers' work

To help ensure that the interviewers knew how to complete the Initial Housing Unit Followup cases correctly, and to provide individual feedback to the interviewer so that he or she could correct erroneous actions and continue correct actions, the crew leader observed each interviewer perform all or part of the interviewing of a block cluster. Likewise, to ensure that the quality control checkers knew how to perform the Quality Control Check correctly, the quality control crew leader observed some work for each quality control checker in his or her crew.

Collectively, interviewers and quality control checkers were referred to as field representatives. Any field representative who completed work should have undergone an Initial Observation as soon as possible after training in order to receive this individual feedback as an extension of their training. The crew leaders recorded the results of the Initial Observation on a white Observation Checklist.

Another measure added to the Census Coverage Measurement program in order to improve quality was an extra observation of the interviewers and quality control checkers conducted approximately two weeks after the Initial Observations. These Extra Observations ensured that interviewers and quality control checkers continued to follow correct procedures and interview correctly. The procedures for performing the Extra Observation were the same as the Initial Observation, except that the crew leaders used a beige-colored Observation Checklist to record the results of the Extra Observation. The beige checklists distinguished the Observation Checklist used for Extra Observations from the white checklists used for the Initial Observations. The results of the Initial and Extra Observations show the following:

- Every interviewer and quality control checker should have been observed twice, once for an Initial Observation and again for the Extra Observation. Disregarding the type of checklist (Initial-white versus Extra-beige) received and keyed, 94.6 percent of the field representatives were observed at least once and 49.9 percent were observed at least twice. Specifically looking at the type of checklist received and keyed, only 45.9 percent of the field representatives had both an Initial and an Extra Observation Checklist. While we expected to receive Extra Observation Checklists for all interviewers, the low percentage is not entirely unexpected since the requirement for conducting the Extra Observations was added just before the operation began and, unlike the Initial Checklists, the Extra Checklists were not tracked in the control system.
- Of the total number of Observation Checklists received, 91.5 percent had a final result of "Satisfactory" recorded, 1.4 percent had a final result of "Unsatisfactory" recorded,

1.3 percent had a final result of “Other” recorded, and 5.8 percent of the Observation Checklists did not have a final result marked.

- Of the 2,665 total Observation Checklists for interviewers, 7.5 percent had at least one task performed incorrectly by the interviewer being observed. Of all the tasks recorded in error during the observations of the interviewers, the three interviewer tasks that interviewers performed incorrectly the most were not following skip patterns properly (22.7 percent), not giving the Confidentiality Notice to the respondent (13.1 percent), and not showing Census identification along with not using the appropriate introduction at each unit (12.2 percent).
- Of the 1,563 total Observation Checklists for quality control checkers, 5.8 percent had at least one task performed incorrectly by the quality control checker being observed. Of all the tasks recorded in error during the observations of the quality control checkers, the two tasks quality control checkers performed incorrectly the most were not giving the Confidentiality Notice to the respondent (15.8 percent) and not correcting each error detected during verification (9.2 percent).

The crew leader edit and office edit checked the interviewers’ and quality control checkers’ work for accuracy and completeness. Although the edits by the crew leaders and office staff were part of the procedures, no data were collected or analyzed.

A Quality Control Check was performed on a random sample of each interviewer’s work in each block cluster. During the Quality Control Check, the quality control checker dependently verified the completeness and accuracy of a sample of the completed Initial Housing Unit Followup case forms for the block cluster. The quality control checker also determined if any errors detected on the selected Initial Housing Unit Followup case forms were critical. A block cluster passed the Quality Control Check if the number of sampled case forms with one or more critical errors detected was less than or equal to the Acceptance Number designated for the block cluster’s sample size (that is, total number of sampled case forms). If a block cluster failed the Quality Control Check, the quality control checker performed a 100-percent dependent rectification of all the remaining case forms in that block cluster. The results of the Quality Control Check from the Initial Housing Unit Followup Quality Control Form are as follows:

- After the Quality Control Check, 76.6 percent of the block clusters had a Quality Control Check outcome of “Pass,” while 23.4 percent had a “Fail-Rectify” result.
- Of the 1,680 interviewers who completed work, 54.2 percent had no failures during the Quality Control Check, while 45.8 percent failed the Quality Control Check at least once. More specifically, 30.4 percent of the interviewers had only one block cluster fail the Quality Control Check and 10.2 percent had exactly two of their block clusters fail the Quality Control Check.
- There were 125,192 followup cases in the Initial Housing Unit Followup workload and 19.7 percent of these followup cases were checked during the Quality Control Check.

Our pre-production estimated sampling rate, based on the planning workload estimates, was 15.9 percent.

- If we assume that all block clusters that had a Quality Control Check result of “Fail - Rectify” were correctly rectified, 34.8 percent of all followup cases were checked after the Quality Control Check and rectification.
- Of the 1,154 block clusters with a Quality Control Check result of “Fail – Rectify,” 99.0 percent had rectification data recorded. The remaining one percent of the block clusters that failed did not have rectification data recorded.
- Our calculated incoming sample error rate estimates that 8.83 percent of the total followup cases contained one or more critical errors (with a 90 percent confidence interval of 8.58 percent to 9.09 percent). Our calculated outgoing error rate estimates that 0.28 percent of the total followup cases remained in error after the Quality Control Check and rectification (with a 90 percent confidence interval of 0.19 percent to 0.38 percent). This estimated outgoing error rate is well below the desired average outgoing quality limit of 4.0 percent.
- The average number of days that an Initial Housing Unit Followup packet was in the field for production was 9.5 days, with 51.9 percent of the block clusters taking 7 to 13 days to complete. The average number of days that an Initial Housing Unit Followup packet was in the field for quality control was 5.5 days, with 34.5 percent of the block clusters taking 4 to 6 days to complete. Overall, each block cluster was in the field for Initial Housing Unit Followup and the Quality Control Check for an average of 14.0 days, though 45.9 percent of all block clusters were completed within 7 to 13 days.

Recommendations:

We recommend the following actions to improve the Census Coverage Measurement Initial Housing Unit Followup Quality Assurance program:

- **Stress the importance of the crew leaders needing to completely fill out the required items on the Observation Checklists. Items such as Field Representative Code and Result should not be left blank. A quick office edit when the Regional Census Centers receive these checklists might take care of this problem. Automating the Observation Checklists would be ideal.**
- **Revisit the procedures requiring the crew leaders to complete an Observation Checklist for field representatives who are assigned work, but resign before completing any work. The 2010 procedures required the crew leader to fill out the identification items of the field representative that resigned, to mark “Other” as the result, and to enter notes explaining that the field representative resigned before completing work on an Observation Checklist. Replacing the “Other” result with**

checkboxes titled “Resigned before observation” and “No work to observe” may be an option.

- **Emphasize during the crew leader and quality control crew leader training the procedures for observing each field representative. This includes how to completely fill out the Observation Checklist, how to complete a checklist for a field representative who resigns before being observed or who does not have any work to observe, and the requirement to complete both an Initial and an Extra Observation Checklist for each field representative.**
- **Enter the results from the Extra Observation Checklists into the Coverage Measurement Operations Control System, if the Observation Checklists are not automated in the future. This would also allow Extra Observation reports to be generated by the Coverage Measurement Operations Control System for use by the Regional Census Centers and Headquarters.**
- **Emphasize during interviewer training the importance of following the appropriate skip pattern for each followup unit in the block cluster. Automation of the data collection instrument would lessen dependence on the interviewers since the instrument would follow the appropriate skip patterns. For quality control checkers, more emphasis should be placed on crossing out and correcting incorrect entries detected. Both the interviewer and quality control checker trainings should stress the importance of showing Census identification, using the appropriate introduction at each followup unit, and providing the Confidentiality Notice to each respondent.**
- **Discuss/explore methods of preventing multiple/duplicate checklists for the same observation for a Field Representative from being sent to and keyed by the National Processing Center. This created duplicate data records for several observations. Again, an automated checklist would solve this problem. Other possible options include directing the Regional Census Centers to use only original checklists and refrain from sending copies to the National Processing Center or having the Regional Census Centers generate and affix the unique barcode labels to the original Observation Checklists instead of the National Processing Center.**
- **Stress during office staff training the importance of entering the correct items from the Initial Housing Unit Followup Quality Control Forms into the Coverage Measurement Operations Control System.**
- **Discuss possible verification methods that the office staff could use for data entry of the Initial Housing Unit Followup Quality Control data into the Coverage Measurement Operations Control System.**

1. INTRODUCTION

1.1. *Scope*

This quality profile presents the results of the Quality Assurance (QA) program of the 2010 Census Coverage Measurement (CCM) Initial Housing Unit Followup (IHUFU) Operation. These results offer summary statistics of the QA data collected and captured from the Observation Checklists and the IHUFU Quality Control (QC) Forms. The background information about the IHUFU Operation is presented in Section 2, Background. The methods that we used to analyze the QC data are presented in Section 3, Methodology, of this report. The limitations hampering our analyses are presented in Section 4, Limitations, and the actual statistics are presented in Section 5, Results (Regional Census Center (RCC) breakdowns of the tables presented in Section 5 are provided in Appendix A). In Section 6, Conclusions and Recommendations, we present a summary of our findings and provide recommendations to improve the QA program for the CCM IHUFU Operation.

1.2. *Intended Audience*

The intended audience of this profile includes members of the Decennial Statistical Studies Division (DSSD) CCM Housing Unit (HU) Team, CCM QA Team, the CCM Team Leaders in DSSD, the CCM program managers at Headquarters (HQ) and the National Processing Center (NPC), and staffs responsible for planning the 2020 CCM or equivalent Coverage Measurement operations in 2020.

2. BACKGROUND

2.1. *Initial Housing Unit Followup Operation*

After the Independent Listing (IL) Operation and before the IHUFU Operation began, the CCM sample size was reduced. This was a result of implementing operational enhancements for the CCM program as part of the Director of the Census Bureau's initiative to reduce nonsampling error. The enhancements that were implemented as part of this initiative incurred additional costs, such as increasing QC rates for field and matching operations. However, a requirement was that the initiatives had to be cost neutral for the entirety of the CCM program. Therefore, CCM program managers decided to reduce the CCM sample size. This reduction was implemented after the IL operation was complete. The IHUFU occurs after the CCM Initial HU Computer Matching of IL CCM units to the Census list of addresses in the sample areas and the CCM Initial HU Before Followup Clerical Matching operations.

The IHUFU field operation occurred from March 4, 2010 to approximately May 2, 2010. The associated QC Check began about a week after production and ran through May 5, 2010. The purpose of IHUFU was to reconcile inconsistencies found between the CCM

and Census address lists during these initial matching operations. Inconsistencies included:

- CCM addresses that did not match to a Census address,
- Census addresses that did not match to a CCM address,
- possible duplications of addresses within either list,
- CCM housing units with an unresolved unit status,
- CCM housing units that matched or possibly matched a housing unit in a surrounding block of the block cluster², and
- Census group quarters or other living quarters that matched or possibly matched to a CCM housing unit.

Each inconsistency required a specific followup interview of the housing unit(s) in disagreement. The interview for each followup housing unit or group of housing units, if the units were possible matches/duplications, made up a followup case form. A block cluster's Initial Housing Unit Followup packet was comprised of all followup case forms located in that block cluster. The objective of the followup interview was to collect additional information meant to facilitate After Followup Clerical Matching in order to create an accurate listing of CCM HUs in a block cluster and to link different versions of an address appearing on the CCM and/or Census lists. The result of the IHUFU field operation was an updated listing of CCM HUs. This updated list comprised the CCM's sample and was used as the basis for the inventory of CCM HUs to interview for the CCM Person Interview field operation. Of the 6,416 block clusters remaining in the reduced CCM sample, 4,932 block clusters had one or more housing units that were sent to IHUFU for resolution.

2.2. *Quality Assurance Program*

The objective of the IHUFU QA program was to ensure that interviewers correctly collected information on the case forms for the followup units that were sent out for IHUFU. This objective was met through the QA activities, such as:

- Observations of the interviewers
- Crew leader edit
- QC Check
- Observations of the QC checkers
- QC crew leader edit
- Office edit

A brief discussion of each of these topics is covered below.

² A sample block cluster is a small geographic area consisting of a single census block or group of census blocks that is included in the Census Coverage Measurement program. It is the basic unit for data collection by Census Coverage Measurement interviewers or other field staff.

An independent QC staff in the field and the office was maintained to ensure objectivity from IHUFU production work. Together, the interviewers and QC checkers were referred to as field representatives (FRs). For detailed information about the IHUFU QA program, please see DSSD 2010 Census Coverage Measurement Memorandum Series #2010-D5-06R, “Quality Assurance Plan for the 2010 Census Coverage Measurement Initial Housing Unit Followup Operation - Revision” (Cecchi, 2009).

2.2.1. *Initial Observation of Interviewers*

To help ensure that the interviewers knew how to complete the IHUFU cases correctly and to provide individual feedback to the interviewer so that he or she could correct erroneous actions and continue correct actions, the crew leader (CL) or a CL assistant observed each interviewer perform all or part of the interviewing of the block cluster. All interviewers were to undergo Initial Observation as soon as possible after training. We considered Initial Observation a continuation of training, rather than a test of the interviewer’s ability. Since interviewers were new to the process, a few errors committed during the observations were to be expected. The point of the Initial Observation was to provide feedback to each interviewer early in the operation.

The CL recorded the results of the observation on the white Observation Checklist, Form D-1222(CCM-IHUFU) for the United States or Form D-1222(CCM-IHUFU)(PR) for Puerto Rico. An illustration of the English-version Form D-1222(CCM-IHUFU) is shown in Appendix B. Throughout this report, these two forms will simply be referred to as the Initial Observation Checklist. The observer evaluated the interviewer’s performance on each task listed in Section A of the Observation Checklist by marking Columns “Y” (task performed correctly), “N” (task not performed correctly), or “NA” (task not applicable) under the “1st Observation” columns.

After the observation, the CL entered the outcome of the observation in Section C of the Observation Checklist by checking (✓):

- “Satisfactory,” if the interviewer had a good understanding of procedures by the end of the observation.
- “Unsatisfactory,” if the interviewer did not have a good overall understanding of procedures.
- “Other,” if the interviewer was not observed because he or she was no longer working (for example, the interviewer quit before the observation).

A second observation was required when a FR received an outcome of “Unsatisfactory” after the first observation and further training was given. If a second observation was performed, the CL made no entry in Section C of the Observation Checklist for the first observation, but instead completed Section C based on the second observation. The CL used the same Observation Checklist for both the first and second observations, recording his/her evaluation of the

interviewer's performance on the tasks listed in Section A under the "2nd Observation" columns for the second observation.

