UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001

October 11, 2012

2010 CENSUS PLANNING MEMORANDA SERIES

No. 245

MEMORANDUM FOR The Distribution List

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

Subject: 2010 Census Update Enumerate Operations Assessment Report

Attached is the 2010 Census Update Enumerate Operations Assessment Report. The Quality Process for the 2010 Census Evaluations, Experiments, and Assessments was applied to the methodology development, specifications, software development, analysis, and documentation of the analysis and results, as necessary.

If you have questions about this report, please contact Sarah Heimel at (301) 763-9297, Geoff Jackson at (301) 763-8447 or Bei Zhang at (301) 763-8512.

Attachment

This page is intentionally blank

2010 Census Update Enumerate Operations Assessment

Update Enumerate Production, Update Enumerate Quality Control, Remote Update Enumerate, and Remote Alaska

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

FINAL REPORT

Heather Fallica
Sarah Heimel, Geoff Jackson, Bei Zhang

Decennial Management Division
Decennial Statistical Studies Division

Intentionally left blank.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Intentionally left blank.

Executive Summary

The 2010 Census Assessment of the Update Enumerate Operations documents the results of four 2010 Census field enumeration operations. The four operations that comprised the Update Enumerate Operations were:

- Update Enumerate Production,
- Update Enumerate Quality Control,
- Remote Update Enumerate, and
- Remote Alaska.

The Update Enumerate Operations were conducted in communities where housing units do not have traditional mailing addresses (for example, no house number or street name), and the geography is very remote or rural. All four of these operations involve 2010 Census enumerators interviewing and verifying the status of housing units in areas that did not receive a mail back 2010 Census questionnaire. Enumeration methodology was essentially the same across the Update Enumerate Operations; however, the implementation of each operation differs according to the climate, cultural characteristics, and remoteness of the geographical areas in which the communities or housing units were located. Refer to Appendix I: Fundamental UEO Differences in the 2010 Census for differences between the four Update Enumerate Operations production methodologies.

The Census Bureau implemented the Update Enumerate operation enumeration methodology in communities with special enumeration needs, including places where housing units did not have city-style mailing addresses (e.g., house number and street name), resort areas with high concentrations of seasonally vacant housing units, selected American Indian reservations, and communities along the Mexican-American border.

Alaskan native villages and sparsely populated communities in very remote areas of Maine and southeast Alaska constituted the Remote Alaska and Remote Update Enumerate operations, respectively. These areas have unique challenges associated with the accessibility to communities where the population ranges from several hundred people to just a few people. Communities are widely scattered and rarely linked by roads. Most are accessible only by small engine airplane, snowmobile, four-wheel-drive vehicles, dogsled, or some combination thereof.

For the 2010 Census, Remote Alaska and Remote Update Enumerate were not included in either the initial Local Update of Census Addresses program or the Address Canvassing operation to update the 2010 Census Master Address File due to their remote nature.

Each Update Enumerate Operation contained quality control activities intended to identify and correct data errors detected during the enumeration phase. Update Enumerate Quality Control was a separate and distinct operation, with separate staff, but concurrent to Update Enumerate production. For Remote Alaska and Remote Update Enumerate, the crew leader conducted a personal verification of the housing units classified as vacant or delete by the production

enumerator. In addition, if the crew leader observed enumerator performance deficiencies, enumerators received additional on-the-job training. For Remote Alaska, the sworn-in tribal leader/representative participated in their tribal final housing unit count reconciliation.

The Group Quarters Advance Visit operation occurred in February 2010 and identified Group Quarters addresses. These addresses were included on address lists for the Update Enumerate Operations. Due to timing of the operations and operational challenges in remote areas, crew leaders that worked on Remote Alaska and Remote Update Enumerate received additional training and conducted the Group Quarters enumeration. Any Group Quarters found during Update Enumerate were enumerated later during the Group Quarters Enumeration operation.

The Paper-Based Operations Control System provided the Cost and Progress System at Census Bureau Headquarters with daily check-in data. The system made progress data available such as assignment of work, check-in of cases, cost of the operation to date, and reports for monitoring progress at the national, Regional Census Center, and Local Census Office levels. The Paper-Based Operations Control System did not capture cases worked as Usual Home Elsewhere. In addition, due to system availability, report data were limited and often delayed at check-in/checkout.

Results

For this assessment, four major data sources were used to assess each Update Enumerate Operation: the Decennial Management Cost and Progress System, the Decennial Response File, the Master Address File Final Tabulation Extract, and the 2010 Census Matching, Reviewing, and Coding System. The data files created from these four sources each have a different number of cases for each of the operations in this assessment since the files were created at different times and had different parameters for what was an acceptable return. The biggest limitation in this assessment is that there is not one static universe identifiable in the data for each operation.

Schedule, Cost, and Workload

The four Update Enumerate Operations took place from December 7, 2009, to June 9, 2010. The first activities in 2009 were the training for Remote Alaska field staff and the last activities were the closeout of the Update Enumerate Quality Control operation. The Update Enumerate Operations workload totaled 1,969,772 housing units (including Reinterview). Of the $127,609,854 budget, $62,436,477 was spent. At the aggregate level, costs for the Update Enumerate Operations which was reported in the Decennial Management Cost and Progress System were 51.1 percent lower than budgeted.

Remote Alaska was the first enumeration operation conducted in the field. The Director of the Census Bureau's visit to Noorvik, Alaska on January 25, 2010 marked the kickoff of the 2010 Census enumeration nationwide. Update Enumerate Production, Update Enumerate Quality Control, and Remote Update Enumerate were in the field concurrently, March 22 through June 9. The Update Enumerate Quality Control operation was the last of the operations in the field, beginning a week after Update Enumerate Production. According to the dates provided by

enumerators on the Enumerator Questionnaire, 40 percent of the Update Enumerate Production workload was enumerated before Census Day (April 1, 2010).

Remote Alaska enumeration ended April 30. The Update Enumerate Production and Remote Update Enumerate operations were conducted March 22 through May 29. The Local Census Offices met the scheduled fieldwork end date of May 29. However, 100 percent check-in was not achieved until June 28, due to limited check-in opportunities and some related problems checking work into the Paper-Based Operations Control System.

The Remote Alaska operation spent $1,756,690 of the $2,283,131 field budget. The under spending was due to a surplus in factors including production salary cost. Additional funding to cover logistical and miscellaneous expenses for Remote Alaska was budgeted to the Seattle Regional Census Center to account for the unique challenges associated with accessing communities in Alaska's remote areas. Based on the reporting from the Seattle Regional Census Center, the estimated spending was about 47.2 percent of the budget. The workload in Remote Alaska totaled 33,464 housing units.

The Remote Update Enumerate operation was also under budget, spending $820,874 of the $1,388,698 field budget. This was due to factors including less than expected production salary and mileage costs. The workload was 8,114 housing units.

Update Enumerate ran considerably under budget by $45,365,759. The actual cost was about 51 percent lower than the expected $89,384,043 field budget. This was mainly due to a higher than expected production rate and lower mileage per case achieved. Most of the Update Enumerate cost factors were under budget. The operation enumerated 1,463,283 housing units.

The total cost of the Update Enumerate Quality Control operation was $15,865,083 of the $34,553,982 field budget. Of the 32,574 Assignment Areas, we received Dependent Quality Control data for about 97 percent. A sample of seven percent of the housing units in the Assignment Areas was verified during the Dependent Quality Control operation. Delete Verification produced a total of 81,332 deletes and eleven cases that went through the "final" deletion process. For Reinterview, there were 1,465,869 cases from Update Enumerate production in the 2010 Census Matching, Reviewing, and Coding System. About 95 percent were eligible to undergo Reinterview and 232,276 cases were selected from the production case workload in the Paper-Based Operations Control System at check-in.

Update Enumerate Quality Control was conducted concurrently with the Update Enumerate production, beginning March 29 (one week after the start of Update Enumerate), and ending June 9 (three weeks after the finish of Update Enumerate). It was originally scheduled to end on June 4, but the date was pushed back due to load issues in the Paper-Based Operations Control System. The Update Enumerate Paper-Based Operations Control System operated under limited hours to accommodate the much larger Nonresponse Followup workload, leading to backlogs of questionnaires in the Local Census Offices for Update Enumerate. On June 3, the Alternate Shipping Solution was made available to the Update Enumerate Operations to ship and track Enumerator Questionnaires. Only 84 percent of the Update Enumerate Reinterview workload

was finished by the official end of the Quality Control operation on June 4. It was not until June 26 that 98 percent of the Reinterview workload was finished.

The start dates of the quality control activities in Update Enumerate are dependent on the completion of other activities which delays how quickly the Quality Control staff can follow up with a housing unit. For instance, all work conducted in the 2010 Census Matching, Reviewing, and Coding System occurred subsequent to Reinterview data capture, from April 15 to June 16. In addition, Dependent Quality Control occurred after the Assignment Area was checked into the Paper-Based Operations Control System.

Update Enumerate Production Outcomes

There were 1,463,689 housing units enumerated in Update Enumerate Production as identified by the Decennial Response File. Of those, 49.4 percent were classified as occupied, 43.6 percent were classified as vacant, and 6.3 percent were classified as deletes. There are two classifications of a vacant housing unit: 1) seasonally vacant or a second home and 2) regular vacant, a housing unit for sale or rent and currently unoccupied. Of the housing units classified as vacant, 75.0 percent were seasonal vacant, and 24.6 percent were regular vacant.

Spanish was used to conduct 5.7 percent of the Update Enumerate Production interviews while Navajo was used in 0.9 percent of the Update Enumerate Production interviews. Of the occupied housing units in Update Enumerate, a household member was the respondent 89.6 percent of the time while a proxy was the respondent for 9.5 percent of the occupied interviews.

The Update Enumerate enumerators completed 70,475 questionnaires for added housing units. Housing units that were enumerator-reported (Type C cases) constituted 95.3 percent of the adds, while respondent-reported adds constituted 4.7 percent. Of all the added Update Enumerate questionnaires completed, 93.8 percent were able to be successfully geocoded to a census block and assigned a Master Address File identification by the Geography Division during their processing of added housing units. The cases that were not successfully geocoded to a block did not contain enough valid address information or the address could not be located using existing resources.

The enumerator was responsible for canvassing each block in their Assignment Area and verifying the address that they found on the ground to the address listed in the Assignment Area binder. As the enumerators canvassed, they updated the action code and housing unit status code for each address listed in the Assignment Area binder. The assessment tally file had 1,458,536 addresses; the vast majority was accepted in the Master Address File/Topologically Integrated Geographic Encoding and Referencing System Database as only 991 records were rejected. Of the 1,457,545 accepted records from the assessment tally file, 80.3 percent were addresses that enumerators verified as correct while canvassing in the field, 9.1 percent required a correction, and 4.5 percent added were housing units. An additional 1.9 percent were deletions and 1.5 percent were classified as nonresidential. The remainder were duplicates, uninhabitable and Empty Mobile Home/Trailer Sites.

The Final Tabulation Master Address File extract had 1,457,535 Update Enumerate addresses. Of the 1,457,535, the majority (88.2 percent) were complete city-style addresses, while 6.7 percent were incomplete addresses. Of the 1,457,535 Update Enumerate addresses, 79 percent were single unit structures.

There were 67,505 total blocks that contained the 1,457,535 housing units in Update Enumerate. Only 11,524 blocks (17.1 percent) had all of their addresses recognized by the United States Postal Service. These blocks accounted for 97,033 housing units, which was 6.7 percent of the Delivery Sequence File matched addresses.

Update Enumerate Quality Control Outcomes

There were 31,656 Assignment Areas worked in the Dependent Quality Control operation; 4.6 percent of the Assignment Areas failed Dependent Quality Control, requiring a recanvass. The most common critical Dependent Quality Control error was when the production enumerator marked a housing unit as a type of delete, while the Quality Control enumerator said it existed. The two most common non-critical Dependent Quality Control errors were map spot errors and incorrect house numbers.

There were a total of 81,332 deletes that went through Delete Verification and 11 that went through Final Delete Verification. The majority of deletes were verified as deletes in Delete Verification, but 15.4 percent of the Delete Verification cases were considered incorrect deletes.

The Reinterview operation utilized the 2010 Census Matching, Reviewing, and Coding System to select certain types of Reinterview cases (i.e. outlier, supplemental, hard fail Reinterview cases, and enumerators for supplemental Reinterview), and facilitate the review and coding of Reinterview cases. During the Update Enumerate Reinterview operation, there were a total of 232,276 cases selected for Reinterview. The largest number of Reinterview cases were selected due to Vacant Reinterview type; Vacant Reinterview type cases accounted for 58.9 percent of the Reinterview cases. The second largest Reinterview type was Random Reinterview, which made up 32.3 percent of the Reinterview workload. Even though 232,276 housing units were selected in the Paper-Based Operations Control System for Update Enumerate Reinterview, the 2010 Census Matching, Reviewing, and Coding System only received data for 215,833 cases.

Of the 215,833 cases worked in 2010 Census Reinterview Matching, Reviewing, and Coding System for Update Enumerate Reinterview, 81.2 percent passed and matched the original Update Enumerate interview. An additional 10.1 percent of cases had an outcome of "Local Census Office Relief" while 6.4 percent were noninterviews. There were 80 housing units that ended up with a final matching outcome of "Hard Fail". The "Hard Fail" final matching outcome indicates that the enumerator was found to be falsifying data. There were 33 Update Enumerate enumerators who were hard failed as a result of the Update Enumerate Reinterview operation.

Remote Update Enumerate Outcomes

The Decennial Response File identified 8,281 housing units enumerated in Remote Update Enumerate. Of those, 31.0 percent were classified as occupied, 51.3 percent were classified as

vacant, and 17.4 percent were classified as deletes. Of the housing units classified as vacants, 73.5 percent were seasonal vacants and 25.5 percent were regular vacants. Of the housing units classified as "delete", 76.1 percent were categorized as "Demolished/Burned Out/Cannot Locate."

The Remote Update Enumerate enumerators completed 1,557 questionnaires for added housing units. Housing units that were enumerator-reported (Type C cases) constituted 95.4 percent of the adds, while respondent-reported adds (Type A cases) constituted 4.5 percent. Of all the added Remote Update Enumerate questionnaires completed, 93.6 percent were able to be successfully geocoded to a block and assigned a Master Address File identification by the Geography Division.

Of the occupied housing units in Remote Update Enumerate, a household member was the respondent 76.5 percent of the time while a proxy was the respondent for 23.4 percent of occupied interviews.

The assessment tally file had 8,149 addresses from the Remote Update Enumerate operation; the vast majority was accepted in the Master Address File/Topologically Integrated Geographic Encoding and Referencing System Database as only one address was rejected. Of the 8,148 accepted records in assessment tally file, 39.8 percent were addresses that enumerators verified as correct while canvassing in the field, 24.9 percent required a correction, and 17.8 percent were added housing units. An additional 13.0 percent were deletions. The remainder was duplicates, uninhabitable, and Empty Mobile Home/Trailer Sites.

The Final Tabulation Master Address File extract had 8,149 Remote Update Enumerate addresses. Only 35.4 percent were complete city-style addresses while 42.8 percent had no address information and 15.9 percent had an incomplete address. Of the housing units with no address information, 97.8 percent had a location description.

There were 465 blocks that contained the 8,149 housing units in Remote Update Enumerate. Only five blocks (1.1 percent) had all of the housing units in that block match to the Delivery Sequence File, while 92.0 percent of the blocks had no housing units that matched to the Delivery Sequence File.

Remote Alaska Outcomes

The Decennial Response File identified 33,391 housing units enumerated in Remote Alaska. Of those, 50.0 percent were classified as occupied, 35.0 percent were classified as vacant, and 14.7 percent were classified as deletes. Of the housing units classified as vacant, 50.5 percent were regular vacants, and 49.4 percent were seasonal vacants. Of the housing units classified as "delete", 60.9 percent were categorized as "Demolished/Burned Out/Cannot Locate" while 19.4 percent were uninhabitable.

The Remote Alaska enumerators completed 5,928 questionnaires for added housing units, all of which were enumerator-reported (Type C cases) and 97.8 percent were able to be successfully

geocoded to a block and assigned a Master Address File identification by the Geography Division.

Of the occupied housing units in Remote Alaska, a household member was the respondent 89.7 percent of the time while a proxy was the respondent for 10.2 percent of occupied interviews.

The assessment tally file had 33,361 addresses from the Remote Alaska operation; the vast majority were accepted in the Master Address File/Topologically Integrated Geographic Encoding and Referencing System Database and only 21 were rejected. Of the 33,340 accepted records, 41.3 percent were addresses that enumerators verified as correct while canvassing in the field, 27.2 percent required a correction, and 17.4 percent were added housing units. An additional 8.9 percent were deletions.

The Final Tabulation Master Address File extract had 33,334 Remote Alaska addresses. Only 23.5 percent were complete city-style addresses while 34.1 percent had no address information, 25.2 percent had a complete post office box address, 0.5 percent had a complete rural route address and 16.8 percent had an incomplete address. Of the housing units with no address information, 97.8 percent had a location description.

There were 1,969 blocks that contained the 33,334 housing units in Remote Alaska and 99.9 percent of the blocks had no housing units that matched to the Delivery Sequence File.

Automation Results

Update Enumerate Operation enumerators used a paper questionnaire to interview housing unit residents and to document their work. Once enumerators completed the questionnaires, they were returned to the Local Census Offices. Staff checked completed questionnaires into the Paper-Based Operations Control System and keyed in the housing unit status. The system then selected questionnaires, based on eligibility rules, for Update Enumerate Reinterview.

The Paper-Based Operations Control System was a web-based control system. It managed most of the field operations from one centralized location while still maintaining a regional and local office-level control model. The Paper-Based Operations Control System was responsible for many essential functions, such as:

- providing address lists to be printed for assignment preparation,
- assigning work to crew leaders and enumerators,
- checking-in of completed questionnaires,
- creating reports for monitoring each operation,
- selecting questionnaires for Update Enumerate Reinterview, and
- checking out of questionnaires from the Local Census Office to data capture centers (upon the initial start of the operations).

During the course of the Update Enumerate Operations, there was a lag between the completion of the enumerator questionnaires and the check-in of those questionnaires into the Paper-Based

Operations Control System. This was primarily caused by the Nonresponse Followup workload arriving and taking priority in the Local Census Offices. Local Census Offices were directed to process Nonresponse Followup work and hold Update Enumerate work when checking work into the Paper-Based Operations Control System. When authorized to continue with Update Enumerate, it was during narrow windows of time. In addition to shipping and checkout difficulty within the Paper-Based Operation Control System, the backlog and instability of the system created issues for the Decennial Management Division's Cost and Progress System. This ultimately extended closeout of the Update Enumerate operation and affected the Census Bureau's ability to monitor the operations in real time.

The use of paper forms caused problems for each of the four Update Enumerate operations. In the paper environment, forms in the field were difficult to track and Quality Control staff found themselves struggling to shuffle through paperwork (Delete Verification forms, Dependent Quality Control forms, Reinterview forms, and forms contained in the Assignment Area Binder). There were also instances of address binders and questionnaires being lost in transit to the National Processing Center and other data capture centers. When questionnaires were lost, Census Bureau Headquarters Processing was required to create returns based on the housing unit status and population count keyed into the Paper-Based Operation Control System.

Furthermore, continuation forms needed to be linked to their parent form, which required queries in census databases to find the parent forms for the continuation forms that were unlinked. The additional processing was able to reduce the number of unlinked continuation forms from hundreds of thousands to a few thousand, but some still remained unlinked. There were also times when multiple questionnaires were completed for the same housing unit. To distinguish multiple questionnaires for the same housing unit, office clerks were required to assign a version number on the questionnaire, but this did not always happen.

Recommendations

The key recommendations from the 2010 Update Enumerate Operations are the following:

- **Automate the questionnaire, operational forms such as payroll and Info-comms[1], and all related sources of paradata.**

- **Develop a data warehouse to create a consolidated repository of operational data that all systems can access.** This will facilitate the ability to monitor the progress of the Update Enumerate Operations (e.g., budget and staffing) in real time.

- **Improve communication about the enumeration method for Update Enumerate Operation areas.** Many residents were expecting questionnaires in the mail, due to the nationwide media campaign.

- **Review criteria for updating addresses in Update Enumerate areas.** Update Enumerate was included in the 2010 Address Canvassing operation. Results data show

[1] Info-comms reported accidents or other incidents that occurred in the field or LCO during the operations.

that 80 percent of Update Enumerate addresses were verified and 88 percent were complete city-style addresses. Consider if areas of Update Enumerate can be included in the Nonresponse Followup Operation and not include an address update.