2.2.2. *Extra Observation of Interviewers*

Another measure added to the CCM program to improve quality and decrease nonsampling error was an additional observation of the interviewers and QC checkers, conducted approximately two weeks after the Initial Observations. These Extra Observations ensured that the interviewers continued to follow correct procedures and interview correctly. The procedures for performing the Extra Observation were the same as the Initial Observation, except that the CL used the beige-colored Observation Checklist to record the results of the Extra Observation. The beige checklists distinguished the Observation Checklist used for Extra Observations from the white checklists used for the Initial Observations. The Regional Census Centers (RCCs) and the Puerto Rico Area Office (PRAO) kept the completed beige Observation Checklists separate from the white checklists. The Extra Observation data were not entered into the Coverage Measurement Operations Control System (CMOCS), as specified in Section 2.2.3, below. For simplicity, the RCCs and the PRAO will simply be referred to as the RCCs throughout this report.

2.2.3. *Keying and Filing of the Observation Checklists*

After an observation, CLs submitted the completed Observation Checklists to the RCCs. There, clerks keyed information from the checklists used for the Initial Observation into the CMOCS. Due to the Extra Observation requirements being added to the CCM program just before the IHUFU Operation began, the information from the Observation Checklists used for the Extra Observation was not able to be entered into the CMOCS.

The clerks in the RCCs filed the Observation Checklists until the end of the operation. Within a week after the completion of IHUFU and the QC Check, the RCCs shipped all completed Observation Checklists, via FedEx, to the NPC. This included the checklists used for the observation of the QC checkers (see Section 2.2.6, below), along with the Observation Checklists used for the Extra Observation.

Clerks in the NPC keyed and verified the data on the Observation Checklists. This included both the white and beige checklists. The NPC then created an output file of the keyed data and delivered it to the DSSD Quality Assurance Branch (QAB) for analysis.

2.2.4. *Crew Leader Edit*

All IHUFU case forms for each block cluster required a CL edit. The purpose of the CL edit was to ensure that the IHUFU case forms were complete and legible.

If correction was necessary, the CL repaired the errors, communicating with the interviewer when needed. After the CL finished their edit and no further correction was necessary, the CL handed off the materials for the block cluster to the QC CL to assign to the QC field staff.

2.2.5. *Quality Control Check*

A QC Check was performed on a random sample of each interviewer's work in each block cluster and the results were recorded on Form D-1380, IHUFU QC Form (displayed in Appendix C). During the QC Check, the QC checker independently verified the completeness and accuracy of a sample of the completed IHUFU case forms for the block cluster. The QC checker also determined if any errors detected on the selected IHUFU case forms were critical. In general, any error was considered a critical error with the exception of the following:

- Spelling errors and/or street type errors for an address,
- Incorrect or blank description for a group quarters,
- One of the write-ins for the facility name or description for a group quarters is filled and correct, but the other is incorrect or blank,
- The item describing a group quarters is marked, but not the correct one, and
- The source of information (household member, proxy, or observation) was not verified.

A block cluster passed the QC Check if the number of sampled case forms with one or more critical errors detected was less than or equal to the Acceptance Number designated for the block cluster's sample size (that is, total number of sampled case forms). This Acceptance Number was pre-printed on the QC Form. If a block cluster failed the QC Check, the QC checker performed a 100-percent dependent rectification of all the remaining IHUFU case forms in that block cluster by verifying all case forms not checked as part of the QC Check, and correcting any errors detected.

To ensure independence, a QC checker was not assigned a block cluster in which he or she performed the IHUFU interview or worked during previous Census or CCM operations.

2.2.5.1. *Selecting the Quality Control Check Sample*

The Housing Unit Matching, Review and Coding System (HU MaRCS) selected a random sample of case forms in each block cluster for the QC Check. The number of case forms sampled in a block cluster varied according to the total number of case forms that required followup in that block cluster. The HU MaRCS selected the QC Check sample based on the table in Appendix D. This table lists the number of case forms the HU MaRCS selected for various ranges of total case forms in a block cluster. Our QA Plan estimated that HU MaRCS would select approximately 15.9 percent of all case forms over all block clusters for the QC Check (Cecchi, 2009).

2.2.5.2. *Initial Housing Unit Followup Quality Control Form*

The HU MaRCS produced the IHUFU QC Form for each block cluster. This form identified the sampled case forms selected for the QC Check in the block cluster. Again, Appendix C displays the layout of the IHUFU QC Form and its required information.

The HU MaRCS identified each case form in the block cluster selected for the QC Check in Section C: QC Check on the IHUFU QC Form.

The HU MaRCS provided the following information for the block cluster on the IHUFU QC Form:

- Number of case forms selected for the QC Check in Section C: QC Check, Item 1
- Acceptance number in Section C: QC Check, Item 2. (See Appendix D for a list of Acceptance Numbers for various sample sizes and block cluster size ranges)
- Total number of case forms for the block cluster in Section D: Rectification, Item 1

The HU MaRCS provided the NPC Document Services Branch (DSB) with the docuprint input file for each block cluster's IHUFU QC Form. The NPC-DSB docuprinted the IHUFU QC Form with the other IHUFU packet materials for the block cluster.

The NPC-DSB placed each IHUFU QC Form into its respective IHUFU packet and sent the packets to the appropriate RCC. Upon receipt of the IHUFU packets, the RCC staff removed the IHUFU QC Forms from the packets and sent them to the QC CLs for the respective block clusters. The IHUFU QC Forms were not sent with the other packet materials to the CLs for IHUFU production.

2.2.5.3. *Checking the Sampled Case Forms Requiring Followup*

The QC checker dependently verified each completed IHUFU case form selected for the QC Check in the block cluster to ensure that the interviewer's entries were complete and correct for the associated followup unit(s). The identification of the followup unit(s) associated with each sampled IHUFU case form was listed in Section C of the IHUFU QC Form.

The QC checker verified each item on the IHUFU case form by following the same IHUFU interviewing instructions as the interviewer. If an item required information from a respondent, the QC checker proceeded to verify the item in one visit, first by attempting to contact the followup unit, then by attempting to contact a proxy, then finally by observation.

The QC checker corrected each critical and noncritical error detected on the IHUFU case form.

For each sampled case form, the QC checker marked whether the case form was correct (no critical errors) or incorrect (one or more critical errors) in Section C of the IHUFU QC Form and at the end of the case form.

2.2.5.4. *Marking the Outcome of the Quality Control Check*

The QC checker marked the outcome of the QC Check for a block cluster on the IHUFU QC Form after verifying the sampled IHUFU case forms.

The number of incorrect IHUFU case forms allowed for the block cluster was pre-printed in Item 2, 'Acceptance Number,' of Section C on the IHUFU QC Form.

- If the number of incorrect IHUFU case forms was less than or equal to the 'Acceptance Number' for the block cluster, the block cluster passed the QC Check. The QC checker marked the 'Pass' checkbox in Item 5, 'QC Check Outcome,' of Section C and returned the IHUFU packet and maps to the QC CL.
- If the number of incorrect IHUFU case forms was greater than the 'Acceptance Number,' the block cluster failed the QC Check. The QC checker marked the 'Fail - Rectify' checkbox in Item 5, 'QC Check Outcome,' of Section C and proceeded to rectify the block cluster. (See Section 2.2.5.5.)

Note: Incorrect case forms had one or more critical errors. Detected non-critical errors were corrected, but not counted as incorrect in the Pass/Fail decision.

2.2.5.5. *Rectifying a Failed Block Cluster*

If a block cluster failed the QC Check, the QC checker dependently verified each of the remaining IHUFU case forms for that block cluster and corrected any errors detected.

- The QC checker followed the same IHUFU interviewing instructions as the interviewer.
- The QC checker corrected each critical and noncritical error detected.
- During the rectification of each of the remaining IHUFU case forms for the block cluster, the QC checker marked whether the case was correct (no critical errors) or incorrect (one or more critical errors) in the appropriate checkbox at the end of the followup case.
- After completing the rectification of the block cluster, the QC checker entered the total number of incorrect case forms in the cluster in Item 2, Section D: Rectification of the IHUFU QC Form. This total included both the number of incorrect case forms discovered during the QC Check's sample portion and the number of incorrect case forms discovered during the rectification.

Note: Again, incorrect case forms had one or more critical errors. Detected non-critical errors were corrected, but not counted in the Rectification error count.

- Upon completing the rectification of the block cluster, the QC checker returned the IHUFU packet to the QC CL.

2.2.6. *Observation of Quality Control Checkers*

Similar to the interviewers, each QC checker was to undergo an Initial Observation as soon as possible after training, along with an Extra Observation approximately two weeks after the Initial Observation. The instructions for the observations of the QC checkers were the same as those specified in Section 2.2.1 and Section 2.2.2, above, for the interviewers, except the QC CL used Section B of the Observation Checklist for the QC checker tasks to observe and evaluate.

2.2.7. *Quality Control Crew Leader Edit*

After the QC Check, each block cluster required a QC CL edit. The purpose of the QC CL edit was to ensure that the QC checker properly performed the QC Check and completed the IHUFU QC Form before the materials for the block cluster were returned to the RCC.

When the QC CL finished the QC CL edit and no further correction was necessary, the QC CL shipped the materials for the block cluster to the RCC.

2.2.8. *Entering Quality Control Check Results into the Coverage Measurement Operations Control System*

Upon receiving the IHUFU packet for a block cluster from the field after the QC Check, the RCC staff checked in the block cluster and entered the following results from the IHUFU QC Form into the CMOCS:

- Section C, Item 4. Total Incorrect
- Section C, Item 5. QC Check Outcome (Pass or Fail – Rectify)
- Section D, Item 2. Total Number of Incorrect Cases in Cluster, if the block cluster had a QC Check Outcome of “Fail – Rectify”

At the end of the IHUFU operation and QC Check, the CMOCS provided a database of the IHUFU QC Form data to DSSD-QAB via the interface between the CMOCS and the Census Evaluation and Experiments (CEE) System.

2.2.9. *Office Edit*

After the QC Check results were entered into the CMOCS, the IHUFU packets for each block cluster required an office edit. Similar to the CL edit and QC CL edit, the purpose of the office edit was to ensure that all IHUFU case forms and the IHUFU QC Forms were complete.

The office editor edited each IHUFU case form and IHUFU QC Form and attempted to correct each error detected. If the office editor could not correct a critical error, the office editor contacted the CL/QC CL or the interviewer/QC checker to try to correct the error and to provide feedback. The RCC did not send the IHUFU packet for the block cluster back out to the field.

2.2.10. *Statistical Quality Requirements*

2.2.10.1. *Sampling Rate*

The IHUFU workload was initially estimated at 4,802 block clusters with 222,496 followup units. The result was a pre-production estimate of 47 followup units per block cluster, with one or more followup units associated with a case form. The QC Check called for the verification of a variable sample of case forms per block cluster, based on the total number of case forms for the block cluster. The goal was a QC Check sampling rate of approximately 15.9 percent of all case forms.

2.2.10.2. *Average Outgoing Quality Limit*

The foundation for the QC Check was an acceptance sampling plan designed to achieve an average outgoing quality limit (AOQL) of four percent on a case form basis. The AOQL represents the worst average outgoing quality (AOQ) of address information over all block clusters after the IHUFU interviewing and QC Check. The Operating Characteristic (OC) curve plots the probabilities of accepting a block cluster ($P(a)$) over all possible fractions of followup case forms with one or more critical errors (p'). The OC curve for our QA plan is shown in Appendix E. This appendix also shows the AOQ curve, which plots the values of the AOQ over all possible values of p' , where $AOQ = P(a) * p'$. The highest point on the AOQ curve is our AOQL of 4.0 percent.

3. METHODOLOGY

The summary statistics presented in this report are based on our analysis of data from two sources, the Observation Checklists and the data file for the IHUFU QC Forms.

3.1. *Observation Checklists, Form D-1222(CCM-IHUFU) and Form D-1222(CCM-IHUFU)(PR) (See Appendix B)*

After receiving the completed Observation Checklists from the RCCs, the NPC keyed each form. There were 4,275 Observation Checklists that the NPC received and keyed. The keying of the checklists underwent 100-percent independent verification and

adjudication in the NPC.³ An output file containing the data was then sent to Headquarters for our analysis. After removing the data for the duplicated forms, there were 4,265 Observation Checklists. This number of 4,265 is used throughout this report when discussing the total number of Observation Checklists (Initial and Extra).

3.2. *Data File of Initial Housing Unit Followup Quality Control Form, Form D-1380, from the Coverage Measurement Operations Control System (See Appendix C)*

When the IHUFU packet for each block cluster was checked back into the RCC from the field, information from the QC Form was entered into the CMOCS. After the operation, an output file was created by the CMOCS and delivered to the DSSD-CEE System for our analysis. When the IHUFU was completed, the NPC keyed the same information from the QC Forms that was entered into CMOCS in order for DSSD-QAB to verify the CMOCS data. When any data for the block clusters differed between the two files, DSSD-QAB received copies of the QC Forms to adjudicate the differences. The RCCs and the NPC keyed the items from the QC Form for all 4,932 block clusters. Layout of the output file provided by the CMOCS is illustrated below:

Field Description	Source
Control Number	Scanned into CMOCS when block cluster was checked in from NPC
Date Assigned to Field	Registered by CMOCS when block cluster was assigned to interviewer
Crew Leader District	Registered by CMOCS when block cluster was assigned to interviewer
Interviewer FR Code	Selected in CMOCS by office staff when block cluster was assigned to interviewer, or updated when block cluster was reassigned
Date Assigned to QC Checker	Registered by CMOCS when block cluster was assigned to QC checker
QC Crew Leader District	Registered by CMOCS when block cluster was assigned to QC checker
QC Checker FR Code	Selected in CMOCS by office staff when block cluster was assigned to QC checker, or updated when block cluster was reassigned
Date Returned from Field	Registered by CMOCS when block cluster was checked in from the field
Total Number of Cases Selected for QC Check	Pulled by CMOCS from Cluster Control File from HU MaRCS
Total Number of Incorrect Cases Selected for QC Check	Entered into CMOCS by office staff when block cluster was checked in from the field
QC Check Outcome	Entered into CMOCS by office staff when block cluster was checked in from the field 1 = Pass 2 = Fail – Rectify
Total Number of Cases in Cluster	Pulled by CMOCS from Cluster Control File from HU MaRCS
Total Number of Incorrect Cases in Cluster	Entered into CMOCS by office staff when block cluster was checked in from the field, if Outcome was “Fail – Rectify”

³ The Weekly Data Keying Verification Reports, illustrated in Appendix F, showed a keying error rate of 1.0 percent on a field basis prior to any keying QC corrections.

3.3. Error Rate Estimation

Below is a brief description of the incoming and outgoing error rate estimates that are reported in the Results section and how each estimate was calculated.

3.3.1. Incoming Sample Error Rate

The incoming sample error rate (ISER) is the estimate of the proportion of errors of the sampled followup cases before correction. It is the weighted average of the error rates over all block clusters, or the number of cases with one or more critical errors divided by the total number of cases selected in the QC Check per block cluster, weighted and summed over all block clusters. The following formulas were used in calculating the incoming sample error rate and its variance:

$$ISER = \sum_{i=1}^M \left(\frac{N_i}{N} \right) \left(\frac{x_i}{n_i} \right) \quad Var(ISER) = \frac{1}{N^2} \sum_{i=1}^M \left(\frac{N_i^2}{n_i} \right) \left(\frac{x_i}{n_i} \right) \left(1 - \frac{x_i}{n_i} \right), \text{ where}$$

M = number of block clusters in the IHUFU

N_i = number of followup cases in block cluster i

N = total number of followup cases in M block clusters

n_i = number of followup cases selected for QC Check in block cluster i

x_i = number of followup cases found to have critical errors in the QC Check sample in block cluster i

3.3.2. Outgoing Error Rate

The outgoing error rate (OER) is the estimate of the proportion of errors after all QC corrections (QC Check and rectification).

For block clusters with a QC Check result of “Fail – Rectify,” we are assuming there are no errors remaining in the block clusters after the rectification is completed, because we assume the QC checkers’ rectification was done correctly.

For block clusters that had a QC Check result of “Pass,” there are two groups, 1) followup cases that were included in the QC that were checked and corrected and 2) followup cases that were not part of the QC Check. The second group’s errors have to be estimated, since these cases were not checked. There is some bias in this estimate since we are assuming that the error rate of the unchecked portion of the block cluster matches the error rate of the QC sample. The following formulas were used in calculating the outgoing error rate and its variance:

$$OER = \frac{\sum_{i=1}^M (N_i - n_i) \left(\frac{x_i}{n_i} \right)}{\sum_{i=1}^M N_i} \quad \text{Var}(OER) = \frac{1}{N^2} \sum_{i=1}^M \left(\frac{(N_i - n_i)^2}{n_i} \right) \left(\frac{x_i}{n_i} \right) \left(1 - \left(\frac{x_i}{n_i} \right) \right)$$

4. LIMITATIONS

This section discusses the assumptions and limitations for this report.

4.1. *Data from the Observation Checklists*

During the analysis of the data, we found that 10 Observation Checklists were duplicates of other keyed checklists.

We also found that many of the checklists were not filled out completely, that is, CLs or QC CLs:

- Did not record the FR code of the crew member being observed on 187 forms (4.4 percent).
- Did not record a result of the observation on 249 forms (5.8 percent).

Because the FR codes for many interviewers/QC checkers were missing from the Observation Checklists, we did not include these Observation Checklists when analyzing the number of FRs (interviewers and QC checkers) observed and the number of observations for each FR.

For Observation Checklists that did not have “Production” or “QC” marked in Identification Items, 2. Type of observation, we examined whether Section A, for interviewers, or Section B, for QC checkers, was completed on the Observation Checklist. After doing this, if we still could not determine if the FR worked on IHUFU production or IHUFU QC, we used the data from the CMOCS to try to determine which side of IHUFU the FR worked on. Using these methods, we were able to resolve many, but not all, of the instances where the type of observation was blank. The type of observation, production or QC, remained unknown for some FRs with Observation Checklists.

4.2. *Data from the Initial Housing Unit Followup Quality Control Forms*

We estimated the total number of interviewers and QC checkers who performed work by taking a count of the unique FR codes that completed each block cluster. The data provided by the CMOCS only provided the FR code of the last crew member that was assigned the work. Therefore, this may be a slight undercount of FRs, if an FR only did partial work on one or more block clusters without actually completing a single block cluster.

The dates associated for each block cluster from the data provided by CMOCS were as follows:

- Date that the block cluster was assigned to the interviewer in the CMOCS,
- Date that the block cluster was assigned to the QC checker in the CMOCS,
- Date that the block cluster was checked in from the field after the QC Check in the CMOCS.

To estimate of the number of days each block cluster was in the field, we used the following formulas:

- Number of days in production = date assigned to the QC checker – date assigned to the interviewer + 1.

This estimate includes days that the block cluster was being shipped from the RCC to the interviewer. Also, because this estimate uses the date that the RCC assigned the block cluster to a QC checker in the CMOCS as the production completion date, the interviewer may have completed the work before this date.

- Number of days in QC = date checked in from the field – date assigned to QC checker + 1.

This estimate includes days that the block cluster was being shipped from the QC checker back to the RCC. Also, since the handoff from production to QC was actually done in the field, the QC checker could have received and begun work on the block cluster before the date the RCC assigned the block cluster to a QC checker in the CMOCS.

- Total number of days in the field = date checked in from the field – date assigned to the interviewer + 1.

This estimate includes days that the block cluster was being shipped from the RCC to the field and shipped back from the field to the RCC.

Note: To account for the day that the block cluster was actually being worked, one day was added to each of these formulas (i.e., if date assigned to the interviewer and date assigned to the QC checker were the same date, our formulas produced a result of one day in production, instead of zero).

When analyzing the data from the IHUFU QC Forms, we discovered that many block clusters with a QC Check result of “Pass” should have failed based on what was entered into CMOCS for total incorrect QC cases and the acceptance number for that block cluster. We received copies of the QC Forms for these block clusters for resolution and discovered that the office staff incorrectly entered Section C, item 3, “Total Correct,” instead of Section C, item 4, “Total Incorrect” when the block clusters were checked back

in from the field. This error in data entry occurred on approximately 2.2 percent of the QC Forms. We used the corrected data for the statistics reported in the Results section.

5. RESULTS

5.1. *Observation Results*

The purpose of the Initial and Extra Observations was to ensure that the interviewers and QC checkers had a good understanding of their jobs and the interviewing procedures. As soon as possible after training was completed, the CLs and QC CLs were supposed to complete an Initial Observation Checklist by accompanying each interviewer and QC checker while he or she was interviewing the followup units in their block cluster. Within two weeks of the Initial Observation, the CLs and QC CLs were to complete an Extra Observation Checklist by again accompanying each interviewer and QC checker to make sure each continued to understand their jobs and interviewing procedures.

5.1.1 *Observation Coverage*

We received 4,265 unique Observation Checklists. There were 2,665 forms for interviewers, 1,563 for QC checkers, and 37 for which we were unable to determine whether they were for interviewers or QC checkers.

Note: The procedures indicated that each FR that performed work should have an Initial Observation Checklist *and* an Extra Observation Checklist sent to and keyed at NPC. Therefore, based on the estimated number of FRs that did work, NPC should have received 5,536 checklists.

Many FRs had multiple Initial Observation Checklists or multiple Extra Observation Checklists received and keyed. When estimating the number of FRs observed and the number of times observed, we only looked at the number of unique FR codes from all the Observation Checklists.

From the data that we received from CMOCS, there were 2,768 total FRs that completed work in one or more block clusters. Every interviewer and every QC checker that was assigned work should have been observed after training for the Initial Observation and again within two weeks of the Initial Observation for the Extra Observation. If the interviewer or QC checker did not have work to observe for the Extra Observation, the CL/QC CL was to still complete an Extra Observation Checklist, mark “Other” for the observation result, and enter a note explaining the situation. However, because the procedures for the Extra Observation were added to the operation just before it began, the RCCs may not have fully understood the procedures as written or the procedures may not have been defined clearly.

Table 1 illustrates the number of FRs (interviewers and QC checkers) observed. Regardless of whether the observation was recorded on an Initial or Extra Observation Checklist, 94.6 percent of the FRs were observed at least once. Of the FRs that completed work, 49.9 percent were observed at least twice. This is likely due the regions not understanding the requirement to observe the FRs twice, as well as, the regions not completing checklists for FRs that resigned or did not have work to observe for a second observation.

**Table 1: Number of Field Representatives (FRs)
Observed by Role***

Role	# FRs That Completed Work	# FRs Observed At Least...			
		Once		Twice	
		Count	%	Count	%
Interviewers	1,680	1,628	96.9	848	50.5
QC Checkers	1,088	962	88.4	532	48.9
Unknown	-	29	-	-	-
Total	2,768	2,619	94.6	1,380	49.9

Data Source: CMOCS and Forms D-1222(CCM-IHUFU), Observation Checklist.

* Based on number of unique FRs recorded on the Observation Checklists, regardless of type of checklist (Initial versus Extra)

Table 2 shows the number of FRs observed considering whether the FR had an Initial Observation Checklist, an Extra Observation Checklist, or both, which was the correct procedure for conducting the Initial and Extra Observations. Accounting for the type of observation checklist received and keyed, only 45.9 percent of the FRs had both an Initial and Extra Observation Checklist. Again, this could have been a result of confusion pertaining to the procedures. The breakdown of both of these tables by RCC can be seen in Table 1A and Table 2A in Appendix A.

Table 2: Number of Field Representatives (FRs) Observed by Type of Checklist and Role*

Role	# FRs That Completed Work	# FRs with...					
		Initial Obs. Checklist Only		Extra Obs. Checklist Only		Both Initial and Extra Obs. Checklists**	
		Count	%	Count	%	Count	%
Interviewers	1,680	750	44.6	95	5.7	783	46.6
QC Checkers	1,088	427	39.2	48	4.4	487	44.8
Unknown	-	28	-	1	-	-	-
Total	2,768	1,205	43.5	144	5.2	1,270	45.9

Data Source: CMOCS and Forms D-1222(CCM-IHUFU), Observation Checklist.

* Based on number of unique FRs recorded on the Observation Checklists

** Procedurally correct

5.1.2 Final Results of the Observation

Of the total number of Observation Checklists received and keyed, 91.5 percent had a final result of “Satisfactory,” 1.4 percent had a final result of “Unsatisfactory,” and 1.3 percent had a final result of “Other.” No result was recorded for 5.8 percent of the Observation Checklists, which illustrated procedural errors by the CL/QC CL. Of the checklists for which we could not determine role (interviewer versus QC checker), 83.8 percent had a result of “Other.” These checklists are most likely for FRs who resigned before an observation could be conducted. The Observation Checklists for QC checkers had a higher rate of missing outcomes (procedural error) than for interviewers. This is likely a result of the QC work requiring less time to complete, QC checkers finishing their work before an observation was able to be performed, and the crew leader not marking an outcome, instead of marking “Other.” Table 3 summarizes the final observation results and Table 3A, Table 3B, and Table 3C in Appendix A illustrate these outcomes by RCC for the Initial, Extra, and all Observation Checklists, respectively.

**Table 3: Final Results from Observation Checklists by
Type of Checklist and Role**

Outcome	Initial Obs.		Extra Obs.		Total	
Interviewers	Count	%	Count	%	Count	%
Satisfactory	1,605	94.0	878	91.8	2,483	93.2
Unsatisfactory	23	1.4	11	1.2	34	1.3
Other	14	0.8	4	0.4	18	0.7
Missing*	66	3.9	64	6.7	130	4.9
Sub-total	1,708	100.0	957	100.0	2,665	100.0
QC Checkers	Count	%	Count	%	Count	%
Satisfactory	912	91.5	503	88.9	1,415	90.5
Unsatisfactory	16	1.6	7	1.2	23	1.5
Other	7	0.7	-	-	7	0.5
Missing*	62	6.2	56	9.9	118	7.6
Sub-total	997	100.0	566	100.0	1,563	100.0
Unknown*	Count	%	Count	%	Count	%
Satisfactory	4	11.1	-	-	4	10.8
Unsatisfactory	1	2.8	-	-	1	2.7
Other	30	83.3	1	100.0	31	83.8
Missing*	1	2.8	-	-	1	2.7
Sub-total	36	100.0	1	100.0	37	100.0
All Roles	Count	%	Count	%	Count	%
Satisfactory	2,521	92.0	1,381	90.6	3,902	91.5
Unsatisfactory	40	1.5	18	1.2	58	1.4
Other	51	1.9	5	0.3	56	1.3
Missing*	129	4.7	120	7.9	249	5.8
TOTAL	2,741	100.0	1,524	100.0	4,265	100.0

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

* *Procedural error*

5.1.3. Summary of Errors Committed by Interviewers and Quality Control Checkers during Observation

Table 4 below presents a summary of errors reported by the CLs during the observation of the interviewers. Overall, 199 of the 2,665 total Observation Checklists (7.5 percent) for interviewers had errors recorded. Of the total number of tasks observed in error for all of the checklists, the three tasks that the interviewer performed incorrectly the most were not answering each question according to the skip pattern (22.7 percent), not giving the Confidentiality Notice to the respondent (13.1 percent), and not showing Census identification along with not using the appropriate introduction at each unit (12.2 percent).

The data from the Extra Observation Checklists show that further into the operation, the three tasks that interviewers performed incorrectly the most were not following the skip pattern (24.2 percent), not correcting and/or updating the CCM maps (15.4 percent), and not contacting or trying to contact a knowledgeable person at each followup unit (11.0 percent).

Table 4: Distribution of Tasks Performed Incorrectly during Observation - Interviewers

Tasks interviewers failed to perform correctly	Initial Obs.		Extra Obs.		Total	
	#	%	#	%	#	%
Traveling through the assigned block cluster						
1. Found the correct block(s) in the block cluster	20	5.6	2	2.2	22	4.9
2. Found or tried to find each followup unit in the block cluster	23	6.4	5	5.5	28	6.2
Completing the Final HUFU Packet						
3. Contacted or tried to contact a knowledgeable person at each followup unit	23	6.4	10	11.0	33	7.3
4. Showed Census identification and used appropriate introduction at each followup unit, if applicable	48	13.4	7	7.7	55	12.2
5. Gave Confidentiality Notice to each respondent	50	13.9	9	9.9	59	13.1
6. Tried to conduct an interview at each followup unit	15	4.2	8	8.8	23	5.1
7. Answered each question according to skip pattern for each followup unit in the block cluster	80	22.3	22	24.2	102	22.7
Using the CCM Maps and the Reference List						
8. Used the CCM maps as a resource	37	10.3	6	6.6	43	9.6
9. Corrected and/or updated the CCM block maps and sketch maps	37	10.3	14	15.4	51	11.3
10. Used the CCM Final Housing Unit Reference List as a resource	26	7.2	8	8.8	34	7.6
Total	359	100.0	91	100.0	450*	100.0

* Overall, 199 of the 2,665 total checklists (7.5 percent) for interviewers had errors recorded

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

Table 5 illustrates the errors reported by the QC CLs during the observation of the QC checkers. Overall, 91 of the 1,563 total Observation Checklists (5.8 percent) for QC checkers had errors recorded. Of the total number of tasks observed in

error for all of the checklists, the two tasks that the QC checker performed incorrectly the most were not giving the Confidentiality Notice to the respondent (15.8 percent) and not correcting each error detected during verification (9.2 percent). Table 4A and Table 5A in Appendix A show the distributions of the interviewer and QC checker errors by RCC.