- **Explore different enumeration methods for Remote Update Enumerate.** The workload for Remote Update Enumerate was just over 8,000 housing units, yet the operation required the same amount of documentation and planning as for Update Enumerate. The quality control aspect should also be reconsidered if Remote Update Enumerate remains separate for the 2020 Census. Verification of every housing unit identified as vacant or delete involved significant time and resources. Results data show that 2,571 occupied housing units contained 5,555 people. Consider if the 5,710 vacant and nonexistent housing units can be identified without an enumerator visit. In addition, consider if this operation is able to use administrative records for these rural areas.

- **Review objectives and best methods for quality checks in Remote Update Enumerate.** Results data showed that 69 percent of cases in the operation needed to be followed up with by a crew leader. Consider if administrative records can be used to verify vacant and deleted housing units to avoid crew leader verification.

- **Investigate possible ways to streamline and simplify the quality control components in the Update Enumerate Quality Control operation.**

- **Use a Spanish in-language questionnaire where there is a majority of people who speak that language.**

1 INTRODUCTION

1.1 Scope

The Update Enumerate Operations (UEOs) included the Update Enumerate Production (UE), Update Enumerate Quality Control (UE QC), Remote Update Enumerate (RUE), and the Remote Alaska (RA)[2] operations. The purpose of the UEOs Assessment is to document the results and for major findings from these operations that were conducted in the 2010 Census. The assessment includes workload, staffing, training, schedule, and cost. In addition, the assessment addresses the change control process, the use of automation, and operation specific assessment questions. This assessment will inform the Housing Unit Enumeration Operation Integration Team (HUE-OIT), stakeholders, and decision makers of recommended changes or improvements for future decennial censuses.

1.2 Intended Audience

This document assumes that the reader has a basic understanding of the UEOs. It will serve as input for discussion by the research, planning, and development teams when planning for the 2020 Census. If the reader does not have a basic understanding of the UEOs, they should refer to the "2010 Census Informational Memorandum No. 43, the 2010 Census Detailed Operational Plan (DOP) for the Update Enumerate Operations. The DOP is a document that describes the UEOs in more detail.

2 BACKGROUND

The UEOs were conducted in communities primarily where most of the housing units (HUs) did not have traditional, city-style mailing addresses (e.g., house number and street name) and housing units located in resort areas. These areas did not receive questionnaires through customary mailout/mailback data collection methods because of the nature of these hard-to-enumerate (HTE) populations. UEO areas include resort areas with high concentrations of seasonally vacant housing units, selected American Indian Reservations, Alaska native villages, communities along the Mexico and United States border, and sparsely populated communities in very remote areas of Maine and Alaska. Geography is often noncontiguous and challenging (i.e., mountainous, coastal, etc.). The Census Bureau consulted with American Indian and Alaska Native (AIAN) tribes and tribal organizations through tribal government liaisons and consultation processes, to obtain input for Census 2000.

Before introducing and discussing the 2010 Census operations, this assessment opens with a summary on the history of Census 2000 and mid-decade research and testing that influenced the 2010 Census UEOs.

[2] "RA" in this report means Remote Alaska. The use of the acronym in other 2010 Census Operations means "Recruiting Assistant".

2.1 Census 2000

The Census 2000 UEO field operations enumerated housing units that did not have a city-style address. These field operations were Update Enumerate, the Update Enumerate Quality Control, Update Enumerate Field Follow-up (UE FFU), List Enumerate (LE), List Enumerate Quality Control (LE QC), List Enumerate Field Follow-up (LE FFU), and enumeration conducted in the remote areas of Alaska as part of LE.

2.1.1 Census 2000 Update Enumerate

The UE operation targeted both rural and urban areas. These areas included resorts with high concentrations of seasonally vacant housing units, selected American Indian reservations, and unincorporated communities near the border of Mexico referred to as the Colonias. Some of the rural areas covered in UE did not have mail delivery. UE was the preferred method of enumeration in these areas because of concerns about the possibility of low response rates, poor address integrity, and inability to mail questionnaires to these areas.

The UE workload consisted of 1,056,553 housing units. The operation began March 13 and ended June 5, 2000. UE finished one week past the scheduled end date of May 30 due to field staff requiring additional time to enumerate an American Indian reservation at the base of the Grand Canyon accessible only by mule.

Enumerators canvassed their assignment areas, updated address listing pages, updated census maps, and added residential units that were not on the address listing pages and maps. Enumerators also conducted an interview with a knowledgeable respondent to determine the HU status on Census Day for every HU (including added units).

See Section 2.1.8 for additional Standard UEO Procedures.

2.1.2 Census 2000 Update Enumerate Quality Control

The Census 2000 UE QC consisted of two main field components, the Dependent Check and a Reinterview.

2.1.2.1 Dependent Check

The Dependent Check was a quality assurance review of the address binder to verify the quality and accuracy of the updated addresses and census maps. This activity was performed concurrent to production. The crew leader (CL) selected a sample of addresses within an Assignment Area (AA) to be included in the review. The CL Assistant (CLA) revisited those addresses to ensure the enumerator correctly updated or added the addresses on the address listing pages and census maps.

The Census 2000 evaluation of the dependent check revealed that only 73.7 percent of AAs completed the Address Register review. Of those AAs, 98.4 percent passed the check the first time.

2.1.2.2 Reinterview

The Census 2000 Reinterview operation was a quality check of housing unit/questionnaire data collected by production enumerators. The intent of the operation was to detect or correct data falsification and identify enumerators who did not understand or follow field procedures correctly. The quality check had two components, an Administrative and a Supplemental Reinterview.

The Administrative Reinterview targeted enumerators whose work was significantly different from others in their work area. If the field or office doubted the accuracy of an enumerator's work, they could undergo Supplemental Reinterview.

Reinterview enumerators independently obtained the Census Day unit status and household roster of a sample of the UE households using an RI form. After comparing data recorded on the production Enumerator Questionnaires (EQs) to the data collected during Reinterview, a preliminary conclusion was drawn about the veracity/accuracy of the production enumerators' data. The Office Operations Supervisor (OOS) made the final Reinterview determination. Reinterview enumerators recorded the details of the Reinterview on the Reinterview and Reconciliation Questionnaire, Form D-806 (RI EQ). A separate questionnaire was not made available to the operation.

A total of 10,210 cases were selected for Reinterview in Census 2000. Only 9,142 Reinterview cases were uniquely identified Reinterview Questionnaires in Census 2000. Of the 9,142, about 11.3 percent contained falsified data, enumerator error, or respondent error. Falsified data accounted for 1.8 percent, enumerator error for 5.2 percent, and respondent error for 1.6 percent of the 11.3 percent of cases with errors. The source for the remaining 2.7 percent of cases with errors could not be determined.

2.1.3 Census 2000 Update Enumerate Field Follow-up

The Census Bureau scheduled conducted the UE FFU from June 12 to July 7, 2000. The operation followed UE production and Reinterview, when fieldwork had completed. There were no seasonal housing units in the workload. Seasonal status was determined at the time of the interview. Field Follow-up was a quality check in which enumerators revisited cases from UE production that were coded as deletes or non-seasonal vacants.

2.1.4 Census 2000 List Enumerate

The Census Bureau conducted LE from mid-March to the beginning of July 2000. The operation added 392,368 addresses. List Enumerate was in remote, sparsely populated areas of the United States where many of the housing units did not have city-style mail delivery. These areas

included counties with "low HU density," areas with inclement weather, limited or seasonal accessibility, long distances between post offices, land uses that precluded or restricted HUs, and a higher percentage of vacant and seasonal HUs.

The LE areas had no address lists or maps containing map spots indicating where a housing unit might be. Address Registers contained blank address listing pages, and census maps for an assignment area. Enumerators canvassed their assignment area on a block basis and listed addresses on the address listing pages and map spotted the HU on the census block map. The enumerator also conducted an interview with a knowledgeable respondent to determine the HU status on Census Day for every HU on the address listing page in their AA.

See Section 2.1.8 for additional Standard UEO Procedures.

2.1.5 Census 2000 List Enumerate Quality Control

The LE Quality Control operation consisted of two components, a Dependent Check for the address register and a Reinterview (a quality check for the questionnaire).

The Census Bureau conducted an evaluation of the 2000 LE operation; however, there was no Quality Profile produced containing additional quality control data.

2.1.5.1 Dependent Check Address Register Review

The Dependent Check was a quality assurance review of the address register to verify the quality and accuracy of the updated addresses and census maps. The CL checked a sample of the addresses and revisited those addresses to evaluate the accuracy of the enumerator's work in updating or adding addresses on the address listing pages and census maps.

2.1.5.2 Reinterview

The OOS was in charge of Reinterview. The OOS examined trouble reports and decided which enumerators should undergo RI. If an enumerator was flagged, his/her next seven cases were selected for RI.

A Reinterview clerk attempted to contact each HU in the sample of RI cases by telephone. In cases where a telephone number was available and after three unsuccessful telephone attempts were made to the respondent a personal visit was made to the respondent's home.

2.1.6 List Enumerate Field Follow-up

The Census Bureau conducted the LE FFU from May 15 to June 10, 2000. The operation followed LE and LE QC, when fieldwork had completed. LE FFU was not conducted in the remote areas of Alaska. The operation was a quality check in which enumerators revisited cases from UE production for which we were missing a completed EQ or the case was coded as a delete or non-seasonal vacant. The universe came from three sources.

1. Cases flagged for resampling during the automated Sample Tolerance Check (STC). A Sample Tolerance Check was performed to see if the correct proportion of the population in an AA was enumerated on a long form. AAs that failed the STC were resampled. Resampled households requiring a long form but were originally enumerated on a short form were included in FFU so that an enumerator could complete the long form.

2. Missing cases identified during the Merge operation. These were cases for which there may have been any combination of the following:

- A missing Address Register or Address Register entry,
- A missing questionnaire at questionnaire check-in from the field or,
- A missing questionnaire at questionnaire checkout to the Data Capture Center (DCC)

3. Nonseasonal Vacants - these were cases coded in Item A of the Interview Summary Section of the questionnaire as Status Code "3-Vacant Regular." These cases should have population "00" in item B, and not be coded as "For Seasonal, recreational or occasional use" or "For migrant workers" in item C.

2.1.7 Census 2000 Alaska Enumeration

The Census Bureau used "modified" List Enumerate methodology to conduct the enumeration in Alaska. Field staff made a preliminary visit to the remote areas from October to December 1999 to contact village leaders and obtain information about the village. The information collected comprised the "village profile" that included information such as lodging and restaurants. Enumeration of the remote areas was split into three waves beginning January 31 and ending April 22, 2000. The workload was about 50,000 HUs.

Enumeration began in late January due to the spring thaw across Alaska. The early timing permits travel to these areas during a period when conditions are most favorable. The frozen ground and rivers allow planes to fly in and out. Once the spring thaw begins, travel to these areas is difficult or impossible and people leave their homes to hunt and fish. Enumeration must finish before this happens or the Census Bureau will miss a large part of the population.

The tribal leader or representative selected the enumerators. The Team Leader (TL) conducted on the job training (OJT) with the enumerators initially. The TL accompanied the enumerator, conducted OJT to ensure the enumerator properly canvassed the assignment area, listed addresses on the listing pages, map spotted HUs on the census block maps, and completed a short or long form questionnaire for each HU (including vacant HUs). Enumerators had to speak with a knowledgeable respondent.

When all AAs for the village were complete, the TL conducted the Address List Validation Check. As a last step, the TL met with the village leader or designee to sign the Confidentiality Agreement and review the address listing pages. Once completed, the TL shipped the Confidentiality Agreement along with the Address Register to the Local Census Office (LCO).

Not all standard procedures applied to Alaska. If enumerators identified a Special Place/Group Quarters (SP/GQ) in their AA, they collected the necessary information to locate the facility and gave the information to the Team Leader.

2.1.8 2000 Standard UEO Procedures

Enumerators did not fill out a questionnaire for any Group Quarters (GQ) and/or housing units in the same structure as a GQ. Enumerators were instructed to complete an add page for the SP/GQ and provide it to their crew leader (CL) who then submitted it to the LCO for appropriate follow-up.

On a daily basis, enumerators met with their CL and delivered completed questionnaires and payroll forms (D-308). The CL reviewed the completed work and provided the enumerator with feedback. In addition, the CL assigned and reassigned work and updated the assignment control sheet. The Field Operations Supervisor (FOS) delivered completed work for all their CLs to the LCO for check-in and office review. The FOS also received any work requiring repair or daily pay and work records requiring correction.

The LCO checked in completed work, and shipped the questionnaires on a flow basis to the data capture center for processing. The Address Registers (with enclosed map pouches) however, stayed in the LCO until the FFU operation had shipped all completed work to the National Processing Censter (NPC). The Geography branch at NPC digitized the maps.

2.1.9 2000 Budget and Actual Cost

There was no assessment for the Census 2000 UE or LE operations that documented the detailed cost analysis. We used the Census 2000 Cost Model and UE and LE evaluations to draw some conclusions about cost for these operations. Table 1 shows budgeted and actual workloads and costs for the Census 2000 UE, LE, and Alaska operations.

Table 1: 2000 UEO Budgeted and Actual Costs

	Budget		Actual		Variance
	Housing Unit Workload	**Budget Cost**	**Housing Unit Actual Workload**	**Actual Cost**	**Percent Variance of Budget**
Total UE and LE	1,291,720	$48,166,419	-	$51,691,287[3]	(7.3)[4]
Total UE	666,720	$17,014,416	-	$31,986,343[5]	(88)[6]
Production	555,600	$14,216,699	1,056,553[7]	-	-
Field Follow-up	111,120	$2,797,717	-	-	-
Total LE	625,000	$31,152,003	-	$19,704,944[8]	(36.7)9
Production	500,000	$23,495,340	392,368[11]	-	-
Field Follow-up	100,000	$3,123,498	-	-	-
Reinterview	25,000	$1,073,647	-	-	-
Remote Alaska	-	$3,459,518[10]	-	-	-

Source: 2000 UE Cost Model, Final Evaluation Report for List Enumerate, Final Evaluation Report for Update Enumerate

Note: Census 2000 final reports for UE and LE Field Follow-up and an LE Quality Profile were not available.

2.1.10 Recommendations from Census 2000

The Census 2000 UE, UE QC, UE FFU, LE, LE QC, and LE FFU operations yielded several recommendations listed below. Information on how we addressed these recommendations in the 2010 Census UEO is in Section 2.4.6 of this document.

2.1.10.1 Update Enumerate

- Continue to target difficult-to-enumerate areas for special enumeration methods in the 2010 Census.

[3] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[4] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[5] Includes UE, Reinterview, and Field Follow-up

[6] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[7] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[8] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[9] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

[10] This number does not include additional travel and lodging for CLs and FOSs

[11] Includes LE, Vacant Follow-up, and Reinterview, and Alaska enumeration

- Include a reference to Census Day, April 1, 2010 when asking respondents to provide the ages of household members.
- Enumerate all household members when the housing unit population count is greater than five.
- Incorporate in the procedures and the training for the UE enumerators, instructions, and examples that stress the need to probe for additional families who may be living in a given housing unit.
- For decennial outreach efforts and educational campaigns, promote census awareness and encourage participation. Continue use of community-based organizations (churches, schools, and American Indian and tribal organizations).
- Use cultural facilitators with local knowledge to work alongside census enumerators. Use this model in selected test sites before the 2010 Census in order to better understand this approach and formalize it through the establishment of standardized training and procedures.
- Use a Spanish language census form and a Spanish language data collection instrument for 2010 Census enumerators. This can greatly facilitate the enumeration process.

2.1.10.2 Update Enumerate Quality Control

- Track the progress of the Dependent Check and Office Review during the operation. Provide management with "real time" (within a day or two) data pertaining to the completion rates and outcomes of these quality control operations, which increases the likelihood that these operations are performed completely and on time.
- Sample more of the vacant and deleted cases for Reinterview.
- Capture the Reinterview data on handheld computers instead of paper forms. By building incompleteness and consistency edits, we reduce missing data and eliminate inconsistencies.

2.1.10.3 List Enumerate

- Eliminate the List Enumerate methodology for the 2010 Census.

2.1.10.4 List Enumerate in Alaska

- Continue use of "waves" to complete enumeration, based on weather factors.
- Continue to send work from villages when the entire village is complete and the tribal leader has "signed off".
- Add barcodes to the D-1(E) SUPP continuation form to allow for electronic linkage.

2.2 Mid Decade Planning for the 2010 Census

The first time the Census Bureau built a nationwide address file was in Census 2000. By 2002, Census Bureau managers had already begun early planning for the 2010 Census. The beginning

of a new decade historically defines the planning cycle for that decade's decennial census of population and housing. The planning cycle for the 2010 Census was no exception.

Key lessons from the Census 2000 experience suggested that the major challenges for the 2010 Census would revolve around the need to improve both data accuracy as well as data relevancy, while developing and implementing more cost effective operations. Furthermore, managers anticipated they would need to meet these formidable challenges in an environment of increasingly rapid technological change and profoundly dramatic demographic diversity.

Census 2000 collected detailed demographic and socioeconomic data on about one-sixth of the population – the part of the census known as the long form or sample data. A close review of the challenges for the decade prompted Census Bureau managers to rethink the once-a-decade approach to building an address file and collecting long form data. As a result, managers determined that these two complex and costly operations should occur on an ongoing basis throughout the decade to increase timeliness and accuracy, while greatly simplifying the design for the actual enumeration in the 2010 Census. This led to the reengineering strategy for the 2010 Census of Population and Housing composed of the following:

- A modernized and maintained Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) address file and geographic database
- The implementation of the American Community Survey
- A short form-only 2010 Census optimally designed to take advantage of the opportunities afforded by the former two initiatives.

We believed that the implementation of these three initiatives would enable the Census Bureau to meet its goals for the reengineered 2010 Census. These goals were:

- Improve accuracy (2010 Census specific)
- Reduce risks (2010 Census specific)
- Contain cost (2010 Census specific)
- Provide more relevant data (American Community Survey specific)

To design and implement an optimal short form-only 2010 Census, the Census Bureau implemented a vigorous research, development, and testing program. The program included several special purpose tests, two census site tests, and a dress rehearsal of the actual 2010 Census plan. The rationale for having two site tests before the dress rehearsal was that it allowed for incremental and iterative development. The two tests would provide a number of opportunities to improve coverage and quality, increase efficiency, and contain costs.

However, realizing these opportunities required new methods and supporting systems. The first test in 2004 focused on new methods and gathering performance metrics. Enumerator operations were not included. The subsequent test in 2006 focused on new and refined methods integrated with new systems and new infrastructure. The Census Bureau scheduled a full dress rehearsal for 2008 but ultimately canceled it. However, a partial dress rehearsal was performed, and included Mailout and Replacement Questionnaire Mailout as well as Coverage Followup.

2.2.1 2006 Test

The Census Bureau conducted a partial census of population and housing, with Census Day occurring on April 1, 2006, in two locations (one rural and one urban). The urban location was a portion of Travis County, Texas, that includes parts of the city of Austin and its suburbs, and the rural location was the Cheyenne River American Indian Reservation and Off-Reservation Trust Land in South Dakota. The Census Bureau chose South Dakota's Cheyenne River Reservation as the site for the test because it posed many of the challenges that have long hindered efforts to accurately count reservation populations: a severe housing shortage and large, rural geography punctuated by small communities that have mostly unnamed streets and unnumbered houses.

In preparing for UE, the Census Bureau used the location information on about 3,000 housing units from Address Canvassing, which was automated, and divided the reservation into 215 assignment areas, each to contain a manageable number of housing units. An assignment area could be a single "block" (a geographic area bounded by roads, rivers, or invisible lines such as county borders) if it contained a sufficient number of housing units; otherwise it was a combination of adjacent MAF/TIGER blocks. Each enumerator initially received one assignment area. Upon its completion, they would receive a second. This process continued until all AAs were assigned.

Using paper maps and address lists, enumerators traversed their assignment areas and obtained household member information via paper questionnaires, submitting completed ones to the reservation field office daily. Their primary task during Update Enumerate was to collect resident information from all housing units in their assignment areas as of April 1, 2006. Enumerators were also instructed to correct, add, or delete addresses and revise maps to reflect changes that had occurred since address canvassing, such as housing units being built or demolished. Once enumerators finished an assignment area, they submitted the address lists and maps to the field office for review by quality control staff.

The quality control program consisted of three operational components. First, the quality control staff conducted a follow-up interview for a sample of households assigned to each enumerator to verify that the required interview was conducted and to independently collect information to be compared to results of the original interview. Second, for each assignment area, using the same paper maps and address lists as the enumeration staff, the quality control staff conducted a quality check of the address updating results by canvassing eight consecutive housing units beginning at a randomly assigned start address[12]. Third, also for each assignment area, quality control staff verified all deleted housing units and house number changes, as well as duplicates. If critical discrepancies were found in the quality check, the assignment area was sent back to the enumeration staff and the entire area recanvassed. Interviews were only conducted at housing units identified as having been missed during the original enumeration. This recanvassing was subject to another quality check. If the area failed again, it was recanvassed one final time.