The data from the Extra Observation Checklists show that further into the operation, the two tasks that QC checkers performed incorrectly the most were not giving the Confidentiality Notice to the respondent (14.5 percent) and not showing Census identification and not using the appropriate introduction at each unit (10.5 percent).

Table 5: Distribution of Tasks Performed Incorrectly during Observation – Quality Control Checkers

Tasks QC checkers failed to perform correctly	Initial Obs.		Extra Obs.		Total	
	#	%	#	%	#	%
Traveling through the assigned block cluster						
1. Found the correct block(s) in the block cluster	6	3.7	1	1.3	7	2.9
2. Found or tried to find each followup unit in the QC sample or requiring rectification	3	1.8	7	9.2	10	4.2
Completing the QC Check						
3. Followed proper procedures in contacting or trying to contact a knowledgeable person at each followup unit in the QC sample or requiring rectification (i.e., HH member, then proxy, then observation)	12	7.3	2	2.6	14	5.8
4. Showed Census identification and used appropriate introduction at each followup unit in the QC sample or requiring rectification, if appropriate	11	6.7	8	10.5	19	7.9
5. Gave Confidentiality Notice to each respondent	27	16.5	11	14.5	38	15.8
6. Verified that the interviewer's entries were complete and correct for each followup unit in the QC sample	8	4.9	6	7.6	14	5.8
7. Crossed out and corrected each entry detected in error for each followup unit in the QC sample or requiring rectification	15	9.1	7	9.2	22	9.2
8. Marked the result of the QC Check in Section C of Form D-1380, IHUFU QC Form, for each followup unit in the QC sample	12	7.3	4	5.3	16	6.7
9. Marked the outcome of the QC Check in Section C of Form D-1380, IHUFU QC Form	12	7.3	5	6.6	17	7.1
10. If block cluster failed the QC Check, rectified the cluster by verifying that all entries were complete and correct for each remaining followup unit in the block cluster	5	3.0	6	7.6	11	4.6
11. Recorded the total number of incorrect cases in Section D of Form 1380, IHUFU QC Form, if rectification is required	10	6.1	7	9.2	17	7.1
Using the CCM Maps and the Reference List						
12. Used the CCM maps as a resource	15	9.1	4	5.3	19	7.9
13. Verified corrections and/or updates on the CCM block maps and sketch maps, as appropriate	13	7.9	6	7.6	19	7.9
14. Used the CCM Final Housing Unit Reference List as a resource	15	9.1	2	2.6	17	7.1
Total	164	100.0	76	100.0	240*	100.0

* Overall, 91 of 1,563 total checklists (5.8 percent) for QC checkers had errors recorded

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

5.2. Quality Control Results

The QC Check was performed on a random sample of each interviewer's work in each block cluster. During the QC Check, the QC checker dependently verified the completeness and accuracy of a sample of the completed IHUFU case forms for the block cluster. The QC checker also determined if any errors detected on the selected IHUFU case forms were critical. A block cluster passed the QC Check if the number of sampled

case forms with one or more critical errors detected was less than or equal to the Acceptance Number designated for the block cluster's sample size (i.e., total number of sampled case forms). If a block cluster failed the QC Check, the QC checker performed a 100-percent dependent rectification of all the remaining IHUFU case forms in that block cluster.

5.2.1. Quality Control Check Result

A QC Check was conducted for each block cluster in the IHUFU. Table 6 shows that 76.6 percent of the block clusters had a QC Check result of "Pass," while 23.4 percent had a "Fail-Rectify" result. Table 6A in Appendix A illustrates these QC Check results by RCC.

Table 6: Quality Control Check Results

Pass		Fail - Rectify		Total
#	%	#	%	#
3,778	76.6	1,154	23.4	4,932

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

Table 6.1 presents the distribution of interviewers by the number of block clusters that failed the QC Check. Of the 1,680 interviewers who completed work, 54.2 percent had no failures, while 45.8 percent had at least one QC Check result of "Fail – Rectify." More specifically, 30.4 percent of the interviewers had only one block cluster with a QC Check result of "Fail – Rectify" and 10.2 percent had two block clusters with a QC Check result of "Fail – Rectify."

Table 6.1: Frequency of Interviewers by Number of Failed Block Clusters

# of Failed Clusters <i>n</i>	Interviewers with <i>n</i> Failed Clusters		Block Clusters Worked	
	#	%	#	%
0	910	54.2	2,188	44.4
1	510	30.4	1,494	30.3
2	172	10.2	731	14.8
3	60	3.6	326	6.6
4	23	1.4	141	2.9
5	3	0.2	33	0.7
6	1	0.1	11	0.2
7	1	0.1	8	0.2
Total	1,680	100.0	4,932	100.0
Total Failed (n>0)	770	45.8	2,744	55.6

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

5.2.2. *Quality Control Workload*

There were 125,192 followup cases in the IHUFU. By counting the number of cases checked in the QC sample, we can compute the QC sampling rate. The calculation shows that 19.7 percent of the followup cases were checked as part of the QC Check. Note: After the sample reduction, we estimated a pre-production sampling rate of 15.9 percent in our Quality Assurance Plan (Cecchi, 2009).

If we assume that all block clusters that had a QC Check result of “Fail - Rectify” were correctly rectified, 34.8 percent of the total followup cases were verified after the QC Check and rectification. Table 7 shows the QC sample workload, along with the total verification workload after rectification, in greater detail. Table 7A, in Appendix A, shows these QC and total verification workloads by RCC.

Table 7: Quality Control Check and Total Verification Workloads

Total # of Cases	# of Cases in QC Check	QC Sampling Rate (%)	# of Cases Rectified after QC (for Failed Clusters)	# of Total Cases Checked*	Total Verification Rate (%)
125,192	24,680	19.7	18,880	43,560	34.8

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

* QC sample + rectification

5.2.3. *Rectification Results*

A block cluster should have been rectified if it failed the QC Check. As illustrated in Table 6 above, of the total 4,932 block clusters in the IHUFU, there were 1,154 block clusters with a QC Check result of “Fail – Rectify.” Therefore, there should have only been 1,154 block clusters rectified. However, 1,197 block clusters had rectification data recorded on the QC Form. Of the 1,154 block clusters with a QC Check result of “Fail – Rectify,” 99.0 percent had rectification data recorded. The remaining one percent of the block clusters that failed the QC Check did not have rectification totals recorded on the QC Form. However, for two of the block clusters that failed the QC Check that did not have rectification data, all of the followup cases were checked in the QC. Therefore, there were no extra cases to be rectified for these two block clusters. Conversely, 1.4 percent of the block clusters with a QC Check result of “Pass” had rectification results recorded. It is possible that the office editor recorded the number of cases with critical errors that they detected during their office edit in Section D: Rectification of the QC Form.

A summary of block clusters rectified is presented in Table 8 and the breakdown by RCC of this table can be seen in Table 8A in Appendix A.

Table 8: Quality Control Check Results Versus Rectification Data

QC Check Result	Total Clusters	Clusters with Rectification Data	
		#	%
Pass	3,778	54*	1.4
Fail - Rectify	1,154**	1,143	99.0
Total	4,932	1,197	24.3

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

* Procedural error

** For two block clusters, all cases were checked in the QC sample so no additional rectification data was recorded in Section D of the IHUFU QC Form

5.2.4. *Incoming and Outgoing Error Rates*

The estimated incoming sample error rate was calculated by taking the sum of the weighted number of followup cases with critical errors in each block cluster and dividing by the total number of followup cases in all block clusters. After this calculation, the incoming sample error rate shows that an estimated 8.83 percent of the total followup cases contained critical errors (with a 90 percent confidence interval of 8.58 percent to 9.09 percent).

By analyzing the block clusters with a QC Check result of “Pass” with one or more cases with critical errors and the block clusters with a QC Check result of “Fail – Rectify” with no rectification data recorded, we can estimate the greatest possible outgoing error rate. This estimated outgoing error rate was calculated by taking the sum of the weighted number of followup cases with critical errors that were not checked in the QC sample for each of these block clusters and dividing that by the total number of followup cases in all block clusters. After this calculation, the outgoing error rate shows that, at worst, an estimated 0.28 percent of the total followup cases remained in error after the QC Check and rectification (with a 90 percent confidence interval of 0.19 percent to 0.38 percent). This estimated outgoing error rate is well below the specified average outgoing quality limit of 4.0 percent set forth in our QA Plan (Cecchi, 2009).

5.2.5. *Time in Field*

To gain perspective as to how much time the production and QC assignments took in the field, we analyzed the time it took for the interviewers and QC checkers to complete each block cluster by means of the dates registered in the CMOCS. The average number of days that a block cluster was in the field for production was 9.5 days, with 51.9 percent of the block clusters taking 7 to 13 days to complete. The average number of days that a block cluster was in the field for QC was 5.5 days, with 34.5 percent of the block clusters taking 4 to 6 days to complete. The average number of days that a block cluster was in the

field throughout both production and QC was 14.0 days, though 45.9 percent of the block clusters took 7 to 13 days to complete. A summary of the number of days block clusters were in the field for production, QC, and overall can be seen in Table 9, Table 10, and Table 11, respectively. Tables 9A, 10A, and 11A in Appendix A show this information by RCC.

Table 9: Number of Days Block Clusters in Field – Production

Avg.	1-6		7-13		14-20		21-27		>27		Total Clusters
	#	%	#	%	#	%	#	%	#	%	
9.5	1,339	27.2	2,561	51.9	835	16.9	161	3.3	36	0.7	4,932

Data Source: CMOCS.

Table 10: Number of Days Block Clusters in Field – Quality Control

Avg.	1-3		4-6		7-13		14-20		>20		Total Clusters
	#	%	#	%	#	%	#	%	#	%	
5.5	1,628	33.0	1,703	34.5	1,391	28.2	173	3.5	37	0.8	4,932

Data Source: CMOCS.

Table 11: Number of Days Block Clusters in Field – Overall

Avg.	1-6		7-13		14-20		21-27		>27		Total Clusters
	#	%	#	%	#	%	#	%	#	%	
14.0	219	4.4	2,263	45.9	1,846	37.4	478	9.7	126	2.6	4,932

Data Source: CMOCS.

6. CONCLUSIONS AND RECOMMENDATIONS

In this section, we summarize our conclusions from the QA activities and provide recommendations for improving the IHUFU and IHUFU QA programs.

6.1 Conclusions

Every interviewer and QC checker should have been observed twice, once for an Initial Observation and again for the Extra Observation. Disregarding the type of checklist (Initial-white versus Extra-beige) received and keyed, 94.6 percent of the FRs were observed at least once and 49.9 percent were observed at least twice. Specifically looking at the type of checklist received and keyed, only 45.9 percent of the FRs had both an Initial and an Extra Observation Checklist. However, because the Extra Observations were added to the operation just before it began, RCCs may not have fully understood the procedures as written or the procedures may not have been defined clearly.

Of the total number of Observation Checklists received, 91.5 percent had a final result of “Satisfactory” recorded, 1.4 percent had a final result of “Unsatisfactory” recorded, 1.3 percent had a final result of “Other” recorded, and 5.8 percent of the Observation Checklists did not have a final result marked by the CL/QC CL.

Of the 2,665 total Observation Checklists for interviewers, 7.5 percent had at least one task performed incorrectly by the interviewer being observed. Of all the tasks recorded in error during the observations of the interviewers, the three tasks that interviewers performed incorrectly the most were not following skip patterns properly (22.7 percent), not giving the Confidentiality Notice to the respondent (13.1 percent), and not showing Census identification along with not delivering the appropriate introduction at each unit (12.2 percent).

Of the 1,563 total Observation Checklists for QC checkers, 5.8 percent had at least one task performed incorrectly by the QC checker being observed. Of all the tasks recorded in error during the observations of the QC checkers, the two tasks that QC checkers performed incorrectly the most during the observations were not giving the Confidentiality Notice to the respondent (15.8 percent) and not correcting each error detected during the verification (9.2 percent).

After the QC Check, 76.6 percent of the block clusters had a QC Check outcome of “Pass,” while 23.4 percent had a “Fail-Rectify” result.

Of the 1,680 interviewers who completed work, 54.2 percent had no failures, while 45.8 percent had at least one block cluster with a QC Check result of “Fail – Rectify.” More specifically, 30.4 percent of the interviewers had only one block cluster with a QC Check result of “Fail – Rectify” and for 10.2 percent of the interviewers, two of their total block clusters had a QC Check result of “Fail – Rectify.”

There were 125,192 followup cases in the IHUFU and 19.7 percent of these followup cases were checked in the QC. Our pre-production estimated sampling rate, based on the planning workload estimates, was 15.9 percent.

If we assume that all block clusters that had a QC Check result of “Fail - Rectify” were correctly rectified, 34.8 percent of the total followup cases were checked after the QC Check and rectification.

Of the 1,154 block clusters that failed the QC Check, 99.0 percent also had rectification data recorded. The remaining one percent of the failed block clusters did not have rectification data recorded.

Our calculation of the incoming sample error rate estimated that 8.83 percent of the total followup cases contained one or more critical errors (with a 90 percent confidence interval of 8.58 percent to 9.09 percent). The outgoing error rate estimated that 0.28 percent of the total followup cases remained in error after the QC Check and rectification (with a 90 percent confidence interval of 0.19 percent to 0.38 percent). This is well below the desired average outgoing quality limit of 4.0 percent.

The average number of days that an IHUFU block cluster was in the field for production was 9.5 days, with 51.9 percent of the block clusters taking 7 to 13 days to complete. The average number of days that an IHUFU block cluster was in the field for QC was 5.5

days, with 34.5 percent of the block clusters taking 4 to 6 days to complete. The average number of days that a block cluster was in the field throughout both production and QC, was 14.0 days, though 45.9 percent of the block clusters took 7 to 13 days to complete.