[12] The Census Bureau refers to this process, in which quality control staff compare enumerators' address updates against their own observations, as the *dependent quality check*.

Beyond the 2006 Census Test, the Census Bureau continued to consult with American Indian and Alaska Native (AIAN) tribes and tribal organizations, to obtain input to help develop improved programs and products for the 2010 Census. For more information on this topic, see the *"2006 Census Test American Indian and Alaska Native Operational Synthesis report"* and OIG report *"Census 2010: Key Challenges to Enumerating American Indian Reservations Unresolved by 2006 Census Test".*

MaRCS

As a part of the UE QC program for Reinterview, the Census Bureau tested the use of the 2010 Census Reinterview Matching, Reviewing, and Coding System (MaRCS) without much success. MaRCS facilitated the comparison of UE interview and RI data and provided computer matching, clerical matching, final coding, and supplemental RI selection. There were many issues associated with using the MaRCS for the UE paper operation. MaRCS was designed for the automated Nonresponse Follow-up (NRFU) operation. A major issue was the time it took to get the results from data capture into the MaRCS to allow Reinterview processing to occur. The changes that would have been required to make the use of MaRCS feasible for a paper operation were not cost effective for an operation as small as UE.

2.2.2 MaRCS for 2010

In October of 2008, with the decision to convert NRFU from automation back to paper, part of the replan was to design NRFU to include the use of MaRCS for Reinterview. By making it possible to effectively use MaRCS for NRFU, the Census Bureau also created the opportunity to use MaRCS for UE. Because the NRFU and UE RI operations utilized the same EQ forms, this further facilitated the use of MaRCS for UE RI. See the "Census MaRCS (for UE and NRFU) development" DSSD 2010 Decennial Census Memo Series #E-09 for more information.

The RI operation utilized Census MaRCS to select certain types of RI cases (i.e. outlier, supplemental, hard fail RI cases, and enumerators for supplemental RI), and facilitated the review and coding of RI cases. The system allowed clerks to view the body of work (e.g., all the cases an enumerator or RI enumerator had completed) in order to assess the specific RI case for the enumerator that was under review by the clerk. It also reduced the RI coding at the LCO because automated and NPC clerical matching resolved 93.8 percent (MaRCS final coded 92.38 percent and NPC coded 1.39 percent) of the cases. The LCOs final coded 6.23 percent of the RI workload for UE due to LCO relief cases at the end of the operation which were final coded by MaRCS. This was the first time we used an automated matching process for RI during the decennial census.

The timeframe between when the UE and RI EQs left the LCO and when the scanned information from them was returned to Census MaRCS for matching was called the NRFU latency, but it also impacted UE since both operations used the same system. Initially, DRIS estimated that the latency period would be approximately 38 days. This was because mailback forms had priority capture. However, this latency period would have been detrimental to the Reinterview program that attempts to detect early falsification of enumerators. In order to reduce the latency to ten days, DRIS prioritized scanning of the UE forms and delivered to

Census MaRCS interim data that had only gone through optical character recognition and optical mark recognition capture, rather than through all phases of data capture including keying and keying quality control.

After data capturing RI EQs, DRIS transmitted RI data to Census MaRCS for computer and clerical matching, to compare the RI case data to the original UE case data. All completed RI cases first underwent computer matching. Computer matching was two-fold. First, it matched cases at the household-level, then the person-level. If the RI case did not pass computer matching, it underwent clerical matching by trained NPC and LCO MaRCS clerks. The number of cases that underwent each type of matching process is documented in the 2010 UE RI Quality Process report. The objective of Reinterview was to determine a final RI outcome for each case, such as "pass," "soft fail" unintentional for enumerator mistakes, and "hard fail" for falsification.

LCOs also used Census MaRCS to produce reports for monitoring the performance of the RI operation.

RI ran concurrently with UE. Telephone RI and personal visit follow-up originally occurred a couple days after the start of UE, on March 29, to allow work to accumulate for the RI enumerators.

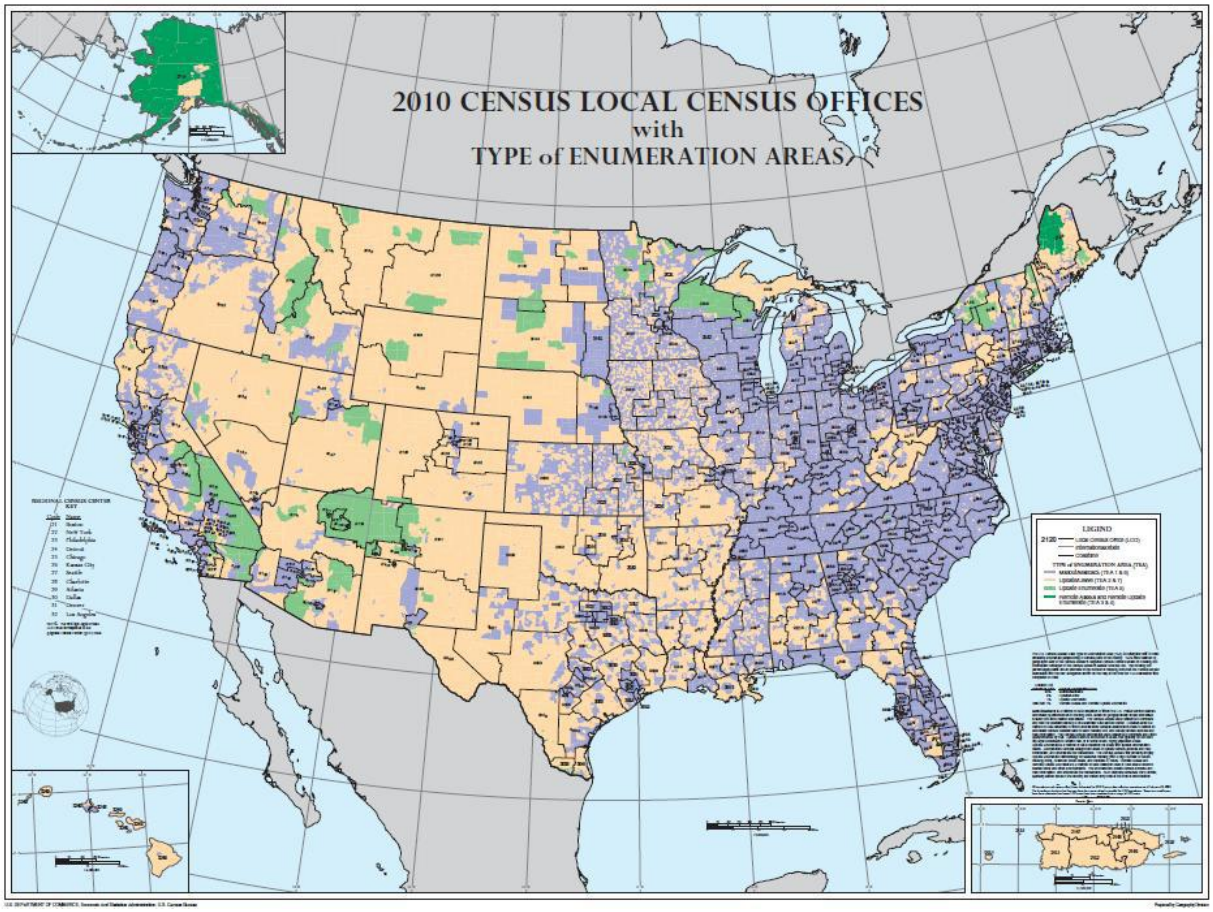
2.3 TEA Delineation

The Type of Enumeration Area (TEA) value represents the type of enumeration and the geography where the Census Bureau conducts various field operations. In Census 2000, 79.8 percent of addresses in the final census count were in Mailout/Mailback areas. About one percent of the housing units were distributed among the Rural Update Enumerate, List Enumerate, and Remote Alaska operations. The remaining areas were in Update Leave.

For the 2010 Census UEOs, TEA 1 represented Mailout/Mailback, TEA 3 represented Remote Update Enumerate (formerly LE in Census 2000), TEA 4 was Remote Alaska (Alaska areas in 2000), and TEA 5 was Update Enumerate (formerly Rural UE in Census 2000). In Census 2000, Urban UE was under TEA 8, which was eliminated for the 2010 Census.

Figure **1** presents the distribution of stateside HUs for the 2010 TEA Delineation grouped by RCC. The number of HUs in each TEA increased as the 2010 Census progressed. Mailout/Mailback (MO/MB) areas (TEA 1) were designated in purple. Update Leave areas are in beige (TEA 2 and TEA 7). The UE areas in light green (TEA 5), are located in the western rural areas, and in denser seasonal areas (which are enumerated in the same way) along the east coast. These areas include Cape Cod, Massachusetts, Key West, Florida, North Carolina, and South Carolina. Also in UE are the Colonias, located along the Mexican-American border. The remote areas in the upper corners of the map in dark green comprise the RA and RUE operations (TEA 3 and TEA 4).

Figure 1: 2010 Census National TEA Map



Source: 2010 TEA Delineation Assessment

The Remote Alaska operation was only conducted in Alaska. The RUE operation was conducted in two LCOs, one in Alaska and one in Maine. The 494 LCOs, there were 88 LCOs that conducted UE. In contrast, MO/MB was conducted in every stateside LCO.

There were 178 stateside LCOs comprised of only one enumeration method (MO/MB). There were 232 offices with two different types of enumeration methods, either MO/MB and Update Leave, or MO/MB and UE. There were 75 offices with three enumeration methods, and the Anchorage, Alaska and Bangor, Maine offices had four enumeration methods each including Mailout/Mailback, Update Leave, UE, RUE, and RA.

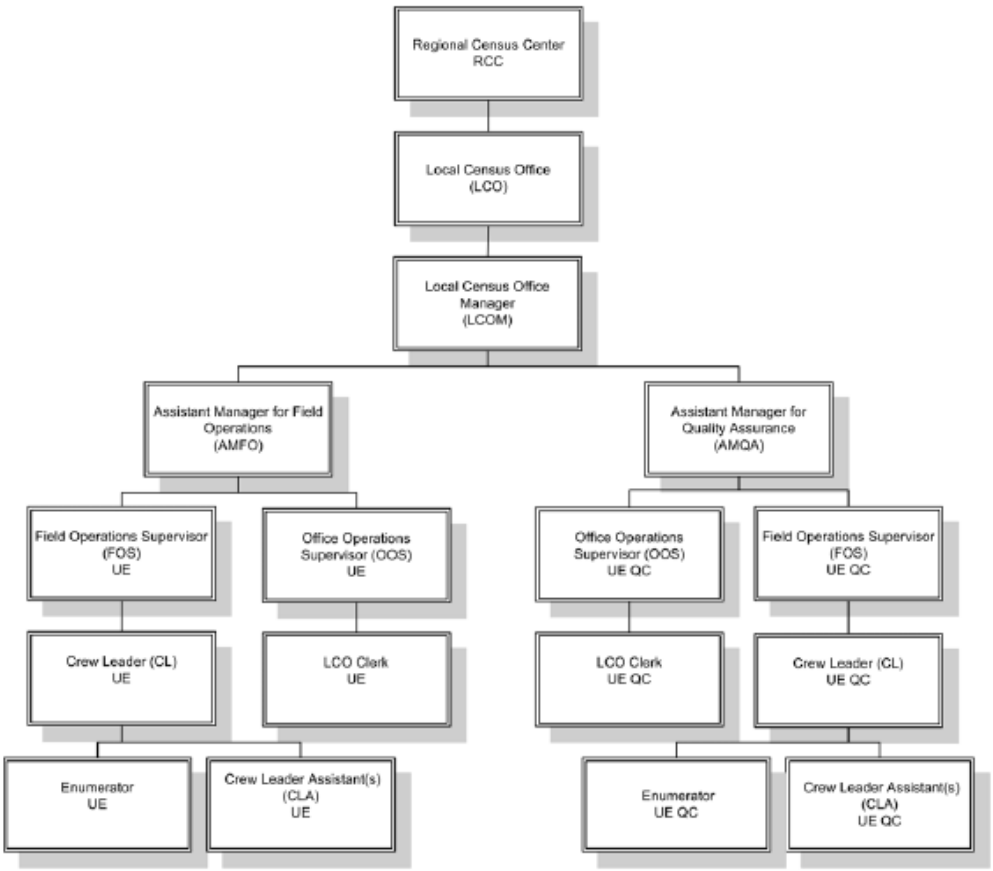
For more information on TEA Delineation, please see Memorandum No. 164 "2010 Census Operational Assessment for Type of Enumeration Area Delineation."

2.4 2010 Census

Regional Census Centers (RCCs) were temporary offices that managed the 2010 Census within a geographical jurisdiction. Twelve RCCs were established in twelve cities where permanent Census Bureau ROs were located. In addition, there was a Puerto Rico Area Office established

to manage all 2010 Census work in Puerto Rico. The 12 RCCs managed 494 LCOs that supervised decennial operations in specific geographic areas. Each LCO reported to the RCC that was responsible for its geographic area. The LCO staff supervised the field staff in its area and provided support to them. LCO staff consisted of both office staff and field staff. Office staff worked on a variety of operations conducted out of the LCO and received specific training for each operation. The UEO operations required the following field staff positions: FOS, CL, CLA, and enumerators. The hierarchy of the field and office staff, for both production and RI, is shown in Figure 2. This was the structure for UEOs as well as for other field operations.

Figure 2: Organizational Chart for the Update Enumerate Operations Staff



Source: 2010 Census Update Enumerate Office Manual

The Paper-Based Operations Control System (PBOCS) was a Census Bureau-designed system that allowed LCO staff to track field assignments and manage the operation in the field. The PBOCS provided functionality such as case assignment, check-in and check-out of cases, and check-out of questionnaires for shipping to the Decennial Response Integration System (DRIS) for data capture. Assignments for UEOs were made available through PBOCS, and LCO staff printed address listing pages which listed all the existing addresses for a given assignment area. The Field Division assumed each enumerator would work three to four assignment areas, which

would include approximately 30 housing units (blocks in UE are not split for assignment purposes).

Enumerators received an Assignment Area binder from their CL that contained Address Listing Pages, Census Maps, Questionnaires and other materials. The enumerator was responsible for canvassing each block in the AA and verifying the address that they found on the ground to the address listed in the AA binder (or book). As the enumerators canvassed an AA, they updating the listing pages (correcting, adding, or deleting addresses to reflect changes, updated census maps, as well as conducting interviews with knowledgeable respondents using the D-1E Enumerator Questionnaire to determine the Census Day status for every HU including adds. LCO staff assembled UEO binders (with binder register labels) - usually one binder per assignment area - to include the following major materials:

- Cover page/Quality Assurance Review page
- Special Notice page (provided instructions/reminders)
- D-114, Block List
- Address Listing and Add pages
- Map envelopes with AA map, AA locator and block maps (also sheets of Processing IDs for Adds)
- Questionnaires labeled with Census IDs
- Unlabeled questionnaires for added cases

LCO clerks checked out assignment area binders to CLs. CLs then distributed work to enumerators, documenting assignment history on the cover page. Clerks keyed this update information into PBOCS.

As an enumerator completed interviews, he or she delivered the completed questionnaires along with his or her payroll form (D-308) to the CL, usually on a daily basis. The CL checked the questionnaires for completeness and errors and delivered the questionnaires to the LCO. LCO staff performed an office review and checked in the questionnaires using PBOCS (which was used for assignment management in all decennial field operations). Check-in consisted of keying specific data items, such as the name of the enumerator, the housing unit status, the population count, the type of respondent, and whether the enumerator collected a telephone number.

The PBOCS performed consistency checks to ensure that, for example, if the housing unit status was occupied, the population count was not zero. In addition, if the population count was greater than five, the system prompted the clerk to check for continuation forms and the continuation forms were electronically associated with the parent EQ. After check-in of the EQs was complete, they were shipped to one of three data capture centers for data capture into DRIS.

2.4.1 2010 Census Update Enumerate Operations

The 2010 Census UEOs has four components: the Update Enumerate Production, Update Enumerate Quality Control, Remote Update Enumerate, and the Remote Alaska operations. Each of the Update Enumerate Operations was a separate field enumeration operation. UE was conducted in 88 LCOs of the 494 LCOs in the 2010 Census, RUE in two LCOs and RA only in

one LCO. Update Enumerate Quality Control was a control check conducted on UE production enumerators. All four of these operations involve Census enumerators interviewing and verifying the status of housing units in areas that did not receive a 2010 Census questionnaire to be mailed back. The UEOs were conducted in communities where housing units do not have traditional mailing addresses (for example, no house number or street name), and the geography is very remote or rural.

Enumeration methodology for each operation in the UEOs was essentially the same; their implementations differ according to the climate, cultural characteristics, and remoteness of the geographical areas in which the communities or HUs are located. The Update Enumerate methodology was implemented in communities primarily where most of the HUs do not have traditional mailing addresses (e.g., house number and street name). These areas include resort areas with high concentrations of seasonally vacant housing units, selected American Indian reservations and Alaska tribal villages, communities along the Mexico-U.S. border, and sparsely populated communities in very remote areas of Maine and Alaska.

2.4.2 2010 Census Update Enumerate

UE areas were part of the Address Canvassing operation in which Listers physically verified, added, or updated the 2010 Census Address List. The Census Bureau conducted the Update Enumerate operation from March 22 to May 29, 2010, enumerating 1,463,689 housing units. The UE production operation enumerated communities in TEA 5. These geographic areas included American Indian Reservations that chose the UE enumeration methodology, resorts with high concentrations of seasonal vacant living quarters, and selected unincorporated communities in the United States along the Mexico and United States border. The states that had UE along the Mexican border were California, Arizona, and Texas.

In Census 2000, the Census Bureau consulted with the American Indian reservations about enumeration and they had some input into how they were enumerated. For the 2010 Census, the Census Bureau met with tribes, beginning in 2007, but the tribes did not get to decide or choose which operation they would be included in, UE or Mailout/Mailback.

Crew leaders assigned AAs to the enumerators. There were 14,326 enumerators and 32,574 AAs, so approximately 2.3 AAs per enumerator. Given the HU workload mentioned above, there were approximately 45 housing units per assignment area.

The enumerators canvassed the AAs, updated address listing pages, updated census maps, and added residential units that were not on the address listing pages and maps. Enumerators also conducted an interview with a knowledgeable respondent to determine the Census Day status for every HU including those that were added and to enumerate everyone at the address. Enumerators conducted UE interviews on D-1E paper questionnaires which were sent to DRIS for data capture.

Enumerators did not fill out a questionnaire for any Group Quarters and/or housing units in the same structure as a GQ. If there was an assisted living facility or skilled nursing home at the

address, it was handled as a housing unit. Any Group Quarters found during Update Enumerate was enumerated later by the Group Quarters Enumeration operation.

Usually, on a daily basis, enumerators met with their CL and delivered completed questionnaires and payroll forms (D-308). The CL reviewed the completed work and provided the enumerator with feedback. The CL also met daily with the FOS to deliver completed enumerator work. The FOS delivered completed work for all CLs to the LCO for check-in and office review. Any work that needed repair, and daily pay and work records requiring correction, were returned to the FOS.

LCO office staff checked in completed work and shipped the questionnaires on a flow basis to the data capture center for processing. The Address Binders (each address binder was generally one completed AA) however, were held in the LCO for use in the QC operation. Subsequent to the QC operation, the binders were sent to NPC for check-in and data capture.

2.4.3 Update Enumerate Quality Control

A separate staff conducted the Update Enumerate Quality Control (UE QC). The objective of the program was to ensure that UE enumerators understood and followed appropriate procedures. This objective was accomplished through initial observations, a UE Reinterview (RI), a Dependent Quality Control (DQC), and a Delete Verification (DV). A brief description follows, but for a detailed description of the UE QC plan, refer to "2010 Census: Quality Control Plan for the Update Enumerate Operation" (Whitford, 2009).

CLs conducted observations immediately after training, in order to identify any procedures the enumerators did not understand. A CL accompanied each enumerator as they interviewed respondents and kept track of all procedures done correctly and incorrectly on a UE Observation checklist. Production CLs observed Production, and RI CLs observed enumerators. Following recommendations for the 2006 Test, the Assistant Manager for Quality Assurance (AMQA) supervised the UE QC operation.

2.4.3.1 Reinterview

The UE Reinterview (RI) was designed to detect and correct enumerator errors and data falsification. A sample of each enumerator's completed UE cases was selected for UE RI. RI occurred concurrent with production, beginning March 29, 2010 (one week after the start of UE) and ending June 9, 2010 (three weeks after the finish of UE). The MaRCS coding effort began April 15, 2010 and ended June 16, 2010. All cases should have been completed in the LCOs by June 13, however, the date was extended to allow the LCOs extra time for coding cases.