6.2 *Recommendations*

We recommend the following actions to improve the CCM IHUFU and IHUFU QA programs:

Stress the importance of the CLs needing to completely fill out the required items on the Observation Checklists. Items such as FR Code and Result should not be left blank. A quick office edit when the RCCs receive these checklists might take care of this problem. Automating the Observation Checklists would be ideal.

Change the procedures requiring the CLs to complete an Observation Checklist for FRs who are assigned work, but resign before completing any work. The 2010 procedures required the CL to fill out the identification items of the FR that resigned, to mark “Other” as the result, and to enter notes explaining that the FR resigned before completing work on an Observation Checklist. Replacing the “Other” result with checkboxes titled “Resigned before observation” and “No work to observe” may be an option.

Emphasize during the CL and QC CL training the procedures for observing each FR. This includes how to completely fill out the Observation Checklist, how to complete a checklist for a FR who resigns before being observed or who does not have any work to observe, and the requirement to complete both an Initial and an Extra Observation Checklist for each FR.

Enter the results from the Extra Observation Checklists into the CMOCS if the Observation Checklists are not automated in future CCM operations. This would allow CMOCS to generate reports for the Extra Observations for use by the RCCs and HQ.

Emphasize during interviewer training the importance of following the appropriate skip pattern for each followup unit in the block cluster. Automation of the data collection instrument would lessen dependence on the interviewers since the instrument would follow the appropriate skip patterns. For QC checkers, more emphasis should be placed on crossing out and correcting the incorrect entries detected. Both the interviewer and QC checker trainings should stress the importance of showing Census identification, using the appropriate introduction at each followup unit, and providing the Confidentiality Notice to each respondent.

Discuss methods for preventing multiple checklists for the same observation for a FR from being sent to and keyed by the NPC. This created duplicate data for several observations. Possible suggestions include directing the RCCs to use only original checklists and refrain from sending copies of the checklists or having the

RCCs generate and affix the unique barcode labels to the original Observation Checklists. Automating the Observation Checklists would also eliminate the duplication of data.

Stress during office staff training the importance of entering the correct items from the IHUFU QC Forms into the CMOCS.

Discuss possible methods for the office staff to verify the data entry of the IHUFU QC data into the CMOCS.

7. ACKNOWLEDGEMENTS

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8. REFERENCES

Cecchi, Ryan (2009), "Quality Assurance Plan for the 2010 Census Coverage Measurement Initial Housing Unit Followup Operation – Revision," DSSD 2010 Census Coverage Measurement Memorandum Series, No. 2010-D5-06R, U.S. Census Bureau, June 4, 2009.

Results Tables by Regional Census Centers

**Table 1A: Number of Field Representatives (FRs)
Observed by Role and RCC***

Role	# FRs That Completed Work	# FRs Observed At Least...**			
		Once		Twice	
		Count	%	Count	%
Interviewers					
Boston	134	134	100.0	72	53.7
New York	66	62	93.9	32	48.5
Philadelphia	101	100	99.0	72	71.3
Detroit	140	116	82.9	13	9.3
Chicago	105	96	91.4	61	58.1
Kansas City	103	102	99.0	43	41.7
Seattle	73	67	91.8	45	61.6
Charlotte	155	117	75.5	81	52.3
Atlanta	158	168	106.3	99	62.7
Dallas	149	147	98.7	79	53.0
Denver	211	225	106.6	173	82.0
Los Angeles	152	151	99.3	52	34.2
Puerto Rico	133	143	107.5	26	19.5
Sub-Total	1,680	1,628	96.9	848	50.5
QC Checkers					
Boston	55	49	89.1	34	61.8
New York	46	45	97.8	34	73.9
Philadelphia	66	60	90.9	43	65.2
Detroit	53	35	66.0	14	26.4
Chicago	68	61	89.7	31	45.6
Kansas City	77	75	97.4	31	40.3
Seattle	56	50	89.3	31	55.4
Charlotte	76	58	76.3	51	67.1
Atlanta	132	111	84.1	18	13.6
Dallas	136	135	99.3	66	48.5
Denver	134	119	88.8	99	73.9
Los Angeles	124	122	98.4	75	60.5
Puerto Rico	65	42	64.6	5	7.7
Sub-Total	1,088	962	88.4	532	48.9
Unknown					
Boston	-	1	-	-	-
New York	-	-	-	-	-
Philadelphia	-	-	-	-	-
Detroit	-	-	-	-	-
Chicago	-	-	-	-	-
Kansas City	-	12	-	-	-
Seattle	-	-	-	-	-
Charlotte	-	-	-	-	-
Atlanta	-	2	-	-	-
Dallas	-	-	-	-	-
Denver	-	1	-	-	-
Los Angeles	-	2	-	-	-
Puerto Rico	-	11	-	-	-
Sub-Total	-	29	-	-	-
All Roles					
Boston	189	184	97.4	106	56.1
New York	112	107	95.5	66	58.9
Philadelphia	167	160	95.8	115	68.9
Detroit	193	151	78.2	27	14.0
Chicago	173	157	90.8	92	53.2
Kansas City	180	189	105.0	74	41.1
Seattle	129	117	90.7	76	58.9
Charlotte	231	175	75.8	132	57.1
Atlanta	290	281	96.9	117	40.3
Dallas	285	282	98.9	145	50.9
Denver	345	345	100.0	272	78.8
Los Angeles	276	275	99.6	127	46.0
Puerto Rico	198	196	99.0	31	15.7
NATIONAL	2,768	2,619	94.6	1,380	49.9

Data Source: CMOCS and Forms D-1222(CCM-IHUFU), Observation Checklist.

* Based on number of unique FRs recorded on the Observation Checklists, regardless of type of checklist (Initial versus Extra)

** Percents could be greater than 100.0 if there were more FRs recorded on Observation Checklists than FRs that completed work per the CMOCS data. (Note: This is possible due to the procedure requiring an Observation Checklist for any FR assigned work, whether they completed any work or not)

Table 2A: Number of Field Representatives (FRs) Observed by Type of Checklist, Role, and RCC*

Role	# FRs That Completed Work	FRs with...					
		Initial Obs. Checklist Only		Extra Obs. Checklist Only		Both Initial and Extra Obs. Checklists***	
		Count	%	Count	%	Count	%
Interviewers							
Boston	134	58	43.3	6	4.5	70	52.2
New York	66	27	40.9	3	4.5	32	48.5
Philadelphia	101	28	27.7	2	2.0	70	69.3
Detroit	140	99	70.7	6	4.3	11	7.9
Chicago	105	31	29.5	5	4.8	60	57.1
Kansas City	103	62	60.2	2	1.9	38	36.9
Seattle	73	21	28.8	2	2.7	44	60.3
Charlotte	155	31	20.0	10	6.5	76	49.0
Atlanta	158	81	51.3	6	3.8	81	51.3
Dallas	149	70	47.0	4	2.7	73	49.0
Denver	211	28	13.3	31	14.7	166	78.7
Los Angeles	152	86	56.6	15	9.9	50	32.9
Puerto Rico	133	128	96.2	3	2.3	12	9.0
Sub-Total	1,680	750	44.6	95	5.7	783	46.6
QC Checkers							
Boston	55	11	20.0	4	7.3	34	61.8
New York	46	11	23.9	-	-	34	73.9
Philadelphia	66	23	34.8	7	10.6	30	45.5
Detroit	53	19	35.8	2	3.8	14	26.4
Chicago	68	25	36.8	5	7.4	31	45.6
Kansas City	77	44	57.1	1	1.3	30	39.0
Seattle	56	19	33.9	2	3.6	29	51.8
Charlotte	76	2	2.6	5	6.6	51	67.1
Atlanta	132	92	69.7	3	2.3	16	12.1
Dallas	136	77	56.6	4	2.9	54	39.7
Denver	134	28	20.9	6	4.5	85	63.4
Los Angeles	124	41	33.1	7	5.6	74	59.7
Puerto Rico	65	35	53.8	2	3.1	5	7.7
Sub-Total	1,088	427	39.2	48	4.4	487	44.8
Unknown**							
Boston	-	-	-	1	-	-	-
New York	-	-	-	-	-	-	-
Philadelphia	-	-	-	-	-	-	-
Detroit	-	-	-	-	-	-	-
Chicago	-	-	-	-	-	-	-
Kansas City	-	12	-	-	-	-	-
Seattle	-	-	-	-	-	-	-
Charlotte	-	-	-	-	-	-	-
Atlanta	-	2	-	-	-	-	-
Dallas	-	-	-	-	-	-	-
Denver	-	1	-	-	-	-	-
Los Angeles	-	2	-	-	-	-	-
Puerto Rico	-	11	-	-	-	-	-
Sub-Total	-	28	-	1	-	-	-
All Roles							
Boston	189	69	36.5	11	5.8	104	55.0
New York	112	38	33.9	3	2.7	66	58.9
Philadelphia	167	51	30.5	9	5.4	100	59.9
Detroit	193	118	61.1	8	4.1	25	13.0
Chicago	173	56	32.4	10	5.8	91	52.6
Kansas City	180	118	65.6	3	1.7	68	37.8
Seattle	129	40	31.0	4	3.1	73	56.6
Charlotte	231	33	14.3	15	6.5	127	55.0
Atlanta	290	175	60.3	9	3.1	97	33.4
Dallas	285	147	51.6	8	2.8	127	44.6
Denver	345	57	16.5	37	10.7	251	72.8
Los Angeles	276	129	46.7	22	8.0	124	44.9
Puerto Rico	198	174	87.9	5	2.5	17	8.6
NATIONAL	2,768	1,205	43.5	144	5.2	1,270	45.9

Data Source: CMOCS and Forms D-1222(CCM-IHUFU), Observation Checklist.

* Based on number of unique FRs recorded on the Observation Checklists

** Procedural error

*** Procedurally correct

Table 3A: Final Results from Initial Observation Checklists by RCC and Role*

Outcome	Boston		New York		Philadelphia		Detroit		Chicago		Kansas City		Seattle		Charlotte		Atlanta		Dallas		Denver		Los Angeles		Puerto Rico		NATIONAL	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Interviewers																												
Satisfactory	124	93.2	59	89.4	101	97.1	116	99.2	106	99.1	92	81.4	65	97.0	123	93.2	184	96.8	146	96.1	189	94.0	134	95.7	166	89.3	1,605	94.0
Unsatisfactory	1	0.8	-	-	1	1.0	1	0.9	-	-	3	2.7	1	1.5	1	0.8	2	1.1	-	-	4	2.0	-	-	9	4.8	23	1.4
Other	-	-	-	-	-	-	-	-	1	0.9	4	3.5	1	1.5	-	-	1	0.5	-	-	1	0.5	2	1.4	4	2.2	14	0.8
Missing**	8	6.0	7	10.6	2	1.9	-	-	-	-	14	12.4	-	-	8	6.1	3	1.6	6	4.0	7	3.5	4	2.9	7	3.8	66	3.9
Sub-total	133	100.0	66	100.0	104	100.0	117	100.0	107	100.0	113	100.0	67	100.0	132	100.0	190	100.0	152	100.0	201	100.0	140	100.0	186	100.0	1,708	100.0
QC Checkers																												
Satisfactory	43	95.6	47	97.9	67	98.5	35	100.0	64	98.5	68	89.5	47	87.0	56	100.0	104	92.9	135	92.5	109	83.9	97	80.8	40	95.2	912	91.5
Unsatisfactory	2	4.4	1	2.1	-	-	-	-	1	1.5	3	4.0	-	-	-	-	1	0.9	2	1.4	1	0.8	4	3.3	1	2.4	16	1.6
Other	-	-	-	-	-	-	-	-	-	-	4	5.3	1	1.9	-	-	1	0.9	-	-	-	-	1	0.8	-	-	7	0.8
Missing**	-	-	-	-	1	1.5	-	-	-	-	1	1.3	6	11.1	-	-	6	5.4	9	6.2	20	15.4	18	15.0	1	2.4	62	3.9
Sub-total	45	100.0	48	100.0	68	100.0	35	100.0	65	100.0	76	100.0	54	100.0	56	100.0	112	100.0	146	100.0	130	100.0	120	100.0	42	100.0	997	100.0
Unknown**																												
Satisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	75.0	-	-	1	50.0	-	-	-	-	-	-	4	11.1
Unsatisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	50.0	-	-	-	-	-	-	1	2.8
Other	-	-	-	-	-	-	-	-	-	-	12	100.0	-	-	-	-	1	25.0	-	-	-	-	2	100.0	15	100.0	30	83.3
Missing**	1	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.8
Sub-total	1	100.0	-	-	-	-	-	-	-	-	12	100.0	-	-	4	100.0	-	-	2	100.0	2	100.0	2	100.0	15	100.0	36	100.0
All Roles																												
Satisfactory	167	93.3	106	93.0	168	97.7	151	99.3	170	98.8	160	79.6	112	92.6	179	95.2	291	95.1	281	94.3	299	89.8	231	88.2	206	84.8	2,521	92.0
Unsatisfactory	3	1.7	1	0.9	1	0.6	1	0.7	1	0.6	6	3.0	1	0.8	1	0.5	3	1.0	2	0.7	6	1.8	4	1.5	10	4.1	40	1.5
Other	-	-	-	-	-	-	-	-	1	0.6	20	10.0	2	1.7	-	-	3	1.0	-	-	1	0.3	5	1.9	19	7.8	51	1.9
Missing**	9	5.0	7	6.1	3	1.7	-	-	-	-	15	7.5	6	5.0	8	4.3	9	2.9	15	5.0	27	8.1	22	8.4	8	3.3	129	4.7
Total	179	100.0	114	100.0	172	100.0	152	100.0	172	100.0	201	100.0	121	100.0	188	100.0	306	100.0	298	100.0	333	100.0	262	100.0	243	100.0	2,741	100.0

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

* After the 1st Obs, or after the 2nd Obs, if 1st Obs was not Satisfactory

** Procedural error

Table 3B: Final Results from Extra Observation Checklists by RCC and Role*

Outcome	Boston		New York		Philadelphia		Detroit		Chicago		Kansas City		Seattle		Charlotte		Atlanta		Dallas		Denver		Los Angeles		Puerto Rico		NATIONAL	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Interviewers																												
Satisfactory	65	84.4	33	78.6	74	96.1	20	100.0	69	100.0	37	88.1	41	87.2	100	90.9	89	95.7	69	85.2	205	95.8	61	87.1	15	100.0	878	91.8
Unsatisfactory	-	-	-	-	1	1.3	-	-	-	-	2	4.8	4	8.5	1	0.9	1	1.1	1	1.2	-	-	1	1.4	-	-	11	1.2
Other	1	1.3	-	-	-	-	-	-	-	-	-	-	1	2.1	-	-	-	-	1	1.2	-	-	1	1.4	-	-	4	0.4
Missing**	11	14.3	9	21.4	2	2.6	-	-	-	-	3	7.1	1	2.1	9	8.2	3	3.2	10	12.4	9	4.2	7	10.0	-	-	64	6.7
Sub-total	77	100.0	42	100.0	77	100.0	20	100.0	69	100.0	42	100.0	47	100.0	110	100.0	93	100.0	81	100.0	214	100.0	70	100.0	15	100.0	957	100.0
QC Checkers																												
Satisfactory	38	97.4	39	100.0	41	100.0	16	94.1	37	100.0	32	97.0	22	71.0	56	96.6	16	69.6	53	85.5	78	83.9	68	79.1	7	100.0	503	88.9
Unsatisfactory	1	2.6	-	-	-	-	1	5.9	-	-	-	-	-	-	-	-	-	-	-	-	2	2.2	3	3.5	-	-	7	1.2
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing**	-	-	-	-	-	-	-	-	-	-	1	3.0	9	29.0	2	3.5	7	30.4	9	14.5	13	14.0	15	17.4	-	-	56	9.9
Sub-total	39	100.0	39	100.0	41	100.0	17	100.0	37	100.0	33	100.0	31	100.0	58	100.0	23	100.0	62	100.0	93	100.0	86	100.0	7	100.0	566	100.0
Unknown**																												
Satisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unsatisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	1	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	100.0
Missing**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total	1	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	100.0
All Roles																												
Satisfactory	103	88.0	72	88.9	115	97.5	36	97.3	106	100.0	69	92.0	63	80.8	156	92.9	105	90.5	122	85.3	283	92.2	129	82.7	22	100.0	1,381	90.6
Unsatisfactory	1	0.9	-	-	1	0.9	1	2.7	-	-	2	2.7	4	5.1	1	0.6	1	0.9	1	0.7	2	0.7	4	2.6	-	-	18	1.2
Other	2	1.7	-	-	-	-	-	-	-	-	-	-	1	1.3	-	-	-	-	1	0.7	-	-	1	0.6	-	-	5	0.3
Missing**	11	9.4	9	11.1	2	1.7	-	-	-	-	4	5.3	10	12.8	11	6.6	10	8.6	19	13.3	22	7.2	22	14.1	-	-	120	7.8
Total	117	100.0	81	100.0	118	100.0	37	100.0	106	100.0	75	100.0	78	100.0	168	100.0	116	100.0	143	100.0	307	100.0	156	100.0	22	100.0	1,524	100.0

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

* After the 1st Obs, or after the 2nd Obs, if 1st Obs was not Satisfactory

** Procedural error

Table 3C: Final Results from All Observation Checklists by RCC and Role*

Outcome	Boston		New York		Philadelphia		Detroit		Chicago		Kansas City		Seattle		Charlotte		Atlanta		Dallas		Denver		Los Angeles		Puerto Rico		NATIONAL	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Interviewers																												
Satisfactory	189	90.0	92	85.2	175	96.7	136	99.3	175	99.4	129	83.2	106	93.0	223	92.2	273	96.5	215	92.3	394	94.9	195	92.9	181	90.1	2,483	93.2
Unsatisfactory	1	0.5	-	-	2	1.1	1	0.7	-	-	5	3.2	5	4.4	2	0.8	3	1.1	1	0.4	4	1.0	1	0.5	9	4.5	34	1.3
Other	1	0.5	-	-	-	-	-	-	1	0.6	4	2.6	2	1.8	-	-	1	0.4	1	0.4	1	0.2	3	1.4	4	2.0	18	0.7
Missing**	19	9.1	16	14.8	4	2.2	-	-	-	-	17	11.0	1	0.9	17	7.0	6	2.1	16	6.9	16	3.9	11	5.2	7	3.5	130	4.9
Sub-total	210	100.0	108	100.0	181	100.0	137	100.0	176	100.0	155	100.0	114	100.0	242	100.0	283	100.0	233	100.0	415	100.0	210	100.0	201	100.0	2,665	100.0
QC Checkers																												
Satisfactory	81	96.4	86	98.9	108	99.1	51	98.1	101	99.0	100	91.7	69	81.2	112	98.3	120	88.9	188	90.4	187	83.9	165	80.1	47	95.9	1,415	90.5
Unsatisfactory	3	3.6	1	1.2	-	-	1	1.9	1	1.0	3	2.8	-	-	-	-	1	0.7	2	1.0	3	1.4	7	3.4	1	2.0	23	1.5
Other	-	-	-	-	-	-	-	-	-	-	4	3.7	1	1.2	-	-	1	0.7	-	-	-	-	1	0.5	-	-	7	0.5
Missing**	-	-	-	-	1	0.9	-	-	-	-	2	1.8	15	17.7	2	1.8	13	9.6	18	8.7	33	14.8	33	16.0	1	2.0	118	7.6
Sub-total	84	100.0	87	100.0	109	100.0	52	100.0	102	100.0	109	100.0	85	100.0	114	100.0	135	100.0	208	100.0	223	100.0	206	100.0	49	100.0	1,563	100.0
Unknown**																												
Satisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	75.0	-	-	1	50.0	-	-	-	-	4	10.8
Unsatisfactory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	50.0	-	-	-	-	1	2.7
Other	1	50.0	-	-	-	-	-	-	-	-	12	100.0	-	-	-	-	1	25.0	-	-	-	-	2	100.0	15	100.0	31	83.8
Missing**	1	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.7
Sub-total	2	100.0	-	-	-	-	-	-	-	-	12	100.0	-	-	-	-	4	100.0	-	-	2	100.0	2	100.0	15	100.0	37	100.0
All Roles																												
Satisfactory	270	91.2	178	91.3	283	97.6	187	98.9	276	99.3	229	83.0	175	87.9	335	94.1	396	93.8	403	91.4	582	90.9	360	86.1	228	86.0	3,902	91.5
Unsatisfactory	4	1.4	1	0.5	2	0.7	2	1.1	1	0.4	8	2.9	5	2.5	2	0.6	4	1.0	3	0.7	8	1.3	8	1.9	10	3.8	58	1.4
Other	2	0.7	-	-	-	-	-	-	1	0.4	20	7.3	3	1.5	-	-	3	0.7	1	0.2	1	0.2	6	1.4	19	7.2	56	1.3
Missing**	20	6.8	16	8.2	5	1.7	-	-	-	-	19	6.9	16	8.0	19	5.3	19	4.5	34	7.7	49	7.7	44	10.5	8	3.0	249	5.8
Total	296	100.0	195	100.0	290	100.0	189	100.0	278	100.0	276	100.0	199	100.0	356	100.0	422	100.0	441	100.0	640	100.0	418	100.0	265	100.0	4,265	100.0

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

* After the 1st Obs, or after the 2nd Obs, if 1st Obs was not Satisfactory

** Procedural error

Table 4A: Distribution of Tasks Performed Incorrectly during Observation by RCC - Interviewers

Observation	Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		Task 7		Task 8		Task 9		Task 10		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Boston																						
Initial	-	-	-	-	-	-	3	14.3	6	28.6	-	-	4	19.0	2	9.5	3	14.3	3	14.3	21	100.0
Extra	-	-	-	-	1	16.7	-	-	-	0.0	-	-	1	16.7	2	33.3	1	16.7	1	16.7	6	100.0
Total	-	-	-	-	1	3.7	3	11.1	6	22.2	-	-	5	18.5	4	14.8	4	14.8	4	14.8	27	100.0
New York																						
Initial	-	-	-	-	-	-	3	33.3	2	22.2	-	-	2	22.2	1	11.1	1	11.1	-	-	9	100.0
Extra	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	10	100.0
Total	1	5.3	1	5.3	1	5.3	4	21.1	3	15.8	1	5.3	3	15.8	2	10.5	2	10.5	1	5.3	19	100.0
Philadelphia																						
Initial	-	-	-	-	1	16.7	1	16.7	1	16.7	1	16.7	-	-	1	16.7	1	16.7	-	-	6	100.0
Extra	-	-	-	-	-	-	-	-	-	-	-	-	1	100.0	-	-	-	-	-	-	1	100.0
Total	-	-	-	-	1	14.3	1	14.3	1	14.3	1	14.3	1	14.3	1	14.3	1	14.3	-	-	7	100.0
Detroit																						
Initial	3	10.7	2	7.1	2	7.1	2	7.1	3	10.7	1	3.6	5	17.9	3	10.7	5	17.9	2	7.1	28	100.0
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	10.7	2	7.1	2	7.1	2	7.1	3	10.7	1	3.6	5	17.9	3	10.7	5	17.9	2	7.1	28	100.0
Chicago																						
Initial	1	3.8	1	3.8	1	3.8	-	-	7	26.9	2	7.7	4	15.4	4	15.4	3	11.5	3	11.5	26	100.0
Extra	-	-	-	-	-	-	-	-	-	-	-	-	4	66.7	-	-	2	33.3	-	-	6	100.0
Total	1	3.1	1	3.1	1	3.1	-	-	7	21.9	2	6.3	8	25.0	4	12.5	5	15.6	3	9.4	32	100.0
Kansas City																						
Initial	2	5.7	1	2.9	4	11.4	6	17.1	7	20.0	2	5.7	9	25.7	2	5.7	1	2.9	1	2.9	35	100.0
Extra	-	-	-	-	2	14.3	3	21.4	1	7.1	1	7.1	2	14.3	1	7.1	2	14.3	2	14.3	14	100.0
Total	2	4.1	1	2.0	6	12.2	9	18.4	8	16.3	3	6.1	11	22.4	3	6.1	3	6.1	3	6.1	49	100.0
Seattle																						
Initial	-	-	1	3.8	4	15.4	5	19.2	2	7.7	2	7.7	5	19.2	3	11.5	3	11.5	1	3.8	26	100.0
Extra	-	-	2	10.0	4	20.0	2	10.0	-	-	3	15.0	6	30.0	-	-	2	10.0	1	5.0	20	100.0
Total	-	-	3	6.5	8	17.4	7	15.2	2	4.3	5	10.9	11	23.9	3	6.5	5	10.9	2	4.3	46	100.0
Charlotte																						
Initial	1	4.0	1	4.0	3	12.0	6	24.0	3	12.0	-	-	6	24.0	2	8.0	1	4.0	2	8.0	25	100.0
Extra	-	-	1	7.7	1	7.7	-	-	3	23.1	1	7.7	2	15.4	1	7.7	3	23.1	1	7.7	13	100.0
Total	1	2.6	2	5.3	4	10.5	6	15.8	6	15.8	1	2.6	8	21.1	3	7.9	4	10.5	3	7.9	38	100.0
Atlanta																						
Initial	1	5.3	2	10.5	-	-	2	10.5	3	15.8	1	5.3	4	21.1	2	10.5	3	15.8	1	5.3	19	100.0
Extra	-	-	1	16.7	1	16.7	-	-	-	-	2	33.3	2	33.3	-	-	-	-	-	-	6	100.0
Total	1	4.0	3	12.0	1	4.0	2	8.0	3	12.0	3	12.0	6	24.0	2	8.0	3	12.0	1	4.0	25	100.0
Dallas																						
Initial	-	-	-	-	-	-	1	16.7	3	50.0	-	-	1	16.7	1	16.7	-	-	-	-	6	100.0
Extra	1	33.3	-	-	-	-	-	-	-	-	-	-	1	33.3	-	-	1	33.3	-	-	3	100.0
Total	1	11.1	-	-	-	-	1	11.1	3	33.3	-	-	2	22.2	1	11.1	1	11.1	-	-	9	100.0
Denver																						
Initial	3	10.7	-	-	1	3.6	3	10.7	4	14.3	2	7.1	5	17.9	3	10.7	4	14.3	3	10.7	28	100.0
Extra	-	-	-	-	-	-	1	12.5	4	50.0	-	-	1	12.5	-	-	1	12.5	1	12.5	8	100.0
Total	3	8.3	-	-	1	2.8	4	11.1	8	22.2	2	5.6	6	16.7	3	8.3	5	13.9	4	11.1	36	100.0
Los Angeles																						
Initial	2	10.5	1	5.3	1	5.3	2	10.5	2	10.5	1	5.3	3	15.8	2	10.5	2	10.5	3	15.8	19	100.0
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2	10.5	1	5.3	1	5.3	2	10.5	2	10.5	1	5.3	3	15.8	2	10.5	2	10.5	3	15.8	19	100.0
Puerto Rico																						
Initial	7	6.3	14	12.6	6	5.4	14	12.6	7	6.3	3	2.7	32	28.8	11	9.9	10	9.0	7	6.3	111	100.0
Extra	-	-	-	-	-	-	-	-	-	-	-	-	1	25.0	1	25.0	1	25.0	1	25.0	4	100.0
Total	7	6.1	14	12.2	6	5.2	14	12.2	7	6.1	3	2.6	33	28.7	12	10.4	11	9.6	8	7.0	115	100.0
NATIONAL																						
Initial	20	5.6	23	6.4	23	6.4	48	13.4	50	13.9	15	4.2	80	22.3	37	10.3	37	10.3	26	7.2	359	100.0
Extra	2	2.2	5	5.5	10	11.0	7	7.7	9	9.9	8	8.8	22	24.2	6	6.6	14	15.4	8	8.8	91	100.0
Total	22	4.9	28	6.2	33	7.3	55	12.2	59	13.1	23	5.1	102	22.7	43	9.6	51	11.3	34	7.6	450	100.0

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

Table 5A: Distribution of Tasks Performed Incorrectly during Observation by RCC – QC Checkers