At UE production check-in, PBOCS selected cases for Reinterview. Selection happened in one of five ways:

1. Random – a sample of eligible UE cases was automatically selected for each enumerator.

2. Outlier – additional RI was automatically selected for enumerators whose work differed significantly from all work within their crew leader district.
3. Supplemental – additional RI was manually selected by the LCO QC staff.
4. Hard Fail – when an enumerator received a Hard Fail outcome, all eligible UE cases completed by that enumerator were selected for RI.
5. Vacant – any Housing Unit with a status of Vacant – regular was automatically selected for RI.

The LCO RI staff first attempted to contact the original respondent by telephone. Cases that could not be completed by telephone were assigned to a RI field enumerator on a case-by-case basis (i.e., not by assignment area) and were completed by personal visit. Enumerators used the Reinterview Questionnaire (D-1E RI) to conduct interviews. The Reinterview consisted of obtaining the Census Day status for the HU. If the respondent confirmed that he/she was visited by a production enumerator, the RI enumerator only collected the roster information. If the respondent could not confirm that someone from the household completed a questionnaire with a production enumerator, the RI enumerator conducted a full interview.

Completed RI EQs were checked into PBOCS, checked out, and shipped to DRIS for data capture. The DRIS provided all UE and UE RI data to the UE Census MaRCS, for matching and assignment of RI outcomes to all UE RI cases. Once MaRCS received all UE and UE RI data, it began a three-stage matching process:

1. Computer Matching – MaRCS automatically compared the UE data to the UE RI data and assigned a final outcome of "pass" to all cases that matched. Cases that did not match were deferred to NPC clerical analysts.
2. NPC Clerical Matching – NPC clerks reviewed all data in MaRCS and assigned a final outcome of "pass" to all cases that matched. Cases that did not match were deferred to the LCOs.
3. LCO Final Coding – LCO clerks reviewed all NPC deferred cases data available to them in MaRCS, and elsewhere to assign a final RI matching outcome code.

The final RI matching outcomes were as follows:

1. Pass – The enumerator followed procedures without mistake.
2. Soft Fail – The enumerator made an honest or unintentional mistake.
3. Hard Fail – The enumerator falsified data or intentionally did not follow procedures.
4. Don't Know/Suspect – The MaRCS clerk was unable to determine a final RI outcome but suspected that the enumerator falsified data or intentionally did not follow procedures.
5. Don't Know/No Suspect – The MaRCS clerk was unable to determine a final RI outcome and did not suspect the enumerator of falsification.
6. LCO Relief – The case did not pass the Computer Matching, but the LCO did not have time to determine a final RI outcome for the case.
7. RI Noninterview – The reinterviewer was unable to collect enough RI data for a valid comparison to the UE data.

The Area Manager for Quality Assurance (AMQA) used Census MaRCS to record a hard-fail outcome. The hard fail enumerator was then prevented from completing further work. Any work completed by that enumerator was reassigned to a RI enumerator for reinterview.

2.4.3.2 Dependent Quality Control

Another aspect of the UE QC program was the DQC, also conducted concurrent to production. The purpose of DQC was to make sure enumerators followed proper procedures when canvassing the AA and updating the address binder. Every AA was subject to DQC, where a QC enumerator canvassed a small subsection of the AA and verified that the original enumerator's notations were correct. A pass/fail decision was made on an AA basis depending on the number of critical and non-critical errors found by the QC enumerator. If the AA failed DQC, the QC enumerator recanvassed the entire AA immediately.

2.4.3.3 Delete Verification

The last major aspect of the UE QC program was Delete Verification (DV). The Census Bureau has decided that a unit cannot be deleted from the Census Universe unless it is marked as a delete by two different operations or two different enumerators in the same operation. The UE DV and Final Delete Verification (FDV) operations were designed to meet this requirement. If an existing address (with a Master Address File (MAF) ID) was deleted during production UE, a QC enumerator verified that the unit should be deleted from the Census Universe. This DV was conducted in the same visit as the DQC. If a QC enumerator deleted an existing address during DQC or recanvassing, then a different QC enumerator (or the CL) verified the delete. This "Final" DV was completed after all DQC and/or recanvassing was completed for the AA.

2.4.4 2010 Census Remote Update Enumerate

The Remote Update Enumerate Operation was conducted in just two LCOs (Anchorage, Alaska and Bangor, Maine) and consisted of sparsely populated communities in very remote areas of Maine and southeast Alaska. These areas consisted of mostly logging communities, fishing camps, and cabins used for hunting. The operation was concurrent with the UE Production operation, starting in March 22 and ending in May 29, 2010. The workload was 8,114 housing units.

RUE operational procedures were similar to UE Production, with the exception that enumerators canvassed the AA only once to determine the housing unit status and household data during this visit ("one pass only"). If a knowledgeable respondent was not available at an occupied unit at the time of the first visit, enumerators obtained information from a proxy. There was not a formal initial observation process for RUE. CLs conducted ad hoc observations and provided on-the-job training (OJT) as necessary. Based on the CLs ad hoc observation results, the LCO may have taken appropriate action. All work returned to the LCO was checked into the PBOCS.

The RUE operation did not have separate QC operation or staff. RUE CLs were responsible for the quality control for the personal verification of all HUs with a vacant or a delete status and for conducting any Group Quarters (GQ) enumeration identified before or during the HU enumeration.

LCO staff performed an office review, checked-in/out completed work using PBOCS and shipped EQs to DRIS for data capture. LCOs shipped binders and maps to NPC for data capture and storage.

2.4.5 2010 Census Remote Alaska

RA enumeration occurred January 25 to April 30, 2010. The Anchorage LCO managed the enumeration for the Remote Alaska areas, comprising TEA 4. The housing unit workload was 33,464 HUs including the initial 27,600 housings units plus adds.

For the 2010 Census, the Census Bureau embarked on a comprehensive partnership/outreach program similar to the one implemented in 2000. Conducting early enumeration during the months of January through April, using the wave concept, permitted travel to these areas during the period when conditions were most favorable. Using this approach allowed the Census Bureau to group American Indian and Alaskan native villages and structure enumeration. The Remote Alaska operation also utilized Update Enumerate procedures (e.g., started with an address list instead of blank pages).

During RA, the crew leader was responsible for verifying all HUs with a status code of vacant or delete, ensuring the completion of a questionnaire for each HU in the village, and conducting, if any, Group Quarters enumeration.

As a quality assurance check and before departing the village, the sworn-in local official (tribal leader/liaison) or designated point of contact conducted the Address List Validation of all completed work in the village. This process allowed the village leader to review and certify the count of HUs, GQs, and the total population in housing units and group quarters for accuracy.

LCO staff performed an office review which included consistency (e.g., between the roster and population count and entries that were vacant but had a population count), checked-in/out completed work using PBOCS and shipped EQs to DRIS for data capture. The DRIS was used to capture the data on the questionnaires. LCOs shipped binders and maps to NPC for data capture and storage.

2.4.6 Recommendations from Census 2000 and How Census Addressed Them in the 2010 Census

The Census 2000 UE, UE QC, and UE FFU operations yielded several major recommendations. We incorporated the UE recommendations into the 2010 Census design, facilitating our ability to conduct a successful 2010 Census. Below are the 2000 UE recommendations and explanations of how we addressed them in the 2010 Census.

There were no recommendations from LE, LE QC, or LE FFU, outside of Alaska enumeration, for the 2010 Census. The Census 2000 LE operations focused on remote areas only. The Census 2000 List Enumerate operation successfully captured and stored map spots and location descriptions for virtually all addresses in the operation to which we were able to use the addresses as a basis for the 2010 Census. Even though there was a high rate of corrective actions taken in the 2010 Census, this was an improvement from 2000 because we started from an existing address list. Below are the recommendations for Remote Alaska only.

2.4.6.1 Update Enumerate

- Continue to target difficult-to-enumerate areas for special enumeration methods (Tool Kits) in the 2010 Census.

  For the 2010 Census, we continued the use of three special Tool Kit strategies: paired enumeration, facilitated enumeration, and blitz enumeration methods. These strategies helped to overcome barriers to successful enumeration and addressed concerns about the personal safety of enumerators, and improved respondent cooperation.

  In addition, the formation of the American Indian and Alaska Natives Program (AIAN) at Census Bureau Headquarters resulted from Census 2000 recommendations. Consultations with Native American Tribes and the 2010 American Indian and Alaska Native Research & Development Planning Group alerted the Census Bureau to the tribal concerns of undercounting within households. The goals of the integrated communication plan were to improve cooperation with enumerators. Each region had stakeholders and special consideration was given to the AIAN population. There may have been up to three different types of enumeration in one American Indian area.

  Prior to the 2010 Census, regional staff worked with tribal governments to seek their recommendations to improve coverage in tribal areas. ROs such as Denver and Seattle had their partnership and management staff work in close consultation with the tribal groups within their boundaries. Staff would explain the options available, for example, some tribes wanted MO/MB, but their address list was not adequate to support a quality census using this methodology.

- Include a reference to Census Day, April 1, 2010 when asking respondents to provide the ages of household members. Census 2000 research showed that there was a tendency to answer age as of today's date instead of the census reference date, April 1, 2000.

  Based on the Statistical Research Divisions (SRDs) cognitive testing results, the Field Division (FLD) included the recommendation and added emphasis in the 2010 Census UE Enumerator Training Manual and Enumerator Training Guide.

  In summer 2008 SRD conducted cognitive testing of the D-1E Enumerator Questionnaire. As part of the cognitive testing, the Population (POP) Division provided a list of content items for training including emphasis on age as of Census Day. Interviewers were

instructed to not omit the reference date when asking the age question. Instead, they were instructed to emphasize it.

- Use continuation questionnaires to the extent possible, to enumerate sub-family members living within the same housing unit on a reservation.

  Continuation forms were used in Census 2000 to enumerate sub- family members living within the same housing unit on a reservation. However, in Census 2000, the continuation form was not linked electronically to the parent form. The continuation form was inserted inside the parent form and not always data captured as such. For the 2010 Census, the UE implementation team and planning group developed procedures to ensure the necessary linking and tracking of continuation forms with the parent questionnaire.

  PBOCS included enhanced questionnaire check-in procedures that collected status information about housing units to include data items such as type of respondent and population count and also collected respondent phone numbers. This allowed us to identify numbers and percents of housing units, for example vacants and deletes that would later be verified in the UE QC operation. As part of the EQ Check-in process in PBOCS, the LCO Clerks key specified data from the EQ. One data item was the population count. If the population count was greater than five, the PBOCS prompted the clerk to provide the appropriate number of continuation forms. The prompt for continuation forms needed to be acknowledged before the clerk could move on, and could be overridden if needed. Supplemental forms counts were reduced from hundreds of thousands to a few thousand in the 2010 Census.

- Incorporate in the procedures and the training for the UE enumerators, instructions and examples that stress the need to probe for additional sub-families who may be living in a given housing unit.

  2010 Census materials included training scenarios to stress who to include in a household.

- For decennial outreach efforts and educational campaigns, promote census awareness and encourage participation. Continue use of community-based organizations (churches, schools, and American Indian and tribal organizations).

  The Census Bureau also improved partnership efforts with tribal leaders. Partnership staff and the American Indian and Alaskan Native Campaign worked with the regions to promote census awareness and encourage participation in American Indian and tribal organizations. The 2010 AIAN campaign was incorporated with the overall 2010 Integrated Communications Campaign under the Regional Partnership Program. See Memo No. 47, the "2010 Census Detailed Operational Plan for Integrated

Communications Program" for a more comprehensive review of how Census improved decennial outreach efforts and educational campaigns.

To promote awareness and encourage participation in the 2010 Census, the Census Bureau held meetings with state-recognized tribes, national and state AIAN organizations, intertribal alliances, urban Indian centers, and other urban Indian organizations to gain input from these stakeholders and ensure an accurate count of the AIAN populations. Through these meetings, participants asked questions, shared concerns, and offered insights and recommendations. See the "2008 State-Recognized Tribes and American Indian and Alaska Native Organizations Working Meetings Final Report" for detailed recommendations.

- Use cultural facilitators with local knowledge to work alongside census enumerators.

  Prior to the 2010 Census, the Partnership and Data Services program hired a contractor to provide AIAN cultural awareness training to regional staff. This model was used in selected test sites before the 2010 Census in order to better understand this approach and formalize it through the establishment of standardized training and procedures. All training allowed time for local topics (situation training specific to each region).

- Revise and augment the training used to train enumerators and crew leaders assigned to Colonias (areas along the Mexico-U.S. border) to more appropriately address the concerns raised in the focus groups (i.e., reduce the volume of paper and other materials distributed during training, train enumerators to conduct interviews with respondents who are Spanish speakers and have little or no knowledge of English).

  The Census Bureau implemented this recommendation by having bilingual enumerators in areas with high percentages of Spanish populations. Particularly in the Colonias, the Census Bureau attempted to hire field staff that spoke Spanish.

- Use a Spanish language census form and a Spanish language data collection instrument for census enumerators. This can greatly facilitate the enumeration process.

  For automated NRFU, Census had planned to have a toggle instrument that would allow for EQ data to be collected on a Spanish or English form. This functionality could have been used for the UE operation if NRFU did not undergo a replan to convert to a paper operation.

  For the 2010 Census, the Census Bureau used an English data collection questionnaire for the 2010 Census UE operations. The enumerator was also provided with a Spanish Job Aid that provided guidance on enumerating Spanish-speaking households. Because of the difficulty in tracking multiple forms in different languages, a conscious decision was made for all stateside questionnaires to not have a separate Spanish questionnaire. In a paper environment, it was not practical to use separate Spanish EQs because of control issues with having two questionnaires containing the same ID.

In the Enumerator Training Guides and the Enumerator Manuals the enumerator was trained that if the household member spoke Spanish, and the enumerator was bilingual in Spanish and English, to read the questions in Spanish and mark the respondent's answers on the labeled English questionnaire. All other languages were handled using a D-1F flashcard to identify the language spoken.

2.4.6.2 Update Enumerate Quality Control

The UE QC for the 2010 Census included an independent office staff; in Census 2000, the office manager managed both the production and QC, and less attention was dedicated to conducting and managing the quality control components. Also, with the addition of MaRCS to NRFU, the Census Bureau was in turn able to use it for UE QC to conduct the Reinterview and facilitate the matching of the data collected on the production EQ to the data collected by the RI enumerator. The UE QC also included improved vacant and delete checks.

- Track the progress of the Dependent Check and Office Review during the operation - if we provide management with "real time" (within a day or two) data pertaining to the completion rates and outcomes of these quality control operations, we increase the likelihood that these operations are performed completely and on time.

  PBOCS tracked and made reports available for Dependent Quality Check (DQC) pass/fail rates by RCC. Office review was not specifically tracked; however, review should have occurred before AA binder check-in. Since there were load issues with PBOCS, (discussed in Section 5.5.1.2) as of June 3, all UE RI processing was halted within the system and a contingency effort was implemented to complete the operation. Although manual report and tracking templates were provided, some of the remaining work was not tracked accurately.

- Capture the Reinterview data on handheld computers instead of paper forms. By building in completeness and consistency edits, we reduce missing data and eliminate inconsistencies.

  The Census Bureau did not use handheld computers to capture reinterview data for the 2010 Census. This eliminated the benefit of real time edits. However, during the decade, we tested the use of the MaRCS that allowed us to perform automated matching of the RI and original EQs, with subsequent clerical matching by clerks at NPC in Jeffersonville, Indiana, and finally the office staff in the LCOs. The Census MaRCS software allowed automated quality checks that improved the efficiency of the RI operation. Intercensal testing provided evidence that MaRCS could provide worthwhile efficiencies to a process that had many opportunities to be error-prone. In addition, there was a separate RI staff in the LCO to manage all RI activities, which eliminated the competing priorities for the LCO and field managers and ensured effective implementation of the RI operation. Finally, introducing more automation into the selection process for RI cases ensured the RI sample design was implemented correctly and controlled appropriately.

- Sample more of the vacant and deleted cases for Reinterview

  All of the Vacant-Regular HUs were selected for Reinterview and we created a separate Delete Verification QC component where we checked 100 percent of the deletes.

2.4.6.3 List Enumerate

- Eliminate the List Enumerate methodology for the 2010 Census. The Census 2000 LE operation successfully captured and stored on the MAF/TIGER map spots and location descriptions for virtually all addresses in this operation.

  The Census 2000 List Enumerate operation successfully captured and stored map spots and location descriptions for virtually all addresses in the operation to which we were able to use this census. Even though there was a high rate of corrective actions taken, this was an improvement from 2000 because we had an address list to start from.

  See Section 2.3 on Type of Enumeration Areas.

2.4.6.4 List Enumerate in Alaska

- Continue use of "waves" to complete enumeration, based on weather factors.

  There are specific challenges to conducting the census in Alaska. Alaska is big, sparsely populated, has virtually no road system outside the larger cities, has an extreme climate, few or no daylight hours during traditional census timeframes, and has a very diverse population. RA enumeration has unique challenges associated with the accessibility to the communities in Alaska's most remote areas, where the population ranges from several hundred people to just a few people. The communities in these areas are widely scattered and rarely linked by roads. Most of these communities are accessible only by small engine airplane, snowmobile, four-wheel-drive vehicles, dogsled, or some combination thereof.

  The Census Bureau conducted RA enumeration in three waves by staggering the enumeration based on when "break-up" (spring thaw) occurred. All three waves ended by April 30, 2010. The Anchorage LCO determined which villages were included in each wave and managed the enumeration for the Remote Alaska areas.

  Remote Alaska Enumeration Waves, Dates, and Region
  Wave 1 01/25/10 – 02/25/10 Western Alaska in Wade-Hampton (Bethel) Area
  Wave 2 02/22/10 – 04/10/10 Bristol Bay Area, the Aleutian Chain and Kodiak Island
  Wave 3 03/22/10 – 04/30/10 North Slope Area (Barrow) and Northwest Arctic Area (Kotzebue)

- Continue to send work from villages when the entire village is complete and the tribal leader had "signed off". Signing the Address List Validation allows the village leader to review the count of housing units, the total population in housing units, and group quarters.

  Alaska was divided into boroughs and census areas. Alaska native regional corporations were completely separate divisions of the state to conduct business and nonprofit affairs for Alaska natives. Located throughout the state are incorporated places, census designated places, and other communities, including Alaska native village statistical areas. Each borough and census area was divided into census subareas, census tracts, block groups, assignment areas, and (the smallest geographic breakdown) census blocks.

  Team Leaders (also referred to as crew leaders in the Remote Alaska operation) traveled from one village to the next. The Team Leader stayed in each village until the enumeration was complete and the tribal leader or representative had signed off on completed work. The team leader could have been in a village for a few weeks depending on the size of the village and weather conditions.

  As in Census 2000 procedures, when all work in the village has been completed, the CL prepared to meet with the village leader, or designated point of contact, to conduct the Address List Validation. This process allowed the village leader to review the count of housing units and the total population in housing units and group quarters for accuracy.

  After the village leader, or designated person, had signed the confidentiality agreement, the CL showed the AA Binder Cover page for each AA as well as a summary if there was more than one AA for the village.

  If the village leader agreed that the figures were correct, the CL entered the certifying official's information in Section 4 of the D-940, Assignment Area Binder Cover Page, and had the official sign in the 'Signature of certifying official' box. By "signing off" this signified that the village agreed with the total housing unit (HU) count, the total Group Quarters (GQ) count, the total population count, and the total GQ population count. The validation process for this village was now complete.

- Add barcodes to the D-1(E) SUPP continuation form to allow for electronic linkage.

  Continuation forms were used to enumerate people at each address. The parent EQ only had space to roster five people in a household. If more than five people lived at an address, then enumerators had to use a continuation form. Continuation forms did not have any of the beginning or concluding questions printed on them; they only collected person-level data for up to five persons on each continuation form.

  In Census 2000, there were 69,000 Supplemental forms that had to undergo further processing as Type C Non-ID records (this occurs predominantly in LE and UE areas where continuations did not include an identifiable MAF ID). Because of the linkage problems experienced in Census 2000 with Supplemental forms (in particular with

American Indian Reservations and remote areas of Alaska), two major innovations were undertaken to try to reduce the number of unlinked forms for the 2010 Census. The Census Bureau created the barcode and electronic linkage through the PBOCS system and HQ staff worked with the contractor to manually force linkages. Same as in the NRFU operation, whenever the check in clerk entered a "population" count greater than 5, PBOCS prompted the clerk to also key a continuation form for that household; thereby linking the continuation form to the parent questionnaire.

For more information on this recommendation, please see Memorandum No. 195 "2010 Census Decennial Response Integration System Paper Questionnaire Data Capture Assessment Report."

2.4.7 UEO Automation

The UEOs used four Integral Systems and nine Support Systems to prepare, conduct, and complete backend activities. The "2010 Census Operations Plan" and the "2010 Census UEO Detail Operations Plan" (UEO DOP) describes these systems.

2.4.7.1 Integral Systems

Decennial Applicant, Personnel and Payroll System (DAPPS)

DAPPS facilitated the processing of applicants, personnel and payroll information for UEOs. UEO field and office staff submitted daily payroll information via the D-308 Payroll paper-based form. At the LCO payroll, forms were then keyed into DAPPS. DAPPS also developed a contingency check-out system in the LCOs that handled all of the checking out of forms sent to the data capture centers. The contingency shipping application more specifically handled UE and UE QC. It did not handle RA and RUE.

Paper-Based Operations Control System (PBOCS)

PBOCS supported assignment management functions performed in the LCO that were specific to the UEO. This included assignment of work, check-in of cases into the LCO, and creating reports for monitoring UEO progress.

Field Data Collection Automation-Office Computing Environment (FDCA-OCE)

FDCA-OCE consisted of hardware, software, telecommunications, technical procedures, training materials, and applications to enable staff to carry out 2010 Census operations. The FDCA-OCE also included a Map Printing System that allowed printing of small format maps for the operations.

Census Matching, Reviewing, and Coding System (Census MaRCS)

Census MaRCS was a system that supported the UE RI operation. The UE RI operation utilized Census MaRCS to select certain types of UE RI cases, facilitate review, and code UE RI cases. Census MaRCS selected outlier RI, hard fail RI, supplemental UE RI cases, and supplemental UE RI enumerators. Census MaRCS transmitted data to PBOCS. Once RI forms were completed and data captured, Census MaRCS performed automated matching of the original interview data and UE RI data. Census MaRCS also produced reports that were used for monitoring the performance of UE RI.

2.4.7.2 Support Systems

Master Address File/Topologically Integrated Geographic Encoding and Referencing System (MAF/TIGER)

The MAF/TIGER system provided geographic services required by the UEOs. This included:

- Delineation and maintenance of geographic areas,
- Mapping,
- Address geocoding and matching, and
- Creation of geographic data extracts (included address lists).

Universe Control and Management System (UCM)

The UCM system provided the capability to create, maintain, distribute, and update all 2010 Census operations universes. The population and status of housing units from PBOCS updated UCM during the UEOs.

Response Processing System (RPS)

RPS received response data from DRIS and was the repository for all such data throughout the UEOs.

Decennial Response Integration System (DRIS)

DRIS updated the universal response database schema with response data from questionnaires, and passed this information to RPS.

NRFU, NRFU VDC, and the UE Operations shared the same form for enumeration, the D-1(E) enumerator questionnaire.

There is no way of distinguishing how many forms were data captured by DRIS for each operation since DRIS only distinguishes by form type. However, data analysis conducted by DSSD shown in Section 5 of this document show EQ counts from the DRF.

Cost and Progress System (C&P)

The C&P system tracked the cost and operational progress of the UEOs. Tracking of the UEOs started with the training of the FOS and continued through the closeout of UEOs. During the course of the operation, the C&P system interfaced with DAPPS, PBOCS, and Census MaRCS to extract the appropriate data to produce reports.

Census Evaluations and Experiments System (CEE)

The CEE system interfaced with DRIS to receive auxiliary data keyed from questionnaires and from PBOCS.

National Processing Center-Automated Tracking and Control System (NPC-ATAC)

NPC-ATAC tracked receipt of AA binders and observation forms mailed from the LCOs to NPC.

National Processing Center-Visual Basic Key from Paper (NPC-VB KFP)

VB KFP was an NPC system that keyed data from the CL Observation forms for UEO.

Geographic Acquis-based Topological Real-time Editing System (GATRES)

The GATRES system allowed digitizing of the updated UEO maps.

2.4.8 Summary 2010 UEO Workload and Cost

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

The budget for the UEOs was based on cost estimates using a number of components that were developed early in the decade. For the 2010 Census, we merged the Census 2000 UE and LE operations. The 2010 Congressional submission (baseline cost model) for UE reflects the merging of the UE and LE operations. The baseline production numbers include UE, UE QC (DQC, Reinterview (included vacants), and delete checks), Remote UE, and Remote Alaska. The baseline cost for these operations was $127,609,854.

As we approached the first operation, our knowledge of the components improved based on experience and data. We learned from similar field operations such as 2010 Address Canvassing and Group Quarters Validation, as well as revisiting from Census 2000 observations and Census

Tests. We also looked at current external challenges and opportunities, and worked with panels of experts at Census Bureau Headquarters to determine the impact of this information on cost drivers. Analysis was a collaborative effort among the Decennial Management Division (DMD), Field Division (FLD), and the Decennial Statistical Studies Division (DSSD). The final budget represented what was loaded in the DMD Cost and Progress (C&P) System, which DMD and FLD used to manage the operations during production. For this assessment we also used the DMD C&P system to analyze the budgeted and actual costs for the UEOs.

The final budget identified components of the original estimate that should remain the same and those that needed updates. The components of greatest concern were workload and productivity due to the high uncertainty and high impact on cost. The cost estimate validation, was completed in January 2010 and resulted in increased workload estimates and realignment of the UE into four components:

1) UE production -Using estimates from the 2010 Census Address Canvassing operation resulted in an increase in the production UE workload
2) UE Quality Control, which included the Reinterview (regular RI and vacant RI), Delete Verification, Dependent Quality Control Check (DQC) - Any Assignment Areas that failed the DQC were re-canvassed. These components were quality checks on completed production work and were enumerated by a separate independent staff.
3) Remote UE was budgeted separately because it covered only two remote areas, Alaska and Maine. The crew leader conducted the quality control.
4) Remote Alaska was separated because the production dates and quality control were different from UE and RUE.

The PBOCS produced inconsistent production data for the UE operations, which made monitoring production and check-in of work via the DMD C&P a challenge for program managers. FLD achieved production monitoring manually, tracking of the Address Register shipments to the NPC for back-end processing was conducted outside of the PBOCS system. See Section 5.5.1.2 for more on automation.

Table 2 shows the operations that comprise the UEOs, the budgeted and actual workloads and costs, and the dollar variance associated with each UEO. Total field costs include production and training salary, mileage, other costs, FICA (Social Security Tax), and Medicare.

Table 2: 2010 UEO Budgeted and Actual Costs

	Budgeted HU Workload	Budget Cost	Actual HU Workload	Actual Cost	Cost Variance	Percent Cost Variance
Total UEO	**2,143,300**	**$127,609,854**	**1,969,772**	**$62,436,477**	**$65,173,377**	**51.1%**
Update Enumerate	1,497,514	$89,384,043	1,463,283	$44,018,284	$45,365,759	50.8%
UE Quality Control	608,773	$34,553,982	464,911	$15,840,629	$18,713,353	54.2%
Remote UE	7,393	$1,388,698	8,114	$820,874	$567,824	41.0%
Remote Alaska[13]	29,620	$2,283,131	33,464	$1,756,690	$526,441	23.1%

Source: DMD C&P

At the aggregate level, the UEO costs were 51.1 percent lower than budgeted.

In Section 5, we will further review each of the four UEOs independently and address the individual cost factors that affected the cost variances. The areas we address include:

- Summary of the field operations cost
- Variance by position type
- Variance by cost factor
- Variance by cost factor and position type
- Production staff.

3 METHODOLOGY

3.1 Research Questions

Table 3 outlines the questions in the UEO Study Plan and shows where we answered these questions in the UEO Assessment. The question outline mirrors the same format as in the Results Section 5 of this Assessment.

[13] Other travel and accommodations for Remote Alaska are not included in this summary table. See Section 5.4.2.5.

Table 3: UEO Study Plan Questions Mapped to UEO Assessment Sections

Questions	Results
3.1.1 Workload and Outcomes	
Update Enumerate	5.1
1. How were the UE production workload established and what were the outcomes?	5.1.1.1, 5.1.1.2
1a. What was the universe at the start of UE?	5.1.1.1, 5.1.1.2
1b. How many cases did enumerators add to the workload?	5.1.1.1, 5.1.1.8
1c. How did Census establish the UE Quality Control workload (by RI type, DQC and Delete Verification)?	5.2.1
2. What were the outcomes and major findings of UE production?	5.1, 5.1.1.3
2a. What is the percent distribution of housing units classified as occupied, vacant or delete?	5.1.1.3
2b. How did the accumulation of outcomes change over time? (i.e., were more cases classified as vacant or delete at the end of the operation than at the beginning?)	5.1.1.4
3. What were the outcomes, characteristics, and results of the UE address records?	5.1.1.1
3a. What were the final field outcomes for address records (e.g., number of additions, corrections, deletes)?	5.1.1.1
3b. What were the characteristics of the Added, Deleted, and Corrected records (e.g., city-style and non-city-style addresses, Delivery Sequence File status, and source of the address pre-UE)?	5.1.1.1
3c.What were the results of the MTdb update process for UE address records? How many addresses were accepted, rejected, and matched?	5.1.1.1
4. How often did the undercount question result in enumerators collecting additional names?	5.1.1.6
5. How often did the overcount question flag roster names?	5.1.1.6
6. Did the enumerators follow field procedures regarding the Residence Rules section of the Information sheet?	5.2.3
7. What was the distribution of completed interviews by personal visit and by telephone? How many contacts did it take to get a completed interview?	5.1.1.5

Questions	Results
8. How many continuation forms did enumerators use?	5.1.1.6
9. How many proxies did enumerators use? How many times did proxies report a HU as vacant, and occupied, etc.?	5.1.1.5
10. In what languages did the enumerators conduct the interviews?	5.1.1.5
11. How many refusals were there?	5.1.1.3
12. What was the demographic/characteristic and relationship distribution of the responses on UE (considering household tenure, relationship status, age, sex, race, and Hispanic origin for each person)?	5.1.1.3, 5.1.1.7
13. What was the distribution of number of contacts needed to complete an interview for UE?	5.1.1.5
14. What was the distribution of the number of people living in the addresses for UE operation?	5.1.1.6
Update Enumerate Quality Control	5.2
15. What were the outcomes and major findings of UE QC?	5.2.1
15a. How many of the original production cases were marked for replacement with Reinterview data?	5.2.1
15b. How many enumerators received a "hard fail" by the end of the Reinterview operation?	5.2.1.3
15c. How many HUs (EQs for that HU) of the UE QC AA workload received a "hard fail" status?	5.2.1.3
15d. How many RI cases did not receive a final outcome code?	5.2.1.1
15e.How many AAs failed DQC and required recanvass?	5.2.1.1
15f.What percentage of the UE QC AA workload required recanvass?	5.2.1.1
15g. How many Delete Verification and Final Delete Verification (FDV) cases did the enumerators complete by AA?	5.2.1.2
15h. How many HU statuses changed during DV and FDV?	5.2.1.2
Remote Update Enumerate	5.3
16. How was the RUE workload established and what were the outcomes?	5.3.1.1, 5.3.1.2
16a. What was the universe at the start of RUE?	5.3.1.1, 5.3.1.2

Questions	Results
16b. How many cases did enumerators add to the workload?	5.3.1.3
17. What were the outcomes and major findings of RUE?	5.3.1.3
17a. What is the percent distribution of housing units classified as occupied, vacant or delete?	5.3.1.3, 5.3.1.2
17b. How did the accumulation of outcomes change over time? (i.e., were more cases classified as vacant or delete at the end of the operation than at the beginning?)	5.3.1.4
18. What were the outcomes, characteristics, and results of the RUE address records?	5.3.1.1
18a. What were the final field outcomes for address records (e.g., number of additions, corrections, deletes)?	5.3.1.1
18b. What were the characteristics of the Added, Deleted, and Corrected records (e.g., city-style and non-city-style addresses, Delivery Sequence File status, and source of the address pre-RUE)?	5.3.1.1
18c.What were the results of the MTdb update process for RUE address records? How many addresses were accepted, rejected, and matched?	5.3.1.1
19. How often did the undercount question result in enumerators collecting additional names?	5.3.1.6
20. How often did the overcount question flag roster names?	5.3.1.6, 5.3.1.6
21. Did the enumerators follow field procedures regarding the Residence Rules section of the Information sheet?	5.3.1
22. What was the distribution of completed interviews by personal visit and by telephone? How many contacts did it take to get a completed interview?	5.3.1.5
23. How many continuation forms did enumerators use?	5.3.1.6
24. How many proxies did enumerators use? How many times did proxies report a HU as vacant, and occupied, etc.?	5.3.1.5
25. In what languages did the enumerators conduct the interviews?	5.3.1.5
26. How many refusals were there?	5.3.1.2, 5.3.1.3
27. What was the demographic/characteristic and relationship distribution of the responses on RUE (considering household tenure, relationship status, age, sex, race, and Hispanic origin for each person)?	5.3.1.3, 5.3.1.7

Questions	Results
28. What was the distribution of number of contacts needed to complete an interview for RUE?	5.3.1.5
29. What was the distribution of the number of people living in the addresses for RUE?	5.3.1.7
Remote Alaska	5.4
30. How was the RA workload established and what were the outcomes?	5.4.1.1, 5.4.1.2
30a. What was the universe at the start of the RA operation?	5.4.1.1, 5.4.1.2
30b. How many cases did enumerators add to the RA workload?	5.4.1.3
31. What were the outcomes and major findings of RA?	5.4.1.3
31a. What is the percent distribution of housing units classified as occupied, vacant or delete?	5.4.1.2, 5.4.1.3
31b. How did the accumulation of outcomes change over time? (i.e., were more cases classified as vacant or delete at the end of the operation than at the beginning?)	5.4.1.2, 5.4.1.4
32. What were the outcomes, characteristics, and results of the UE address records?	5.4.1.1
32a. What were the final field outcomes for address records (e.g., number of additions, corrections, deletes)?	5.4.1.1
32b. What were the characteristics of the Added, Deleted, and Corrected records (e.g., city-style and non-city-style addresses, Delivery Sequence File status, and source of the address pre-RA)?	5.4.1.1
32c.What were the results of the MTdb update process for UE address records? How many addresses were accepted, rejected, and matched?	5.4.1.1
33. How often did the undercount question result in enumerators collecting additional names?	5.4.1.6
34. How often did the overcount question flag roster names?	5.4.1.6
35. What was the distribution of completed interviews by personal visit and by telephone? How many contacts did it take to get a completed interview?	5.4.1.5
36. How many continuation forms did enumerators use?	5.4.1.6
37. How many proxies did enumerators use? How many times did proxies report a HU as vacant, and occupied, etc.?	5.4.1.5
38. In what languages did the enumerators conduct the interviews?	5.4.1.5

Questions	Results
39. How many refusals were there?	5.4.1.3
40. What was the demographic/characteristic and relationship distribution of the responses on RA (considering household tenure, relationship status, age, sex, race, and Hispanic origin for each person)?	5.4.1.3,5.4.1.7
41. What was the distribution of number of contacts needed to complete an interview for RA?	5.4.1.5
42. What was the distribution of the number of people living in the addresses for RA operation?	5.4.1.7
3.1.2 Cost, Staffing and Production Rates	5.1.2, 5.2.2, 5.3.2, 5.4.2
Update Enumerate	5.1.2
43. How did the budgeted costs for the operations compare to the actuals?	5.1.2.1
44. How did the actual staffing levels and production rates compare to the budgeted estimates for UE?	5.1.2.3, 5.1.2.4
Update Enumerate Quality Control	5.2.2
45. How did the budgeted costs for the operations compare to the actuals?	5.2.2, 5.2.2.6
46. How did the actual staffing levels and production rates compare to the budgeted estimates for UE QC?	5.2.2.6
Remote Update Enumerate	5.3.2
47. How did the budgeted costs for the operations compare to the actuals?	5.3.2.1
48. How did the actual staffing levels and production rates compare to the budgeted estimates for RUE?	5.3.2.6
48a. Did Census provide adequate finance flexibility to the Seattle RCC to satisfy the traveling and transportation expenses to and from Remote Alaska?	5.3.2.6
48b. What was the actual breakdown of costs for this budget?	5.3.2, 5.4.2

Questions	Results
Remote Alaska	5.4.2
49. How did the budgeted costs for the operations compare to the actuals?	5.4.2.1
50. How did the actual staffing levels and production rates compare to the budgeted estimates for RA?	5.4.2.4
50a. Did Census provide adequate finance flexibility to the Seattle RCC to satisfy the traveling and transportation expenses to and from Remote Alaska?	5.4.2.5
50b. What was the actual distribution of costs for this budget?	5.4.2
3.1.3 Training	5.1.3, 5.2.3, 5.3.3, 5.4.3
Update Enumerate	5.1.3
51. What happened during training for the UE operation?	5.1.3
Update Enumerate Quality Control	5.2.3
52. What happened during training for the UE QC operation?	5.2.3
Remote Update Enumerate	5.3.3
53. What happened during training for the RUE operation?	5.3.3
Remote Alaska	5.4.3
54. What happened during training for the RA operation?	5.4.3
3.1.4 Schedule	
Update Enumerate and Update Enumerate Quality Control	5.1.4, 5.2.4
55. How did the planned start and finish dates for the operations compare to the actuals for UE and UE QC?	5.1.4, 5.2.4

Questions	Results
Remote Update Enumerate	5.3.2
56. How did the planned start and finish dates for the operations compare to the actuals for RUE?	5.3.4
Remote Alaska	5.4.4
57. How did the planned start and finish dates for the operations compare to the actuals for RA?	5.4.4
3.1.5 Automation	
58. What types of automation problems did we experience? What was the frequency of the problems and how were they resolved?	5.5.1, 0
3.1.6 Change Control	
59. Was the change control process easy to execute?	5.6
60. What were the primary reasons for implementing schedule changes?	5.6.1
61. What were the primary reasons for implementing requirement changes?	5.6.2

3.2 Data Sources

Many data files and sources were utilized to produce the results in this assessment. Section 3.2 describes each of the sources.

3.2.1 DMD Cost and Progress

Managers and team members used the DMD Cost and Progress to monitor costs and check-in data during the operation. Cost and Progress tallied data and was not available at the housing unit level. Cost and Progress received data from areas including DAPPS, PBOCS, DMD Budget Formulation Branch, Census MaRCS, and UCM. PBOCS provided Cost and Progress with daily check-in data at the national, Regional Census Center, and LCO level. Using national level Cost and Progress data, we produced tables that show cumulative check-in results summarized by week.

3.2.2 2010 Decennial Response Files (DRF)

The DRF includes the core data that made up the Universal Response Database from all EQs that were data captured. In addition, the DRF included records for cases that were not data captured; the only data available from these records came from PBOCS. The Decennial Systems and Processing Office (DSPO) created the DRF.

3.2.3 Auxiliary Questionnaire Data (AUX)

The data-captured data from all the EQs that were not core response data were included in this file. DRIS transferred these data daily to DSSD. The auxiliary database (AUX) data were merged to the DRF via the unique Document ID assigned to each paper EQ.

3.2.4 UE/RUE/RA Assessment tally file

The Geography Division (GEO) provided this file, which contained the TEA-level tallies of the UE/RUE/RA field actions and rejects including adds from Enumerator Questionnaires and non-adds from Address Registers in the MTdb.

3.2.5 Final Tabulation MAF extract (MAFX)

This file was also provided from GEO and contained address information, geography (official tabulation block codes), and the final MTdb status for all UE/RUE/RA records from Address Registers for non-adds and Enumerator Questionnaires for adds.

3.2.6 Census MaRCS

MaRCS was the system used to facilitate the RI operation. It included data-captured EQs but only contained the initial version of the data-captured EQ not the final data capture record.

3.2.7 UE QC RCC Spreadsheet

The RCCs completed spreadsheets that documented progress of UE QC (i.e., verification of cases enumerated for the first time in Production and having a vacant or delete status). The RCCs sent the spreadsheets to FLD who then sent them to the DSSD Quality Assurance Branch (QAB) for analysis.

3.2.8 FLD Cost and Staffing Spreadsheets

FLD created spreadsheets based on DMD Budget Formulation, DAPPS, and universe data to show staffing, production rates, budget, and actual cost data. We used these data to address the Cost, Production Rates, and Staffing portion of this assessment.

3.2.9 Master Activities Schedule (MAS)

The Master Activities Schedule (MAS) documented the baseline start and finish, and actual start and finish dates for all scheduled activities. Following the completion of the 2010 Census, the DMD Management Information System (MIS) staff provided a spreadsheet of baseline and actual dates, related operations and other information for each activity line. Using the sort and filter functionalities in Microsoft Excel, we were able to determine how many UEO lines were on schedule or late.

3.2.10 NPC MaRCS Debriefings

Staff from the DSSD conducted debriefings with the clerks that used MaRCS in NPC. DSSD documented and summarized the outcome of the NPC clerk debriefings.