Observation	Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		Task 7		Task 8		Task 9		Task 10		Task 11		Task 12		Task 13		Task 14		Total			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
Boston																																
Initial	2	18.2	1	9.1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9.1	1	9.1	1	9.1	2	18.2	2	18.2	1	9.1	11	100.0	
Extra	-	-	1	16.7	1	16.7	1	16.7	1	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	1	16.7	1	16.7	-	-	6	100.0	
Total	2	11.8	2	11.8	1	5.9	1	5.9	1	5.9	-	-	-	-	-	-	-	1	5.9	1	5.9	1	5.9	3	17.6	3	17.6	1	5.9	17	100.0	
New York																																
Initial	-	-	-	-	-	-	2	8.3	4	16.7	1	4.2	-	-	4	16.7	4	16.7	1	4.2	2	8.3	2	8.3	2	8.3	2	8.3	2	8.3	24	100.0
Extra	-	-	-	-	-	-	2	16.7	3	25.0	1	8.3	1	8.3	1	8.3	1	8.3	-	-	-	-	1	8.3	2	16.7	-	-	12	100.0		
Total	-	-	-	-	-	-	4	11.1	7	19.4	2	5.6	1	2.8	5	13.9	5	13.9	1	2.8	2	5.6	3	8.3	4	11.1	2	5.6	36	100.0		
Philadelphia																																
Initial	-	-	-	-	-	-	-	-	1	50.0	-	-	1	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	-	-	-	-	-	-	-	-	1	50.0	-	-	1	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	
Detroit																																
Initial	-	-	-	-	-	-	-	-	3	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	100.0	
Extra	-	-	-	-	-	-	-	-	-	-	1	25.0	1	25.0	-	-	1	25.0	-	-	1	25.0	-	-	-	-	-	-	-	4	100.0	
Total	-	-	-	-	-	-	-	-	3	42.9	1	14.3	1	14.3	-	-	1	14.3	-	-	1	14.3	-	-	-	-	-	-	-	7	100.0	
Chicago																																
Initial	1	5.0	-	-	-	-	-	-	1	5.0	1	5.0	4	20.0	2	10.0	2	10.0	-	-	2	10.0	3	15.0	3	15.0	1	5.0	20	100.0		
Extra	-	-	-	-	-	-	-	-	1	50.0	-	-	1	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	
Total	1	4.5	-	-	-	-	-	-	2	9.1	1	4.5	5	22.7	2	9.1	2	9.1	-	-	2	9.1	3	13.6	3	13.6	1	4.5	22	100.0		
Kansas City																																
Initial	-	-	-	-	3	10.7	4	14.3	2	7.1	1	3.6	3	10.7	1	3.6	1	3.6	3	10.7	4	14.3	1	3.6	3	10.7	2	7.1	28	100.0		
Extra	1	6.3	1	6.3	1	6.3	2	12.5	2	12.5	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	1	6.3	16	100.0
Total	1	2.3	1	2.3	4	9.1	6	13.6	4	9.1	2	4.5	4	9.1	2	4.5	2	4.5	4	9.1	5	11.4	2	4.5	4	9.1	3	6.8	44	100.0		
Seattle																																
Initial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	100.0	1	100.0	
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	100.0	1	100.0	
Charlotte																																
Initial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	-	-	-	-	-	-	-	-	2	100.0		
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	-	-	-	-	-	-	-	-	2	100.0		
Atlanta																																
Initial	-	-	1	5.9	5	29.4	1	5.9	3	17.6	-	-	1	5.9	1	5.9	2	11.8	-	-	-	-	1	5.9	1	5.9	1	5.9	17	100.0		
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	-	-	1	5.9	5	29.4	1	5.9	3	17.6	-	-	1	5.9	1	5.9	2	11.8	-	-	-	-	1	5.9	1	5.9	1	5.9	17	100.0		
Dallas																																
Initial	1	4.2	-	-	1	4.2	2	8.3	6	25.0	2	8.3	5	20.8	1	4.2	1	4.2	-	-	1	4.2	3	12.5	-	-	1	4.2	24	100.0		
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	1	4.2	-	-	1	4.2	2	8.3	6	25.0	2	8.3	5	20.8	1	4.2	1	4.2	-	-	1	4.2	3	12.5	-	-	1	4.2	24	100.0		
Denver																																
Initial	-	-	1	8.3	1	8.3	-	-	2	16.7	1	8.3	-	-	1	8.3	1	8.3	-	-	-	-	1	8.3	-	-	4	33.3	12	100.0		
Extra	-	-	2	14.3	-	-	1	7.1	2	14.3	2	14.3	1	7.1	1	7.1	1	7.1	1	7.1	1	7.1	1	7.1	-	-	1	7.1	14	100.0		
Total	-	-	3	11.5	1	3.8	1	3.8	4	15.4	3	11.5	1	3.8	2	7.7	2	7.7	1	3.8	1	3.8	2	7.7	-	-	5	19.2	26	100.0		
Los Angeles																																
Initial	1	6.7	-	-	1	6.7	2	13.3	5	33.3	1	6.7	1	6.7	2	13.3	-	-	-	-	-	-	1	6.7	1	6.7	-	-	15	100.0		
Extra	-	-	3	15.0	-	-	2	10.0	2	10.0	1	5.0	2	10.0	1	5.0	1	5.0	2	10.0	4	20.0	-	-	2	10.0	-	-	20	100.0		
Total	1	2.9	3	8.6	1	2.9	4	11.4	7	20.0	2	5.7	3	8.6	3	8.6	1	2.9	2	5.7	4	11.4	1	2.9	3	8.6	-	-	35	100.0		
Puerto Rico																																
Initial	1	14.3	-	-	1	14.3	-	-	-	-	1	14.3	-	-	-	-	-	-	-	-	-	-	1	14.3	1	14.3	2	28.6	7	100.0		
Extra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total	1	14.3	-	-	1	14.3	-	-	-	-	1	14.3	-	-	-	-	-	-	-	-	-	-	1	14.3	1	14.3	2	28.6	7	100.0		
NATIONAL																																
Initial	6	3.7	3	1.8	12	7.3	11	6.7	27	16.5	8	4.9	15	9.1	12	7.3	12	7.3	5	3.0	10	6.1	15	9.1	13	7.9	15	9.1	164	100.0		
Extra	1	1.3	7	9.2	2	2.6	8	10.5	11	14.5	6	7.9	7	9.2	4	5.3	5	6.6	6	7.9	7	9.2	4	5.3	6	7.9	2	2.6	76	100.0		
Total	7	2.9	10	4.2	14	5.8	19	7.9	38	15.8	14	5.8	22	9.2	16	6.7	17	7.1	11	4.6	17	7.1	19	7.9	19	7.9	17	7.1	240	100.0		

Data Source: Form D-1222(CCM-IHUFU), Observation Checklist.

Table 6A: Quality Control Check Results by RCC

RCC	Pass		Fail - Rectify		Total
	#	%	#	%	#
Boston	298	77.8	85	22.2	383
New York	175	86.6	27	13.4	202
Philadelphia	235	72.5	89	27.5	324
Detroit	261	82.1	57	17.9	318
Chicago	191	64.1	107	35.9	298
Kansas City	277	79.4	72	20.6	349
Seattle	311	84.3	58	15.7	369
Charlotte	337	75.2	111	24.8	448
Atlanta	447	94.5	26	5.5	473
Dallas	275	65.2	147	34.8	422
Denver	507	73.3	185	26.7	692
Los Angeles	253	62.6	151	37.4	404
Puerto Rico	211	84.4	39	15.6	250
NATIONAL	3,778	76.6	1,154	23.4	4,932

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

Table 7A: Quality Control Check and Total Verification Workloads by RCC

RCC	Total # of Cases	# of Cases in QC Check	QC Sampling Rate (%)	# of Cases Rectified after QC (for Failed Clusters)	# of Total Cases Checked*	Total Verification Rate (%)
Boston	6,051	1,875	31.0	776	2,651	43.8
New York	7,143	1,239	17.3	528	1,767	24.7
Philadelphia	6,756	1,568	23.2	1,355	2,923	43.3
Detroit	5,416	1,399	25.8	631	2,030	37.5
Chicago	4,745	1,348	28.4	1,349	2,697	56.8
Kansas City	4,587	1,428	31.1	520	1,948	42.5
Seattle	6,935	1,682	24.3	932	2,614	37.7
Charlotte	10,316	2,330	22.6	1,589	3,919	38.0
Atlanta	15,660	2,497	15.9	558	3,055	19.5
Dallas	10,944	2,094	19.1	2,663	4,757	43.5
Denver	12,574	3,145	25.0	3,200	6,345	50.5
Los Angeles	10,083	2,015	20.0	3,817	5,832	57.8
Puerto Rico	23,982	2,060	8.6	962	3,022	12.6
NATIONAL	125,192	24,680	19.7	18,880	43,560	34.8

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

* QC Check sample + rectification

Table 8A: QC Check Results Versus Rectification Data by RCC

QC Check Result	Total Clusters	Clusters with Rectification Data	
		#	%
Boston			
Pass	298	1*	0.3
Fail - Rectify	85**	84	98.8
Sub-Total	383	85	22.2
New York			
Pass	175	-	-
Fail - Rectify	27	27	100.0
Sub-Total	202	27	13.4
Philadelphia			
Pass	235	-	-
Fail - Rectify	89	88	98.9
Sub-Total	324	88	27.2
Detroit			
Pass	261	-	-
Fail - Rectify	57	56	98.2
Sub-Total	318	56	17.6
Chicago			
Pass	191	9*	4.7
Fail - Rectify	107	107	100.0
Sub-Total	298	116	38.9
Kansas City			
Pass	277	2*	0.7
Fail - Rectify	72	70	97.2
Sub-Total	349	72	20.6
Seattle			
Pass	311	-	-
Fail - Rectify	58	58	100.0
Sub-Total	369	58	15.7
Charlotte			
Pass	337	-	-
Fail - Rectify	111	111	100.0
Sub-Total	448	111	24.8
Atlanta			
Pass	447	5*	1.1
Fail - Rectify	26	25	96.2
Sub-Total	473	30	6.3
Dallas			
Pass	275	1*	0.4
Fail - Rectify	147	145	98.6
Sub-Total	422	146	34.6
Denver			
Pass	507	13*	2.6
Fail - Rectify	185**	182	98.4
Sub-Total	692	195	28.2
Los Angeles			
Pass	253	23*	9.1
Fail - Rectify	151	151	100.0
Sub-Total	404	174	43.1
Puerto Rico			
Pass	211	-	-
Fail - Rectify	39	39	100.0
Sub-Total	250	39	15.6
NATIONAL			
Pass	3,778	54*	1.4
Fail - Rectify	1,154	1,143	99.0
Total	4,932	1,197	24.3

Data Source: CMOCS and Form D-1380, IHUFU QC Form.

* Procedural error

** For one block cluster, all cases were checked in the QC

Table 9A: Number of Days Block Clusters in Field by RCC – Production

RCC	Average	1-6		7-13		14-20		21-27		>27		Total Clusters
		#	%	#	%	#	%	#	%	#	%	
Boston	8.8	113	29.5	210	54.8	57	14.9	3	0.8	-	-	383
New York	10.3	41	20.3	114	56.4	41	20.3	6	3.0	-	-	202
Philadelphia	6.2	180	55.6	119	36.7	24	7.4	1	0.3	-	-	324
Detroit	7.9	95	29.9	203	63.8	20	6.3	-	-	-	-	318
Chicago	8.6	77	25.8	180	60.4	30	10.1	11	3.7	-	-	298
Kansas City	8.1	117	33.5	190	54.4	41	11.8	1	0.3	-	-	349
Seattle	10.9	52	14.1	211	57.2	89	24.1	16	4.3	1	0.3	369
Charlotte	10.3	91	20.3	239	53.4	103	23.0	15	3.4	-	-	448
Atlanta	7.8	172	36.4	268	56.7	29	6.1	4	0.9	-	-	473
Dallas	9.9	88	20.9	249	59.0	79	18.7	6	1.4	-	-	422
Denver	10.4	190	27.5	270	39.0	170	24.6	53	7.7	9	1.3	692
Los Angeles	12.0	64	15.8	206	51.0	90	22.3	26	6.4	18	4.5	404
Puerto Rico	11.8	59	23.6	102	40.8	62	24.8	19	7.6	8	3.2	250
NATIONAL	9.5	1,339	27.2	2,561	51.9	835	16.9	161	3.3	36	0.7	4,932

Data Source: CMOCS.

Table 10A: Number of Days Block Clusters in Field by RCC – Quality Control

RCC	Average	1-3		4-6		7-13		14-20		>20		Total Clusters
		#	%	#	%	#	%	#	%	#	%	
Boston	5.8	111	29.0	106	27.7	156	40.7	10	2.6	-	-	383
New York	4.8	83	41.1	54	26.7	64	31.7	1	0.5	-	-	202
Philadelphia	5.1	118	36.4	111	34.3	88	27.2	7	2.2	-	-	324
Detroit	5.3	59	18.6	153	48.1	106	33.3	-	-	-	-	318
Chicago	7.3	60	20.1	84	28.2	116	38.9	36	12.1	2	0.7	298
Kansas City	3.7	181	51.9	122	35.0	45	12.9	1	0.3	-	-	349
Seattle	4.6	163	44.2	126	34.2	66	17.9	13	3.5	1	0.3	369
Charlotte	5.2	188	42.0	109	24.3	125	27.9	24	5.4	2	0.5	448
Atlanta	5.9	83	17.6	216	45.7	169	35.7	4	0.9	1	0.2	473
Dallas	5.0	121	28.7	197	46.7	102	24.2	2	0.5	-	-	422
Denver	7.0	185	26.7	235	34.0	178	25.7	67	9.7	27	3.9	692
Los Angeles	5.1	152	37.6	119	29.5	123	30.5	6	1.5	4	1.0	404
Puerto Rico	4.2	124	49.6	71	28.4	53	21.2	2	0.8	-	-	250
NATIONAL	5.5	1,628	33.0	1,703	34.5	1,391	28.2	173	3.5	37	0.8	4,932

Data Source: CMOCS.

Table 11A: Number of Days Block Clusters in Field by RCC – Overall

RCC	Average	1-6		7-13		14-20		21-27		>27		Total Clusters
		#	%	#	%	#	%	#	%	#	%	
Boston	13.7	5	2.3	205	9.1	149	8.1	20	4.2	4	3.2	383
New York	14.1	6	2.7	102	4.5	67	3.6	24	5.0	3	2.4	202
Philadelphia	10.3	71	32.4	163	7.2	77	4.2	12	2.5	1	0.8	324
Detroit	12.2	8	3.7	213	9.4	93	5.0	4	0.8	-	-	318
Chicago	14.9	2	0.9	105	4.6	157	8.5	31	6.5	3	2.4	298
Kansas City	10.9	39	17.8	209	9.2	96	5.2	5	1.1	-	-	349
Seattle	14.5	10	4.6	151	6.7	159	8.6	40	8.4	9	7.1	369
Charlotte	14.5	15	6.9	183	8.1	175	9.5	64	13.4	11	8.7	448
Atlanta	12.7	12	5.5	273	12.1	167	9.1	17	3.6	4	3.2	473
Dallas	13.9	19	8.7	180	8.0	171	9.3	47	9.8	5	4.0	422
Denver	16.4	7	3.2	240	10.6	275	14.9	129	27.0	41	32.5	692
Los Angeles	16.1	9	4.1	142	6.3	169	9.2	52	10.9	32	25.4	404
Puerto Rico	15.0	16	7.3	97	4.3	91	4.9	33	6.9	13	10.3	250
NATIONAL	14.0	219	4.4	2,263	45.9	1,846	37.4	478	9.7	126	2.6	4,932

Data Source: CMOCS.