3.2.11 Initial Observation Reports

Crew leaders (CL) or CL assistants (CLAs) observed each enumerator conduct at least one interview, called an Initial Observation. This was done for both UE and UE QC enumerators by the UE and UE QC CLs respectively. The Census Bureau planned that all enumerators undergo an Initial Observation during the first week after training when the enumerator has been given their first assignment. The CL or CL Assistant documented their observation on the Observation Checklist (Form D-1222). The completed Observation Checklists were data captured by NPC and sent to DSSD.

3.2.12 Field Observation Reports

Census Bureau Headquarters (HQ) staff had the opportunity to observe UEO enumerators, CLs, and LCO staff. After the Census HQ staff completed their observations, they documented their findings in a field observation report.

3.2.13 DMD Change Control Forms

A Change Control form documented all changes to the UEO baseline. For a Change Control form to be implemented, it needed approval from the Housing Unit Enumeration-Operation Integration Team (HUE-OIT) and the Census Integration Group (CIG).

3.2.14 Risk Register

The HUE-OIT documented risks associated with completing UEO. The risks were assigned a probability and impact rating. DMD documented and maintained the risks in the Risk Register.

3.2.15 Lessons Learned

After the UE field operations were completed, DMD conducted several Lessons Learned sessions with HQ and NPC staff involved in the design and monitoring of the UEOs. Census HQ and NPC staff documented successes, problems, and recommendations for the UEOs.

3.2.16 MaRCS Trouble Reports

The Decennial Operations Technical Support (DOTS) exported all of the remedy tickets assigned to MaRCS to DSSD.

3.2.17 Behavior Coding

The Center for Survey Measurement conducted a behavior coding study that focused on the NRFU interviewer-administered survey instrument, the EQ. The UE operation uses the same questionnaire that NRFU used. The study was aimed at testing an interviewer administered survey instrument. A small sample of interviews from the UE population (from an American Indian reservation) were obtained and coded.

The purpose was to identify problems with how interviewers ask, and respondents answer, questions. A total of 204 (21 tapes from an Indian Reservation and 11 from Puerto Rico) audiotaped interviews were gathered from eight sites across the United States during observations for the Comparative Ethnographic Studies of Enumeration Methods and Coverage evaluation. The sample included interviews from eight racial and/or ethnic communities including American Indian, Alaska Native, Asian, Black, non-Hispanic White, Native Hawaiian and Other Pacific Islander, and Hispanic populations.[14]The sample was not intended to be a representative sample, but rather a sample of convenience (see Schwede 2009 for how the sites were selected). In addition, eleven tapes were gathered from the NRFU operation in Puerto Rico solely for this project to examine a small sample of Spanish-language interviews.[15]

Behavior coders applied a prescribed framework of behavior codes to interviewer and respondent behaviors by listening to the audiotapes and following the interview's progress by reading along with a blank questionnaire. By comparing the written document to the interviewers' recitation of the questions, coders made assessments about whether and to what extent the interviewers read the questions exactly as worded. Coders also made assessments regarding whether or not the respondents' answers to the questions could be easily classified into the existing response categories (i.e., are "codable"). For more information on the NRFU behavior coding study refer to Childs' "Behavior Coding of the 2010 Nonresponse Follow-up (NRFU) Interviews Report (2011)".

[14] The eighth site was a "generalized" site that represented different racial and ethnic groups within the site.

[15]Because there was not a full Spanish-language questionnaire outside of Puerto Rico, a full evaluation of the Spanish translation was not possible for this study. Stateside Spanish UEO interviews are within the scope of another evaluation of enumeration of non-English-speaking households (see Pan 2010). In addition to the 11 Puerto Rico Spanish cases, four cases were recorded as mixed language. These were primarily conducted in English, but had some Spanish in parts of the interview as well.

3.3 UEO Assessment Topic and Sources

Table 4 lists the major topics addressed in this assessment, along with the corresponding data sources for each topic.

Table 4: UEO Assessment Topic and Sources

UEO Assessment Questions	UEO Assessment Data Sources																	
	DMD Cost and Progress	Auxiliary Questionnaire Data	2010 Decennial Response Files (DRF-I)	Census MaRCS	UE RI RCC Spreadsheets	FLD Cost and Staffing Spreadsheets	Master Activities Schedule (MAS)	Field and Office Staff Debriefings	NPC MaRCS Debriefings	Initial Observation Forms	Field Observation Reports	DMD Change Control Forms	Lessons Learned	MaRCS Trouble Reports	UEO Universe Tally and Reject files	Behavior Coding	MAF Extract
Address Updates														X		X	
Universe			X														
Housing Unit Status		X	X														
Interview Completion and Case Check-in		X	X														
Interview Characteristics		X	X							X	X				X		
Characteristics of Occupied Housing Units		X	X														
Standard Demographic Tables			X														
Added Housing Units			X														
UE QC (DQC, DV, RI)			X	X	X												
Cost, Staffing, and Production Rates	X					X											
Training							X	X	X	X							
Schedule							X										
Change Control												X					
Risk Management													X				
Automation														X	X		

4 LIMITATIONS

The types of enumeration area, enumeration methodologies, and analysis variables for the 2010 Census may differ from previous censuses. Caution should be taken when comparing results across censuses.

4.1 Limited Formal Evaluations

A synthesis of the field collection methods used in Census 2000 is limited to only a few operations. Although there were formal evaluations specific to UE, LE, Update Leave (UL), and

Urban UL, they focused on address list development and not on operational aspects. For these collection methods, the "Data Collection in Census 2000 Topic Report No. 13" only provides a comparison as to what was done in 1990 and only covers the timing of the operations in Census 2000.

4.2 Paper Questionnaires – Universe Discrepancies

There are four major data sources for this assessment: DMD C&P, the Decennial Response File (DRF), the Master Address File Extract (MAFX), and Census MaRCS. All four sources have a different number of cases in the universe for each of the four UE operations. The data files from the sources were created at different times and had different parameters for what was an acceptable return for the operation's universe. Thus, the biggest limitation in this assessment is that there is not one static universe identifiable in the data for each operation.

The DMD C&P data do not exist such that each housing unit has a distinct set of data associated with it. The data only exist in aggregate so the data cannot be reconciled with the other sources. The DMD C&P data also do not contain any cases not checked in to PBOCS.

The DRF file contains operation code discrepancies, multiple versions of units, and dummy returns created by Census Bureau Headquarters for cases that were in PBOCS but never data captured. The DRF also contains added housing units associated with addresses and consists of all data captured questionnaires.

The GEO created the MAFX file. The MAFX contains one record for every address that is contained in the final Census universe and was created at the end of all 2010 Census operations not just the end of the UEO. In the MAFX, TEA is used to determine in which operation a case was worked. However, there are records in a UEO TEA that were not enumerated in an UEO operation. For instance, an enumerator could have added a case during NRFU for a respondent's usual home which resides in a UEO TEA. Such cases would exist for UE on the MAFX file (assuming they were in the final census universe) but would not be included in tables using the DRF for this assessment because it was completed in the NRFU operation.

Census MaRCS data only contain data captured data (thus has no dummy returns as the DRF does). MaRCS does not necessarily contain the final data captured data if a case was re-captured and does not contain cases with incorrect operation codes.

To best analyze these operations, a different universe is inevitable when looking at results that are only available from a specific source. Thus, the total number of housing units will differ slightly between tables that used different data sources.

4.3 Paper Questionnaires – Incomplete Data

The use of paper questionnaires required the enumerators to take the effort to write neatly, complete all required sections of the EQ, and write in correct information in the data fields. This unfortunately did not always happen. When enumerators wrote in invalid dates or contradictory information, the responses were either considered invalid or coding rules were established to document the outcomes from the data fields.

4.4 Added Address Data

When enumerators added EQs for Usual Homes Elsewhere (UHE) or missing housing units, the enumerators documented the address of these housing units on the EQ. The address information analyzed in the results section for the added EQs only reports the presence of information and not the validity of the data.

4.5 Type of Enumeration Area

In analyzing the data tallies for UE, RUE, and RA, records that changed blocks may have had a different TEA (TEA is based on collection block). This should have only affected a small number of records. Adds from the Enumerator Questionnaire were tabulated by source using the operation code, which was provided by DSPO.

4.6 Type of UE area

Areas with special enumeration needs were included in the Update Enumerate operation, including American Indian Reservations, Colonias, seasonal areas, and other difficult to enumerate areas. There was no variable available for this analysis to identify which of these reasons applied to each housing unit, so this analysis will not be able to show differences in characteristics between these areas.

4.7 Type of Address Classification

The types of addresses were determined by first looking at the location house number and street name fields. If these fields were filled for a given address record, it was classified as a complete city-style address. However, for a given record, there may have been complete address information contained in one of these fields and not the other due to inconsistencies in form completion and/or data capture issues. Therefore, a complete house number and street name may be present in the street name or location description field on the UE/RUE/RA Address Listing Pages, and result in an understatement of the number of city-style addresses in the UE/RUE/RA workload. Conversely, 'bad' or 'invalid' data may be present in the house number or street name fields thereby resulting in a overstatement of the number of city-style addresses in the UE/RUE/RA workload.

4.8 Determination of Number of Size at Basic Street Address

A basic street address was defined by a house number and street name, in addition to other street name prefixes and suffixes (e.g., east, old, bypass) within a collection block and ZIP code. If two or more records in the same collection block and ZIP code had the same location house number and street name combination, they were considered to be in the same basic street address. If an address record did not have a house number or street name, it was classified as a single unit designation.

4.9 Corrections/Uninhabitable/Empty Mobile Home/Trailer Sites

In the 2010 Final Tabulation MAF extract files, the field actions Correction, Uninhabitable, and Empty Mobile Home/Trailer Site were combined into Update Action Code as "C." For definitions of these classifications, refer to page 49 (second, fifth, and sixth bullets). There were no available variables to separate them. The UE/RUE/RA assessment tally file reflected a combination thereof for each operation as shown in Section 5 (Table 10, Table 102, and Table 147).

4.10 Formal Debriefings

There were no debriefings conducted for the UEOs in the 2010 Census. Because there were no LCO specific debriefings for these operations, no qualitative or quantitative data are available on topics to include feedback from training of staff.

4.11 Quality Control

The success of the RI operation depended on timely RI coding results, which relied on prompt delivery of interview data. Therefore, the Census Bureau and DRIS developed a solution for MaRCS to receive interview data within ten days of DRIS receiving the form. However, the only way to achieve this was for DRIS to deliver raw data from their optical character recognition scanners. We expected errors in these data because they had not yet gone through any DRIS QA or keying. We also expected the impacts of these errors to be minimal because all control data were coming from PBOCS and should be free of these errors.

Once the operation began, unexpected delays in the PBOCS interface caused us to drastically change the MaRCS application to rely solely on DRIS data. This report will refer to this change as the "MaRCS contingency" because it was implemented in response to unexpected events. The consequence of this change was that the data capture errors began to affect control data such as case ID and applicant ID. These errors resulted from the DRIS data capture system reading characters incorrectly. MaRCS received the DRIS data before keyers corrected errors in an attempt to quicken Reinterview. Originally, PBOCS was going to send data such as case ID and applicant ID. Since shifting to relying solely on DRIS data, some of these data capture errors appeared in the case IDs and applicant IDs, causing MaRCS to create new cases and enumerators. For example, if a case ID was 12345, and DRIS read it as 13345, the wrong case ID was reflected in MaRCS.

These data capture errors complicated the final analyses presented here, and sometimes limited the type of analyses possible. Additionally, access to PBOCS for UE RI check-in was stopped on June 3, 2010 due to increasing PBOCS performance. The manual tracking system limited the ability to monitor the UE QC operation. For this reason, we could not provide any analyses that required the PBOCS RI check-in date.

Concerning the DQC, DV, and Observation analyses, the limitations result from being based on keyed data from paper forms. We received roughly half the number of observation checklists that we expected. There were many DQC, DV, and Observation forms with invalid or missing data in necessary fields such as result, applicant ID, and action code that limit our ability to

simply report on what happened. These are all issues that could be greatly reduced by moving to an automated system.

5 RESULTS

This section presents the answers to each of the research questions mentioned in Section 3, Methodology. The results are presented by operation as follows:

- Section 5.1 discusses the results of the UE operation.
- Section 5.2 discusses the results of the UE QC operation.
- Section 5.3 discusses the results of the RUE operation.
- Section 5.4 discusses the results of the RA operation.

5.1 Update Enumerate

Section 5.1 is divided into four components that address the majority of the research questions for UE. This content will be discussed for each of the four UEO operations, beginning with Update Enumerate.

- Section 5.1.1 discusses the workload and operational results from UE.
- Section 5.1.2 discusses the cost and staffing of UE.
- Section 5.1.3 discusses the training provided to UE staff.
- Section 5.1.4 discusses the schedule for UE.

5.1.1 Workload and Outcomes

Enumerators in the Update Enumerate operation had two primary responsibilities:

- Enumerators were to canvass their assigned area and update the Census Bureau's address list and maps, to ensure they are as complete and accurate as possible. Enumerators were to work "ground-to-list" comparing housing units found on the ground against the printed address list.
- Enumerators also conducted interviews and completed questionnaires about each housing unit in their assigned area.

Section 5.1.1.1 provides results about the enumerators' first task, to update the address lists. Subsequent sections discuss other results as listed below:

- Section 5.1.1.1discusses address updates during UE.
- Section 5.1.1.2 discusses the formation of the UE DRF analysis universe.
- Section 5.1.1.3 discusses the housing unit status of cases worked in UE.
- Section 5.1.1.4 discusses the timing of when UE interviews were completed.
- Section 5.1.1.5 discusses characteristics of UE interviews, notably key paradata results.
- Section 5.1.1.6 discusses characteristics of occupied housing units.
- Section 5.1.1.7 presents standard demographic tables for UE people and housing units.

- Section 5.1.1.8 discusses housing units added during UE.

5.1.1.1 Address Record Updates

This section provides results on the address listing updates done by the UE enumerators in the Field. The enumerators were assigned an AA binder by their CL. The AA binder (or Address Register) consisted of Address Listing Pages (D-920, shown in Appendix B) that contained the following information pre-filled when available for each address:

- Case ID
- Block Number
- Map Spot Number
- House Number
- Street or Road Name
- Unit Designation
- Mailing Address

The enumerator was responsible for canvassing each block in the AA and verifying the address that they found on the ground to the address listed in the AA binder. As the enumerators canvassed an AA, they updated the Action Code and HU Status Code for each address listed in the AA binder. The Action Codes for updating the Address List Page were:

- V = Verified. No change was made to the address listing.
- C = The address listing required correction.
- DCL = The address listing was demolished or burned out, or the enumerator could not locate the listed housing unit in the block. DCL is indicated by "Delete" in Table 6, Table 10, Table 99, Table 102, Table 144, and Table 147.
- N = Nonresidential. The address listing was for a commercial building (e.g., a business, commercial storage, or other type of non-housing unit).
- U = Uninhabitable (open to the elements, condemned, or under construction). This code was to be assigned only if no one lived there.
- E = The address listing was for an Empty Mobile Home/Trailer Site in a mobile home park or trailer court.
- D2 = The address listing was a duplicate of another address on the printed address list.
- Z = Indicated that the address listing was for a Group Quarters.

The enumerator gave one of the following three housing unit status codes for each address:

- O – Occupied
- V – Vacant
- D – Delete

While canvassing the AA, the enumerator could also discover a housing unit that was not listed on their Address Listing Pages. The enumerator then added the housing unit address to the Add Page for Housing Units (D-920.1, shown in Appendix C). The Add Page for Housing Units allowed the enumerator to capture the same information that was on the Address Listing Pages

for known housing units. However, the Add Page was not used for processing the Adds. All Adds were processed by GEO using the Enumerator Questionnaires.

When the UE enumerator completed canvassing and interviewing all the housing units within the AA binder, the binder underwent two quality checks: Dependent Quality Control and Delete Verification. Those quality checks are discussed in Sections 5.2.1.1 and Section 5.2.1.2.

Outcomes of Address Updates

Once the updates for the address registers were completed in the field, they were captured and delivered to the Geography Division at HQ to update the MAF/TIGER database (MTdb) for subsequent 2010 Census operations. The Address Registers and Enumeration Questionnaires underwent processing within GEO where the address updates were either accepted or rejected.

Addresses were rejected for reasons such as not having an action code or having an illegal code. Table 5 identifies the UE cases rejected in MTdb.

Table 5: UE Cases Rejected in MTdb

Outcome	Number of Housing Units	Percent
Records Accepted	1,457,545	99.9%
Records Rejected	991	0.1%
Total Records	**1,458,536**	**100.0%**

Data Source: 2010 UE/RUE/RA assessment tally files

A total of 1,458,536 UE address records were received by GEO; 991 records were rejected during GEO processing, leaving 1,457,545 accepted address records. Records were rejected due to illegal or missing values, illegal block codes, the same MAFID is treated as a survivor and retired record, and the Surviving MAFID is filled on the ADDUP and the Unit Status does not equal "7" (duplicate).

The UE enumerators were expected to give a status for each address record in their AA binder. Table 6 reports on the final UE field outcomes.

Table 6: Final Field Outcomes for UE Addresses

Field Action Code	Number of Housing Units	Percent
Verified	1,171,038	80.3%
Correction	132,405	9.1%
Uninhabitable	16,835	1.1%
Empty Mobile Home/Trailer Site	10,123	0.7%
Delete	27,320	1.9%
Duplicate	13,228	0.9%
Nonresidential	21,703	1.5%
Add	64,893	4.5%
Total Housing Units Processed	**1,457,545**	**100.0**%

Data Source: 2010 UE/RUE/RA assessment tally files

A total of 1,171,038, or 80.3 percent, of the total UE housing unit addresses were verified by UE enumerators. A total of 132,405, or 9.1 percent, of the total UE housing unit addresses were corrected. A total of 27,320, or 1.9 percent, of the total UE housing unit addresses were marked for deletion. There were 64,893 housing units assigned an Add action derived from the Enumeration Questionnaire, which accounted for 4.5 percent of the entire UE universe.

If an enumerator could not determine from the description on the Address Listing Page if the housing unit they were at was the same one on the Listing Page, the enumerator deleted the listing with insufficient identification and then added a housing unit with correct information.

The added addresses on the Add Page for Housing Units were compared to the MTdb and records were added to the MTdb based on the following scenarios:

1) When the incoming added record matched to an existing record in the MTdb that had one of the following criteria, the match was ignored and a new MAF Unit was created in the MTdb (added a record):

- A GQ, Other Living Quarter (OLQ), or Transitory Location (TL),
- A retired record,
- A deleted or nonresidential record,
- Another record that had a positive action from the same operation, regardless of block,
- In the 2010 Census universe (meaning, the record was delivered to DSPO as good for the Census, and on either the Enumeration Product Database (PDB), Supplemental NRFU PDB, or had a source from one of the following operations: Group Quarter Enumeration, RA, RUE, UE, Enumeration of Transitory Locations, NRFU, or Vacant Delete Check)

2) When the incoming added record did not match to an existing record in the MTdb, a new MAF Unit was created (added a record).

3) When the incoming added record matched an existing sensitive GQ or record that was "Not in the Census Universe", the record was merged in the MTdb (updated the matched record).

Table 7 shows how the MTdb was affected by the housing units added in UE.

Table 7: Outcomes of Added Addresses in UE

Outcome	Number of Housing Units	Percent
Total New MAF Units Created	59,671	92.0%
New Records Added	*40,165*	*61.9%*
Matches Ignored and New MAF Unit created	*19,506*	*30.1%*
Total Records Merged (Updated Match)	5,222	8.0%
Total Adds	**64,893**	**100.0%**

Data Source: 2010 UE/RUE/RA assessment tally files

Table 7 shows, of the total UE adds, 59,671 (92 percent) resulted in the creation of new MAF Units in the MTdb, while 40,165 (70 percent of the new MAF units created) were new addresses to the MTdb (they did not match to existing records in the MTdb). Overall, 19,506 (30 percent) of the updates matched to existing records in the MTdb, but only 5,222 (8 percent) added during RUE updated existing records in the MTdb.

Records were categorized by TEA, but there were some limitations to this approach. Only the Non-add records were classified by TEA in order to produce tallies for the assessment. They did not have unique source codes on the update file so this was determined to be a viable method to show the results by operation. Notably, it was possible for addresses to have a different collection block after processing than they did before, and TEA was assigned based on the collection block. Addresses that changed collection blocks could have a different final TEA than the one they originally had. The assessment tally files that informed the previous tables relied on the original collection block and TEA, before any possible shifting. However, the Final Tabulation MAF extract file had the final collection block and final TEA.

There were 187 records on the UEO assessment tally file with a final TEA value of 1, 2, 6 or 7. Those TEAs are not in the UEO universe. It is assumed that these UEO cases were moved to another TEA after GEO processing. For these results, they were combined with TEA 5 under the assumption that the majority of them originally came from TEA 5, since that was by far the largest TEA on the file.

Due to MTdb update rules, it was possible for a MAF Unit from the UEOs to be updated by additional 2010 Census operations. For example, some records were added by a different operation (NRFU, Vacant Delete Check (VDC), Update/Leave (U/L) Reconciliation), or Flippage[16] and the operation geocoded the records to a different block with a different TEA; 302 add records from the UEOs were geocoded to blocks with TEA values other than 3, 4, and 5 because of these additional Census operations.

Table 8 outlines the distribution of HUs in the Final Tabulation MAF extract (MAFX) by TEA.

[16]Flippage is an activity that moved map spots from one block to another block located very close to the block boundary and thought to have an incorrect preferred block.

This is the first table produced from the MAFX; the universe of UE cases identified on the MAFX differs slightly from the universe in previous tables that was produced from the assessment tally files. The two files had different parameters for what was an acceptable return for the operation's universe.

Table 8: UE MTdb Update by TEA

Final Type of Enumeration Area	Number of Housing Units	Percent
UE (TEA 5)	1,457,233	100.0%
Other	302	<0.1%
Mailout/Mailback (TEA 1)	171	<0.1%
Update Leave (TEA 2)	122	<0.1%
Military (TEA 6)	3	<0.1%
Urban Update Leave (TEA 7)	6	<0.1%
Total	**1,457,535**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

There were 302 records originally in TEA 5 (UE) that were given a different TEA value after the operation had finished. They will be combined with UE in later tables to show the work done during UE. The operations were categorized differently between assessment tally file and Final Tabution MAF files; the assessment tallies used operation codes from the Non-ID Type C ADDUP, while the Final Tabulation contained TEAs, and these may have changed from their original TEA value

Address Characteristics

Addresses were classified into five categories based on the highest criterion met. The categories are complete city-style, complete rural route, complete P.O. Box, incomplete address, and no address information. Location house number and street name fields were used while location ZIP Code was not included in the criteria for determining a complete city-style address.

- Complete city-style: Included all units with a house number and street name.
- Complete rural route: Included units without a complete city-style address but did have a complete rural route address, such as Rural Route 2, Box 3.
- Complete P.O. Box: Included units that did not have either a complete city-style or a complete rural route address, but did have a complete P.O. Box address, such as P.O. Box 515.
- Incomplete address: Included units with some address information but did not have a complete address of any type.
- No address information: Included units without house number, street name, Rural Route, and P.O. Box information.

Addresses were further delineated by the presence or absence of a physical/location description provided during a census field operation. Some of the workload may have only had a location description on the listing pages. The enumerators had the potential to add physical/location description information if they were unable to obtain a house number for a given address.

Table 9 shows the UE HUs in the Final Tabulation MAF extract by address type.

Table 9: UE MTdb Update by Address Type

Type of Address	Number of Housing Units	Percent
Complete City-Style Address	**1,285,706**	**88.2**%
with location description	373,763	25.6%
without location description	911,943	62.6%
Complete Rural Route Address	**5,329**	**0.4**%
with location description	5,327	0.4%
without location description	2	<0.1%
Complete Post Office Box Address	**19,030**	**1.3**%
with location description	19,030	1.3%
without location description	0	0.0%
Incomplete Address	**97,139**	**6.7**%
with location description	95,886	6.6%
without location description	1,253	0.1%
No Address Information	**50,331**	**3.5**%
with location description	46,818	3.2%
without location description	3,513	0.2%
Total	**1,457,535**	**100.0**%
with location description	540,824	
without location description	916,711	

Data Source: 2010 Final Tabulation MAF extract

In Table 9, 88.2 percent of the entire UE workload consisted of units with a complete city-style address. A city-style address was defined as having a house number and a street name present on the UE Address Listing Pages. DSSD used MAFX to ascertain UE Address Listing Pages information.

In Table 9, close to 7 percent of the total units had an incomplete address (no complete city-style address, or no rural route or P.O. Box, but some address information present). It is possible there may have been complete address information contained in one address field due to

inconsistencies in form completion and/or data capture issues. For instance, a complete house number and street name could have been contained in the street name field or location description field on the listing pages.

There were 3,513 records in the UE workload that had no address information and no location description. This does not indicate the enumerators did not have any address information to verify. There could have been address information in MAF fields that were not included in the determination of the address type categories and also potential map spots.

Table 10 and Table 6 show similar results. The results of the MAF update process done at HQ by GEO were the same as the possible final field outcomes an enumerator assigned (reported in Table 6). However, some records were not flagged as a valid decennial address due to a combination of poor data quality of the incoming records and the design of the database systems. Table 10 contains a summary of the UE MTdb update action codes.

Table 10: UE MTdb Update by Action

GEO Action Codes	Number of Housing Units	Percent
Verify	1,171,038	80.3%
Correction*	132,395	9.1%
Add	64,913	4.5%
Delete	27,317	1.9%
Nonresidential	21,694	1.5%
Uninhabitable*	16,834	1.1%
Duplicate	13,222	0.9%
Empty Mobile Home/Trailer Site*	10,122	0.7%
Total	**1,457,535**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

*Notes: * All three of these actions were represented by the same action code on the MTdb. The distributions reported here are the breakdown of "C" actions approximated using the percent of each field action from the UE/RUE/RA assessment tally file. The 2010 Final Tabulation MAF extract reported 159,351 for the combination of these three.*

Table 10 shows that there were 64,913 HUs assigned an Add action, which accounted for 4.5 percent of the entire UE universe. This is a larger number than were recorded by enumerators according to the assessment tally file, as some add records from the address registers were verified in Field Verification and included on the Final Tabulation MAF extract. They were included in the 2010 Census because of these other operations like FV and Non-ID Processing, but still carried the RA/RUE/UE source from the address registers. A total of 1,171,038, or 80.3 percent, of the total UE HUs were assigned a Verify action. Correction and Delete actions comprised 9.1 percent and 1.9 percent of the total workload, respectively.

Table 11 shows the number of UE housing units in the census as a percent of each UE block that matches to a residential address on the Delivery Sequence File (DSF). Any vintage of the

DSF was used for this assessment. DSF is a list of the addresses serviced by the United States Postal Service (USPS).

Table 11: UE MTdb Update by Blocks that Match the Delivery Sequence File

Percent of housing units in a block that match the DSF	Number of Blocks	Percent	Number of Housing Units	Percent
0 percent	31,297	46.4%	345,831	23.7%
0 < percent ≤ 25	4,736	7.0%	208,840	14.3%
25 < percent ≤ 50	5,926	8.8%	255,191	17.5%
50 < percent ≤ 75	6,915	10.2%	281,375	19.3%
75 < percent < 100	7,107	10.5%	269,265	18.5%
100 percent	11,524	17.1%	97,033	6.7%
Total	**67,505**	**100.0**%	**1,457,535**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Table 11 shows that of the 67,505 total blocks, only 11,524 blocks (17.1 percent) had all of their addresses recognized by the USPS. These blocks accounted for 97,033 HUs, which was 6.7 percent of all DSF matched addresses. Combining the last two rows in Table 11, 27.6 percent of blocks were such that 75 percent of the housing units in the block matched the DSF. We would expect successful mail delivery for these blocks. On the other hand, combining the top two rows of Table 11 shows that 53.4 percent of blocks were such that no more than 25 percent of the housing units in the block matched the DSF. Blocks where less than 25 percent of HUs match to the DSF would presumably present mail delivery challenges for the USPS.

Table 12 presents the UE HUs in the Final Tabulation MAF extract by the size of the structure at the basic street address. A basic address was defined by a house number and a street name, in addition to other street name prefixes and suffixes (e.g. East, Old, bypass) within a collection block and ZIP code.

Table 12: UE MTdb Update by Basic Street Address

Size of Structure	Number of Housing Units	Percent
Single Unit	1,151,816	79.0%
Multi-Unit	305,719	21.0%
2 – 4 units	117,593	8.1%
5 – 9 units	29,012	2.0%
10 – 19 units	27,561	1.9%
20 – 49 units	43,727	3.0%
50+ units	87,826	6.0%
Total	**1,457,535**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Single unit housing structures comprised 79 percent of the total UE workload. Among the 305,719 addresses with a multi-unit structure, 117,593 housing units contained two to four units.

Table 13 shows the distribution of original sources for addresses in the Final Tabulation MAFX. The methodology for calculating the 2010 MAF Original Source variable was to compare the corresponding earliest census operation date by MAFID on the Final Tabulation MAF extract to the DSF refresh variable.

- If there was no DSF flag prior to the operation date, then the MAF source corresponding to that operation date was taken to be the original source.
- If there was a DSF flag prior to the earliest operation date, then that DSF update cycle was considered the original source.
- The DSF records prior to and including Spring 2000 were grouped into the Original Source category "Census 2000 and before," the records from Fall 2000 to Spring 2008 were categorized as "pre-Address Canvassing," and the records from Fall 2008 to Fall 2009 were categorized as "pre-Supplemental delivery."

Table 13 on the next page shows the distribution of Original Source for UE HUs in the Final Tabulation MAF extract.

Table 13: UE MTdb Update by Original Source

Original Source	Number of Housing Units	Percent
1990 Census	193,862	13.3%
2000-2010 HQ updates	4,935	0.3%
2000-2010 survey updates	18,101	1.2%
2004-2008 Census Tests	768	0.1%
2010 Address Canvassing	301,430	20.7%
2010 GQ list updates	6	<0.1%
2010 GQV	1,266	0.1%
2010 LUCA	78,653	5.4%
2010 New Construction	12	<0.1%
2010 Non-ID	20	<0.1%
2010 RA/RUE/UE	60,626	4.2%
Census 2000 operations	83,187	5.7%
DSF: Census 2000 and before	556,809	38.2%
DSF: pre-Address Canvassing	54,307	3.7%
DSF: pre-Supplemental delivery	103,553	7.1%
Total	**1,457,535**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

The highest percent of original source addresses for the UE operation was the "DSF: Census 2000 and before" category (38.2 percent). The second largest percentage came from the 2010 Address Canvassing operation (20.7 percent) and then the 1990 Census (13.3 percent).

5.1.1.2 Formation of the DRF Analysis Universe

Section 5.1.1.1 discussed the address update component of UE enumerators' work. The rest of Section 5.4.1 discusses results of the enumeration component of the enumerators' work. As mentioned in the Methodology and Limitations Section (Section 3 and Section 4), there were three primary data sources used to report on the results of the UE. The MAF extract was used for most of the tables in Section 5.1.1.1 while the DRF will be used primarily in the rest of Section 5.1.1. Additionally, C&P will be used in Section 5.1.2. (A fourth data source for this assessment, MaRCS, will be discussed in Section 5.2 on the Reinterview operation). Section 5.1.1.2 presents how the DRF universe was identified, before subsequent sections show the results obtained from the EQs completed in UE.

The DRF contained information for every data captured questionnaire completed by a respondent or an Enumerator for a housing unit during the 2010 Census. The data on the DRF were not cleaned so there were cases with operation code discrepancies, multiple versions of the same questionnaire, and information for added housing units. The DRF also contained "dummy returns," which were primarily cases where a housing unit status had been entered into PBOCS but the return had not been received by RPS.

These characteristics made it challenging to identify the correct universes for each of the field operations. The three variables below (form type, operation code, and type of enumeration area) were used to identify the field operation in which a case was worked.

1. The form type of the questionnaire.
    a. Every questionnaire on the DRF has a form type. UEO enumerators used the same questionnaire as NRO enumerators. The Reinterview operation had a distinct questionnaire so only two form types should be associated with any UEO operation:
        i. Stateside English production EQ, and
        ii. Stateside English Reinterview EQ.
    b. The Stateside English production form was in the NRFU, VDC, NRFU Residual, UE, RUE, and Remote Alaska Operations.
    c. The Stateside English Reinterview form was in the NRFU RI and UE RI operations.
    d. A Puerto Rico production EQ and Puerto Rico Reinterview EQ existed for use in NRO and should not have been associated with UEO.
    e. All cases within the same operation should have used the same type of EQ and so should all have the same form type on the DRF.
2. The operation code
    a. Operation codes existed for all census operations, including Mailout/Mailback, Telephone Questionnaire Assistance, and Enumeration at Transitory Locations.
    b. Each component of UEO had a distinct operation code (UE, UE RI, Remote Alaska, and RUE).
    c. The operation code was printed on the address label attached to each EQ, or hand-written for added cases.
3. The Type of Enumeration Area (TEA) an address was in. There were seven TEAs used in the 2010 Census:
    a. Mailout/Mailback (TEA 1),
    b. Update/Leave (TEA 2),
    c. Remote Update Enumerate (TEA 3),
    d. Remote Alaska (TEA 4),
    e. Update Enumerate (TEA 5),
    f. Military (TEA 6),
    g. Urban Update/Leave (TEA 7)

For UEO operations, all added cases that were not from Usual Home Elsewhere (UHE) situations or mover situations should have come from the RUE, RA, or UE TEAs.[17]

[17] Added cases will be discussed in more depth in Section 5.1.1.8.

In theory, a case worked in UE would have a stateside production EQ form type, the UE operation code, and come from TEA 5. Similar expectations existed for each of the other UEOs. However, there were a number of situations that created inconsistent values between these variables.

- Sometimes the original questionnaire was damaged and the data had to be transcribed onto a blank questionnaire. During the transcription, the Census ID or the operation Code could have been transcribed incorrectly.
- Some RI form types had an operation code for a production operation, or production form types had an operation code for the RI operation.
- There were cases completed by a Nonresponse Follow-up enumerator as an added case for a respondent's regular address that resides in a UE TEA. For such a case, the operation code would have been NRFU to reflect the operation that collected the data but the TEA would have been set based on the collected address.
- Some completed questionnaires did not arrive at a data capture center. In those cases, the LCO office staff entered basic information into PBOCS. HQ processing created 'dummy returns' for each such questionnaire that was completed in the field but did not arrive at a data capture center using the data from PBOCS. Dummy returns had a different value for form type than the typical EQs.
- Dummy returns did not have an operation code.

When the form type, operation code, and TEA were conflicting, a determination was made as to which operation the case should be analyzed in. We prioritized form type first, then the operation code variables. If the operation code was not present, then the case was assigned an operation code based on its TEA. If the TEA was zero or undetermined, then the case was analyzed as a NRFU case, since NRFU was the largest field operation and thus the most likely place the case was worked. Some UE cases might have been misclassified as a result.

For this analysis, we wanted to assess the results of one EQ for each address. However, there could be more than one EQ linked to an address on the DRF. There are two primary reasons for this: multiple data captures of an EQ and additional fieldwork done by enumerators to revisit an address.

1. One questionnaire could have been data captured more than once, so a record exists for every time that questionnaire was captured. While there would then be multiple questionnaires on the DRF, they do not represent additional work done by an enumerator.
2. If there was an issue with the questionnaire, the production staff could rework cases after an earlier version of the questionnaire was checked into PBOCS at the LCO. For instance, if managers reviewed reports and recognized coverage problems such as the existence of a large number of non-interviews or other questionable data quality indicators, they could prepare another address label and have another questionnaire completed for the same address. Multiple questionnaires then exist on the DRF for the same address from the same operation and they represent additional work done by an enumerator. Whenever a replacement questionnaire was checked into PCOCS and was received by Census processing, it became the record of choice.

The majority of the research questions require results tabulated using only one questionnaire per housing unit to accurately report what happened in UE at an address. If every questionnaire contained on the DRF was included in the analysis, the statistics would be inaccurate.

Thus, we identified one primary questionnaire per address for this assessment. The primary questionnaire per address within a field operation was selected by choosing the unique questionnaire with the highest version number. The LCO office staff was instructed to enter an increased version number on a questionnaire that was reworked. If there were multiple unique questionnaires with the same version number that was also the highest version number, the questionnaire that was processed last according to the FORM_SEQ variable was selected as the primary questionnaire.

As described above, the data on the DRF had to be subset to identify each operation's universe. Table 14 shows the results of the subsetting efforts. The top row in Table 14 is the total number of EQs associated with UE on the DRF, including multiple copies of the same questionnaire and added questionnaires that were not able to be successfully geocoded to a block within a state and county. The second row removes multiple copies of the same questionnaire. The third row removes all questionnaires that were for an added housing unit which were not geocoded and assigned to an address. There were 4,396[18] of those from the UE universe. The last row in the table removes multiple questionnaires generated for an address due to rework. There were 17,417 additional questionnaires completed for housing units in the UE universe. The universe to analyze the results of the UE operation from the DRF in this assessment is 1,463,689 unique housing units.

Table 14: UE Universe

UE Universe Characteristics	Number of Questionnaires
All Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	1,490,909
Unique Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	1,485,502
Unique Questionnaires on the DRF (only including Adds geocoded and assigned to an address)	1,481,106
Unique Housing Units on the DRF (only including Adds geocoded and assigned to an address)	1,463,689

Source: DRF

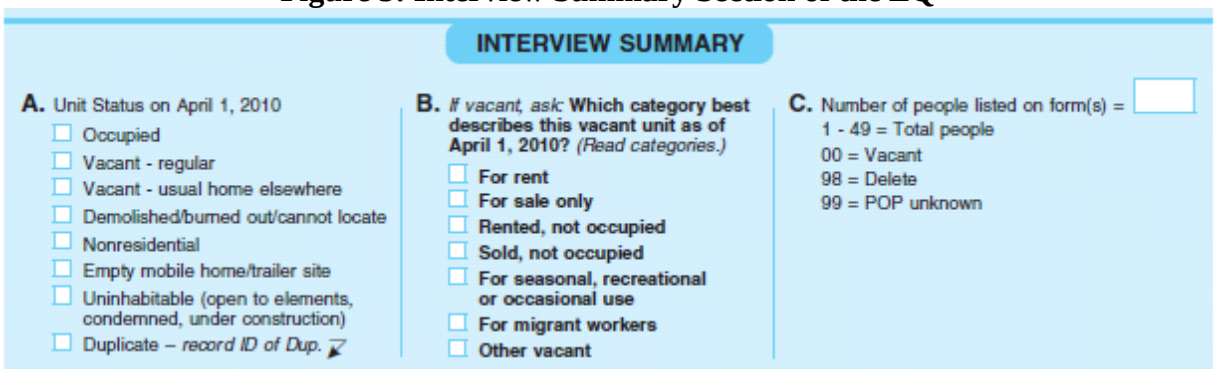
5.1.1.3 UE Housing Unit Status

When an enumerator interviewed a respondent for a UE address, they were to first confirm that they were at the right address. After that, they were to determine whether the housing unit was occupied on April 1, if it was vacant on April 1, or if it should be deleted from the address list for a variety of reasons. Ultimately, this information was recorded in Item A of the Interview Summary section of the Enumerator Questionnaire. There were eight options available for the

[18] These cases will be discussed again in Section 5.1.1.8.

enumerator to designate what the unit status was on April 1, 2010, as shown in the first column of Figure 3. The last five status descriptions in that column all describe a housing unit to be deleted from the address list.[19]

Figure 3: Interview Summary Section of the EQ



The status as marked in Item A, the population count from Item C (also shown in Figure 3), and the total number of data-defined people[20] on the form were used subsequently in data processing to determine if an address was occupied, vacant, a deleted address, or had an unresolved status. For instance, if a housing unit was identified as vacant in Item A, had no data-defined people, but had a population count between 1 and 97 in Item C, the final status was set as unresolved. These values were designated in the variable PP_HOUSING_STATUS[21]. Table 15 shows the distribution of housing unit status for the addresses visited in UE.

Table 15: UE Housing Unit Status

Housing Unit Status	Number of Housing Units	Percent[22]
Occupied	722,654	49.4%
Vacant	638,245	43.6%
Delete	91,495	6.3%
Unresolved	11,295	0.8%
Total Housing Units	**1,463,689**	**100.0%**

Source: DRF

Of the 1,463,689 housing units visited in UE, 49.4 percent were found to be occupied. An additional 43.6 percent were vacant housing units, 6.3 percent were marked to be deleted, and

[19] We will refer to these cases as 'deletes' throughout the assessment, but it is important to note that they might not ultimately have been deleted from the address list. That decision was made in subsequent processing when examining the cumulative questionnaires from all operations for that address.

[20] A data-defined person is a person who has at least two pieces of information to describe them; these could be a name containing at least three legal characters, a relationship status, sex, age or date of birth, Hispanic origin, or race.

[21] See the Specification for the Linking of Enumerator Supplemental Forms and Assigning the 2010 Census Return Housing Unit Status (Barrett 2010) for information on how PP_HOUSING_STATUS was set.

[22] This column does not total 100.0 percent due to rounding.

0.8 percent were considered unresolved. The number of vacant units is close to the number of occupied units, which is to be expected given the inclusion of seasonal areas in the UE universe. The following tables explore occupied, vacant, and deleted housing units in more depth.