THIS REPORT CONTAINS INFORMATION, THE RELEASE OF WHICH IS PROTECTED BY THE PRIVACY ACT OF 1974, AND IS FOR AUTHORIZED USE ONLY.

FORM D-1222(CCM-IHUFU) (12-16-2008)		U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. CENSUS BUREAU		IDENTIFICATION ITEMS		
OBSERVATION CHECKLIST CENSUS COVERAGE MEASUREMENT INITIAL HOUSING UNIT FOLLOWUP 2010 Census				1. Interviewer/QC Checker a. Name _____ b. FR Code _____		
				2. Type of observation – Mark (X) one 1 <input type="checkbox"/> Production 2 <input type="checkbox"/> QC		
1st Observation	3. Observer a. Name _____ b. FR Code _____		4. Date – Month/Day /	5. No. of cases observed	6. Crew Leader District No.	
2nd Observation	a. Name _____ b. FR Code _____		/		7. RCC No.	
SAFETY & SECURITY REMINDERS						
<ul style="list-style-type: none"> • As required by law, use a seatbelt while driving. • Protect all Title 13 data or any medium that may contain personally identifiable information. • Any lost or stolen medium containing Title 13 data or personally identifiable information must be reported as soon as possible according to the instructions in your manuals. 						
GENERAL INSTRUCTIONS						
<ul style="list-style-type: none"> • Use this checklist to evaluate and document overall performance of the interviewer/QC checker as you observe the crew member in the field. • As you are observing, keep in mind the tasks listed. • For every task listed – <i>Mark X in the appropriate column:</i> Y – Yes, task observed and performed correctly. N – No, task observed but not performed correctly – <i>Discuss proper procedure before observing next followup case.</i> NA – Not Applicable, task not observed – <i>Discuss proper procedure at the end of observation.</i> • Use Section A to record performance for interviewer. • Use Section B to record performance for QC checker (on reverse side). • Use Section C to record observation result for interviewer/QC checker. 						
Section A – INTERVIEWER OBSERVATION						
Tasks			1st Observation		2nd Observation	
			Y	N	NA	Y
			N	NA	Y	N
			NA	Y	N	NA
Traveling through the assigned block cluster						
1. Found the correct block(s) in the block cluster						
2. Found or tried to find each followup unit in the block cluster						
Completing the Initial HUFU Packet						
3. Contacted or tried to contact a knowledgeable person at each followup unit						
4. Showed Census identification and used appropriate introduction at each followup unit, if applicable						
5. Gave Confidentiality Notice to each respondent						
6. Tried to conduct an interview at each followup unit						
7. Answered each question according to skip pattern for each followup unit in the block cluster						
Using the CCM Maps and the Reference List						
8. Used the CCM maps as a resource						
9. Corrected and/or updated the CCM block maps and sketch maps, as appropriate						
10. Used the CCM Initial Housing Unit Reference List as a resource						
Section C – OBSERVATION RESULT						
<ul style="list-style-type: none"> • Rate "Satisfactory" if the interviewer/QC checker demonstrated a good overall understanding of the tasks. • If you believe the interviewer/QC checker did NOT demonstrate a good overall understanding of the tasks after the 1st observation, contact your immediate supervisor to discuss action to be taken (retraining, 2nd observation, mark "Unsatisfactory," etc). <ul style="list-style-type: none"> • Do not mark "Unsatisfactory" after 1st observation unless instructed by your supervisor. • If a 2nd observation is conducted, <i>mark the result of the 2nd observation only.</i> • Other – can be used if the interviewer/QC checker resigned before you could observe him or her in the field. • Notes – are required detailing procedural problems observed and actions to be taken. <ul style="list-style-type: none"> 1 <input type="checkbox"/> Satisfactory – By the end of observation, interviewer/QC checker understands and follows procedures. 2 <input type="checkbox"/> Unsatisfactory – By the end of observation, interviewer/QC checker does NOT understand or follow procedures. <i>(Notes required to explain.)</i> 3 <input type="checkbox"/> Other – For example, employee resigned before observation could take place. <i>(Notes required to explain.)</i> 						

Census Coverage Measurement (CCM)
Initial Housing Unit Followup (IHUFU) Quality Control (QC) Form
 2010 Census

INTRODUCTION – Hello. I am (your name) from the U.S. Census Bureau. Here is my identification. Recently, Census employees checked addresses in this area as part of the 2010 Decennial Census. I am here to check the quality of their work. My questions should only take three minutes. This notice explains that your answers are confidential. (Hand the respondent a Confidentiality Notice and allow time for him or her to read it).

Section A: Identification

1. Cluster No.: XXXXXXXXX	2. LCO Name: XXXXXXXXXXXXXXXXXXXXXXXXX	3. LCO Code: XXXX
---------------------------	--	-------------------

Section B: Assignment Information

Position (a)	CLD (b)	Name (c)	FR Code (d)	Dates			
				Assigned (e)		Completed (f)	
				Month	Day	Month	Day
1. QC Crew Leader							
2. QC Checker							
3. QC Checker							

Section C: QC Check

Followup Cases Selected for QC Check								QC Check Results	
Page # (a)	CCM			Census			Followup Code (h)	Case Correct (No Critical Errors)* (i)	Case Incorrect (One or More Critical Errors) (j)
	Block (b)	MSN (c)	WMSN (d)	Block (e)	Census ID (f)	MSN (g)			
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]
XXX	XXXXXXXX	XXXXXX	XXXX	XXXXXXXX	XXXXXXXXXX	XXXXX	XXXXXXXXXX	[]	[]

(Note: Listing of sample continues as needed, possibly causing section to scroll to second page.)

1. Total Number of Cases Selected for QC Check: XX	2. Acceptance Number - Cluster passes if Total Incorrect is less than or equal to: XX	3. Total Correct	4. Total Incorrect
--	---	------------------	--------------------

5. QC Check Outcome (Mark (X) one): Pass Fail – Rectify

6. Notes

Section D: Rectification

1. Total Number of Followup Cases in Cluster	XXXXX
2. Total Number of Incorrect Cases in Cluster (Cases with One or More Critical Errors)	

*List of Noncritical Errors:

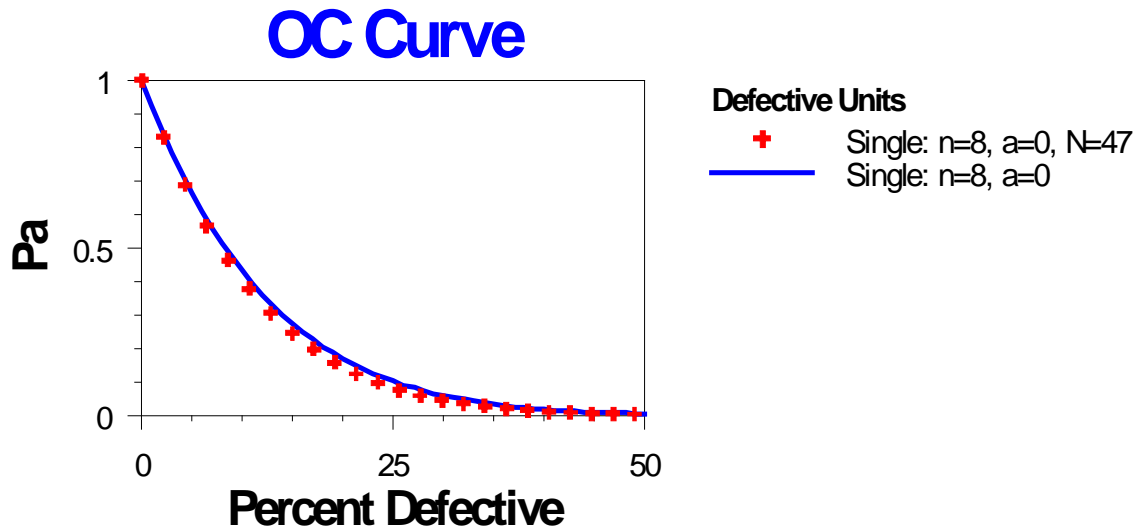
- Spelling errors
- Street-type errors
- For a GQ, one of the fields for facility name or description is filled and correct, but the other is either incorrect or blank.

CENSUS CONFIDENTIAL: RESTRICTED DATA FOR OFFICIAL USE ONLY. Information contained in this report is for use by the Census Bureau and is confidential by law (Title 13, U.S.C.). It may be seen only by sworn Census employees and may be used only for statistical purposes.

Quality Control Check Sample Table

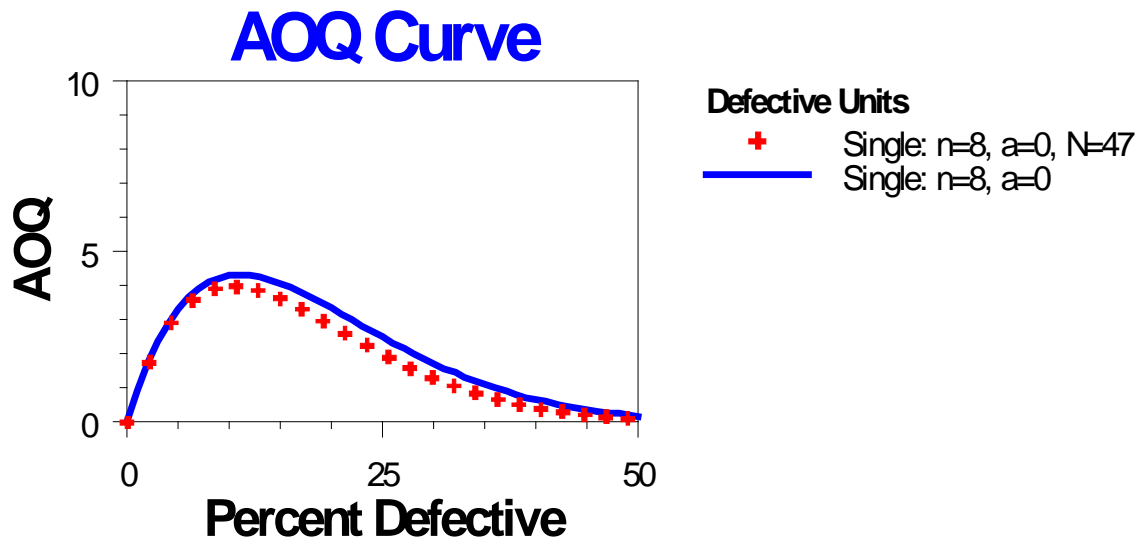
Number of Followup Case Forms in Block Cluster	Number of Followup Cases Forms Selected for QC Check	Acceptance Number - Number of Allowable Case Forms with Critical Errors for Cluster Sample Size
1	1	0
2	2	0
3 - 4	3	0
5 - 7	4	0
8 - 10	5	0
11 - 17	6	0
18 - 29	7	0
30 - 61	8	0
62 - 259	9	0
260 - 419	20	1
420 - 599	21	1
600 - 879	33	2
880 - 999	34	2
1000 - 1344	47	3
1345 - 1489	61	4
1490 - 1774	62	4
1775 - 1848	76	5
1850 - 2199	77	5
>= 2200	93	6

Operating Characteristic (OC) Curve



where P_a = the probability of acceptance

Average Outgoing Quality (AOQ) Curve



WEEKLY DATA KEYING VERIFICATION REPORT

Project: 5312
Job Name: IHUFU

Processing Year: 2010
2010 CENSUS COVERAGE MEASUREMENT INITIAL

Date: 06/27/2010 - 07/03/2010

Cum Date Range: 05/09/2010 - 07/03/2010

Special Report:

	THIS WEEK					CUMULATIVE				
	100 %	0.0%	0 %	0 %	Total	100 %	0.0%	0 %	0 %	Total
UnitCount	2	0	0	0	2	85	0	0	0	85
Accept	0	0	0	0	0	0	0	0	0	0
Reject	0	0	0	0	0	0	0	0	0	0
KeyedDocuments	35	0	0	0	35	4008	0	0	0	4008
VerifiedDocuments	35	0	0	0	35	4008	0	0	0	4008
KeyedRecords	118	0	0	0	118	14504	0	0	0	14504
VerifiedRecords	122	0	0	0	122	14521	0	0	0	14521
KeyedFields	685	0	0	0	685	88397	0	0	0	88397
VerifiedFields	725	0	0	0	725	88515	0	0	0	88515
ChargeFieldErrors	46	0	0	0	46	766	0	0	0	766
ChargeErrorRate	6.34%	0.00%	0.00%	0.00%	6.34%	0.87%	0.00%	0.00%	0.00%	0.87%
TotalErrors	46	0	0	0	46	912	0	0	0	912
TotalErrorRate	6.34%	0.00%	0.00%	0.00%	6.34%	1.03%	0.00%	0.00%	0.00%	1.03%

WEEKLY DATA KEYING VERIFICATION REPORT

Project: 5312

Processing Year: 2010

Job Name: IHUFUPR

2010 CENSUS COVERAGE MEASUREMENT INIT HOUS UNIT

Date: 06/06/2010 - 06/12/2010

Cum Date Range: 05/23/2010 - 06/12/2010

Special Report:

	THIS WEEK					CUMULATIVE				
	100 %	0.0%	0 %	0 %	Total	100 %	0.0%	0 %	0 %	Total
UnitCount	1	0	0	0	1	7	0	0	0	7
Accept	0	0	0	0	0	0	0	0	0	0
Reject	0	0	0	0	0	0	0	0	0	0
KeyedDocuments	3	0	0	0	3	267	0	0	0	267
VerifiedDocuments	3	0	0	0	3	267	0	0	0	267
KeyedRecords	9	0	0	0	9	871	0	0	0	871
VerifiedRecords	9	0	0	0	9	872	0	0	0	872
KeyedFields	50	0	0	0	50	5806	0	0	0	5806
VerifiedFields	50	0	0	0	50	5808	0	0	0	5808
ChargeFieldErrors	0	0	0	0	0	17	0	0	0	17
ChargeErrorRate	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.29%
TotalErrors	0	0	0	0	0	22	0	0	0	22
TotalErrorRate	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.38%