One research question asks for the number of times that UE enumerators were unable to complete an interview for a housing unit because the possible respondents refused to complete an interview. This information was captured on the back page of the EQ where enumerators were to mark the REF box on the EQ for refusals. This appeared under the Interview Summary with a series of boxes that applied to other situations. Figure 4 shows these data capture fields.

Figure 4: Flags on the EQ to Report Certain Interview Characteristics

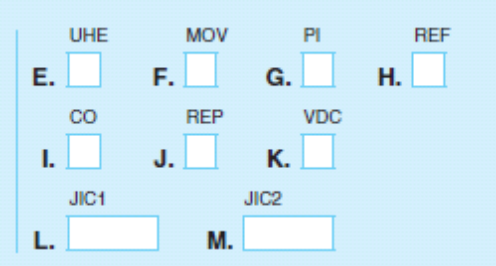


Table 16 shows the number of housing units marked as refusals during the UE operation, by housing unit status. This does not capture the number of times enumerators reported in the Record of Contacts section if an initial contact was a refusal.

Table 16: Housing Units Reported as Refusals during UE

Housing Unit Status	Number of Housing Units	Number of Refusals	Refusal Percentage
Occupied	722,654	9,179	1.3%
Vacant	638,245	906	0.1%
Delete	91,495	243	0.3%
Unresolved	11,295	336	3.0%
Total Housing Units	**1,463,689**	**10,664**	**0.7%**

Source: DRF

Of the 1,463,689 housing units in UE, there were 10,664 (0.7 percent) that were marked as a refusal on the questionnaire. Of the housing units that had an unresolved status, 3.0 percent were flagged as refusals.

Occupied Housing Units

We classified the 722,654 occupied housing units in UE based on the reported population count of the housing unit (as captured in Item C from Figure 3):

- 1-49 = These values are considered 'valid' population counts. Enumerators were instructed to collect person information for at most 49 people.
- Blank, 0, 50-97 = These values are considered 'invalid' population counts for occupied housing units.

- 98 = This value should have only been used for housing units marked for deletion and not for occupied housing units. If it was used with a housing unit ultimately classified as occupied, it was categorized as an 'invalid' population count for the purposes of this table.
- 99 = This value indicates an unknown population count. There are instances when an enumerator could confirm an address was occupied but they were unable to collect any information about the number of people living or staying at that address. Enumerators were instructed to give these housing units a population count of 99.

When a respondent refuses to complete the interview enumerators are not always able to collect a population count. Table 17 shows how often each of these three types of population counts was recorded in conjunction with a reported refusal.

Table 17: Types of Refusals for UE Occupied Housing Units

Type of Population Count	Number of Housing Units	Percent
Valid population count	2,846	31.0%
Invalid population count	119	1.3%
Unknown population count	6,214	67.7%
Occupied Refusals	**9,179**	**100.0%**

Source: DRF

Table 17 shows that roughly two-thirds (67.7 percent) of the refusals in UE had an unknown population count, while roughly one-third (31.0 percent) had a valid population count.

Vacant Housing Units

Table 15 showed that 638,245 housing units were determined to be vacant during UE. There are two primary types of vacant housing units, as listed in Item A from the Interview Summary in Figure 3. The first type, called "regular" vacant, are those units that are normally occupied year-round but are for sale, for rent, or otherwise uninhabited on Census Day. The second class of vacant units is called "usual home elsewhere" vacant, or UHEs. Vacant housing units classified as UHEs might be occupied only on weekends or seasonally. There are also housing units that were marked as both Regular and UHE vacant. We classified those vacant housing units in this assessment as Unknown.

Table 18 describes the distribution of vacant housing units between being a Vacant-Regular or being a Vacant-UHE.

Table 18: Types of UE Vacant Housing Units

Vacant Type	Number of Housing Units	Percent
Regular	156,994	24.6%
Usual Home Elsewhere (UHE)	478,687	75.0%
Unknown	2,564	0.4%
Total Vacant Housing Units	**638,245**	**100.0%**

Source: DRF

Table 18 reports that 24.6 percent of all vacant units were vacant-regular, while 75.0 percent were UHEs. Only 0.4 percent were unknown. Table 14 reported that there were 1,463,689 housing units in the entire UE universe. Table 18 identifies 478,687 of those as seasonally vacant housing units, so 32.7 percent of the entire UE universe was classified as seasonally vacant.

Delete Housing Units

Table 15 showed that 91,495 housing units were marked to be deleted during UE. There are five classes of deletes, as seen in Figure 3, Item A.

- Demolished/Burned Out/Cannot Locate,
- Nonresidential,
- Empty Mobile Home/Trailer Site,
- Uninhabitable, and,
- Duplicate.

If an enumerator indicated two or more delete classifications for an address, then it was coded as a Delete-Unknown. Table 19 shows the distribution of deletes in UE.

Table 19: Types of UE Deleted Housing Units

Delete Type	Number of Housing Units	Percent
Demolished/Burned Out/Cannot Locate	27,982	30.6%
Nonresidential	22,128	24.2%
Empty Mobile Home/Trailer Site	9,436	10.3%
Uninhabitable	18,237	19.9%
Duplicate	12,963	14.2%
Delete Unknown	749	0.8%
Total Deleted Housing Units	**91,495**	**100.0%**

Source: DRF

If an enumerator could not determine from the description on the Address Listing Page if the housing unit they were at was the same one on the Listing Page, the enumerator deleted the listing with insufficient identification and then added a housing unit with correct information. The majority of deletes (30.6 percent) were classified as housing units that were demolished, burned out, or could not be located. An additional 24.2 percent were classified as nonresidential, 19.9 percent were classified as uninhabitable, and 14.2 percent were a duplicated address of another housing unit. Empty mobile home or trailer sites accounted for 10.3 percent of all deletes. A classification could not be determined for 0.8 percent of the deletes.

5.1.1.4 Interview Completion

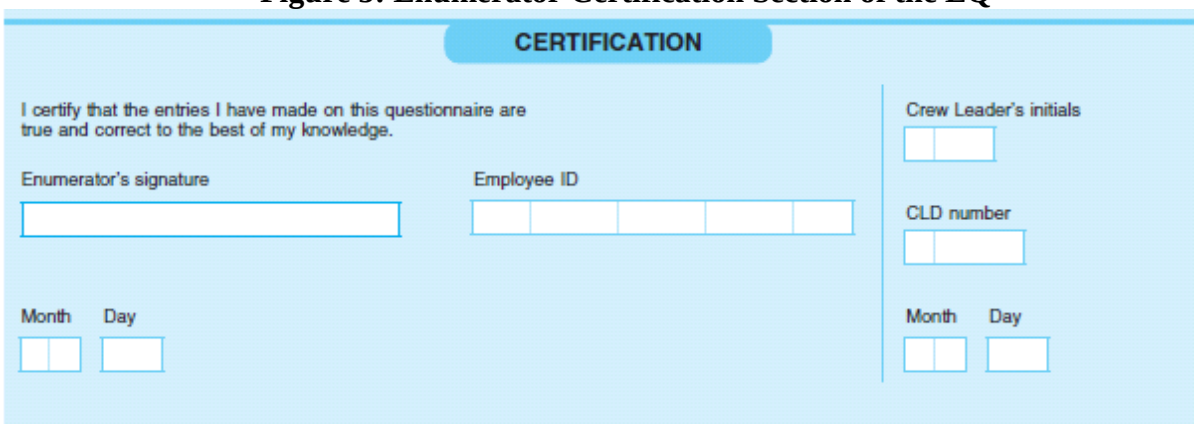
The following section will discuss the timing of when UE interviews were conducted in the field with respondents. These results answer the research questions regarding how the planned start and finish dates for the UE operation compared to the actual start and finish dates, and how the

accumulation of outcomes changed over time. There are no reliable data from PBOCS to report when EQs were checked-in or how long it took LCOs to finish their UE assignments.

The UE operation was officially scheduled to begin on Monday, March 22, 2010. Training for the majority of enumerators happened from March 15 to March 19.[23] The original schedule showed training occurring from Tuesday through Friday but the training schedule in the training guide spread the training and "live" field work over 4 ½ days. Most RCCs/LCOs started on Monday, March 15 to conduct the fingerprinting.

Table 20 shows the progress of UE cases through spring 2010. These results use the dates reported by the enumerator or crew leader in the Certification section of the EQ, which should best reflect the actual date that an interview was completed. Figure 5 shows the Certification section of the EQ.

Figure 5: Enumerator Certification Section of the EQ



If the enumerator provided a valid date of completion, that date was used. However, if the enumerator's date fields were invalid or blank and the CL certification dates were valid, then the CL dates were used as the date of completion. Table 20 shows the distribution of completed cases by week.

[23] Training will be discussed in depth in Section 5.1.3

Table 20: UE Housing Units Completed By Week[24]

Week		Housing Units Completed	Percent[25]	Cumulative Percent
3/01 - 3/06		771	0.1%	0.1%
3/07 - 3/13		596	<0.1%	0.1%
3/14 - 3/21		51,306	3.5%	3.6%
3/22 - 3/27	Start of UE	338,518	23.1%	26.7%
3/28 - 4/03		314,526	21.5%	48.2%
4/04 - 4/10		257,442	17.6%	65.8%
4/11 - 4/17		190,819	13.0%	78.8%
4/18 - 4/24		125,660	8.6%	87.4%
4/25 - 5/01		68,361	4.7%	92.1%
5/02 - 5/08		42,079	2.9%	95.0%
5/09 - 5/15		32,161	2.2%	97.2%
5/16 - 5/22		18,272	1.2%	98.4%
5/23 - 5/29	End of UE	9,947	0.7%	99.1%
5/30 - 6/05		5,160	0.4%	99.4%
6/06 - 6/12		3,870	0.3%	99.7%
6/13 - 6/19		1,383	0.1%	99.8%
6/20 - 6/26		367	<0.1%	99.8%
6/27 - 6/30		74	<0.1%	99.8%
Missing/Out of Range		2,377	0.2%	100.0%
Total Housing Units		**1,463,689**	**100.0%**	**100.0%**

Source: DRF and AUX

The week of March 14 was the week of training, when each enumerator should have completed at least one interview as a fieldwork component of the training. Table 20 shows that enumerators completed 23.1 percent of all UE cases in the first week of enumerating (March 22 to 27th). Over 90 percent of the UE workload was completed by the end of April. According to dates provided by enumerators on the EQ, 40 percent of the UE workload was completed before Census Day (April 1). This number reflects when cases were actually enumerated and worked in the field. As part of UE closeout and reconciliation of cases, a small number of cases was completed in June.

Of the entire UE universe, 0.2 percent of cases was either missing a date in the Certification section, the date written was before March 1, or the date was after June 30. Dates could have been captured incorrectly due to handwriting and legibility issues inherent in using a paper questionnaire.

Table 21, Table 22, and Table 23 show the number of occupied, vacant, and delete housing units completed each week.

[24]Some rows in the table do not contain seven days. This division of dates is to show the start and end date of the operation.

[25] This column does not total 100.0 percent due to rounding.

Table 21: UE Occupied Housing Units Completed By Week

Week		Housing Units Completed	Percent[26]	Cumulative Percent
3/01 - 3/06		371	0.1%	0.1%
3/07 - 3/13		274	<0.1%	0.1%
3/14 - 3/21		27,817	3.8%	3.9%
3/22 - 3/27	Start of UE	157,584	21.8%	25.7%
3/28 - 4/03		151,323	20.9%	46.7%
4/04 - 4/10		125,955	17.4%	64.1%
4/11 - 4/17		95,181	13.2%	77.3%
4/18 - 4/24		65,136	9.0%	86.3%
4/25 - 5/01		36,471	5.0%	91.3%
5/02 - 5/08		22,802	3.2%	94.5%
5/09 - 5/15		17,662	2.4%	96.9%
5/16 - 5/21		10,388	1.4%	98.4%
5/22 - 5/29	End of UE	4,912	0.7%	99.1%
5/30 - 6/05		2,709	0.4%	99.4%
6/06 - 6/12		2,201	0.3%	99.7%
6/13 - 6/19		713	0.1%	99.8%
6/20 - 6/26		126	<0.1%	99.9%
6/27 - 6/30		29	<0.1%	99.9%
Missing/Out of Range		1,000	0.1%	100.0%
Total Occupied Housing Units		**722,654**	**100.0%**	**100.0%**

Source: DRF and AUX

All three statuses were completed at about the same rate each week. The vacant housing units were completed slightly faster than the occupied or deleted housing units. For instance, by the end of the week of April 25, 93.7 percent of the vacant housing units were completed while only 91.3 percent of the occupied housing units and 87.4 percent of the deletes were completed. This is a particularly important statistic because it shows that most vacant HUs provide an observable clue that the unit is vacant, and enumerators can go straight to a knowledgeable proxy to confirm.

[26] This column does not total 100.0 percent due to rounding.

Table 22: UE Vacant Housing Units completed by week

Week		Housing Units Completed	Percent[27]	Cumulative Percent
3/01 - 3/06		341	0.1%	0.1%
3/07 - 3/13		280	<0.1%	0.1%
3/14 - 3/21		21,118	3.3%	3.4%
3/22 - 3/27	Official Start of UE	161,360	25.3%	28.7%
3/28 - 4/03		143,685	22.5%	51.2%
4/04 - 4/10		113,848	17.8%	69.0%
4/11 - 4/17		80,932	12.7%	81.7%
4/18 - 4/24		50,477	7.9%	89.6%
4/25 - 5/01		25,866	4.1%	93.7%
5/02 - 5/08		15,158	2.4%	96.1%
5/09 - 5/15		11,318	1.8%	97.8%
5/16 - 5/22		5,723	0.9%	98.7%
5/23 - 5/29	Official End of UE	4,082	0.6%	99.4%
5/30 - 6/05		1,810	0.3%	99.6%
6/06 - 6/12		1,297	0.2%	99.9%
6/13 - 6/19		366	0.1%	99.9%
6/20 - 6/26		99	<0.1%	99.9%
6/27 - 6/30		38	<0.1%	99.9%
Missing/Out of Range		447	0.1%	100.0%
Total Vacant Housing Units		**638,245**	**100.0%**	**100.0%**

Source: DRF and AUX

[27] This column does not total 100.0 percent due to rounding.

Table 23: UE Deleted Housing Units completed by week

Week		Housing Units Completed	Percent[28]	Cumulative Percent
3/01 - 3/06		44	<0.1%	<0.1%
3/07 - 3/13		36	<0.1%	0.1%
3/14 - 3/21		1,932	2.1%	2.2%
3/22 - 3/27	Official Start of UE	16,692	18.2%	20.4%
3/28 - 4/03		17,025	18.6%	39.1%
4/04 - 4/10		15,712	17.2%	56.2%
4/11 - 4/17		13,550	14.8%	71.0%
4/18 - 4/24		9,312	10.2%	81.2%
4/25 - 5/01		5,661	6.2%	87.4%
5/02 - 5/08		3,872	4.2%	91.6%
5/09 - 5/15		2,980	3.3%	94.9%
5/16 - 5/22		1,917	2.1%	97.0%
5/23 - 5/29	Official End of UE	861	0.9%	97.9%
5/30 - 6/05		576	0.6%	98.6%
6/06 - 6/12		311	0.3%	98.9%
6/13 - 6/19		282	0.3%	99.2%
6/20 - 6/26		139	0.2%	99.4%
6/27 - 6/30		7	<0.1%	99.4%
Missing/Out of Range		586	0.6%	100.0%
Total Deleted Housing Units		**91,495**	**100.0%**	**100.0%**

Source: DRF and AUX

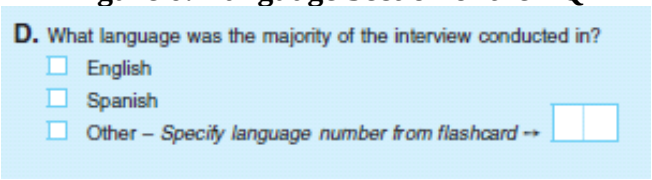
5.1.1.5 Interview Characteristics

The following section presents some results about the interviews with UE respondents, including the language in which interviews were conducted, the number of contacts that enumerators made to enumerate a housing unit, and the type of respondents who completed UE interviews.

Language

As shown in Figure 6, the EQ asked enumerators to record the language in which the majority of an interview was conducted via checkboxes provided for English and Spanish, the two most common languages, as well as Other.

Figure 6: Language Section of the EQ



[28] This column does not total 100.0 percent due to rounding.

Other languages were to be indicated using the number assigned to them on the Language Identification Flashcard (shown in Appendix E). There were 50 spoken languages (including two dialects of Chinese that sound the same when spoken) officially supported and identified on the Language Identification Flashcard.

Table 24 shows the top five languages in which UE interviews were conducted.

Table 24: Top Five Languages in which UE Interviews were Conducted

Language	Total	Percent[29]
English	1,291,993	88.3%
Spanish	83,307	5.7%
Navajo	13,295	0.9%
Portuguese	56	<0.1%
Nepali	51	<0.1%
All other languages	194	<0.1%
Multiple languages indicated	4,980	0.3%
Unknown	69,813	4.8%
Total Housing Units	**1,463,689**	**100.0%**

Source: DRF and AUX

English was the most common language spoken, accounting for 88.3 percent of all UE interviews. Spanish was spoken for 5.7 percent of UE interviews and Navajo was spoken for 0.9 percent of interviews. The prevalence of Spanish and Navajo is logical since the UE universe included Colonias and American Indian reservations. While other languages were reported as being used to complete an interview, the frequency of specific other languages drops sharply after Navajo.

An additional three rows are shown at the bottom of Table 24. The 'All other languages' row condenses the 45 additional languages that are on the language identification flashcard. The distribution of those languages is provided in Appendix F. The 'Multiple languages indicated' row reflects the interviews where both the English and Spanish boxes were marked, or where one of those boxes was marked as was the other language box, and a number was also written in to indicate a different language from the flashcard. More interviews fit that description (4,980 interviews) than for any single language besides English, Spanish, and Navajo. Additionally, the language of interview was unknown for 4.8 percent of all UE interviews. This is a sizable number of interviews and could influence the distribution of languages if this information had been recorded, especially if the language was not English.

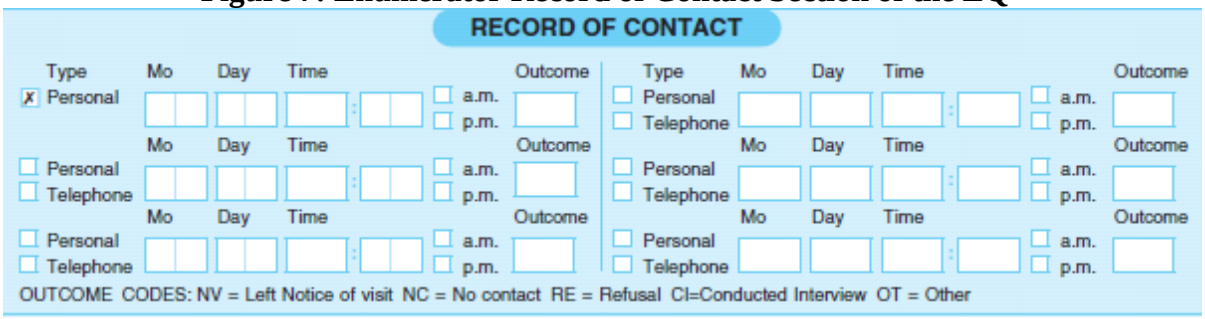
Record of Contact

The following tables document how many times an enumerator had to contact an address before a completed interview was obtained. Enumerators were told not to contact an address more than six times and there was only space to record six contacts, but that does not guarantee an enumerator did not make more than six contacts.

[29] This column does not total 100.0 percent due to rounding.

If no one answered the door at a housing unit, enumerators were instructed to leave a Notice of Visit form (shown in Appendix G). For each attempted contact to an address, the enumerator was supposed to write the month and day of the contact, the time of day, and what the outcome of the visit was, as well as whether the attempt was in person or over the telephone, as seen in Figure 7.

Figure 7: Enumerator Record of Contact Section of the EQ



Not all information needed to be filled in to be counted as a contact for this assessment. For a contact to be counted as valid, a row in the Record of Contact section had to have a mark in one of five boxes: the Personal visit box, Telephone visit box, Outcome box, Day, or Month of contact. For the first Record of Contact row, the Personal visit box is already filled in so one of the other three key boxes had to be marked in that row in order for it to qualify as a contact. These criteria were established by the authors of the "2010 Census Nonresponse Follow-up Contact Strategy Experiment Final Report" and are discussed in more detail in that report. We used the same criteria in this assessment to be consistent and comparable across reports.

The first contact to a housing unit by UE enumerators was required to be a personal visit. For subsequent contacts, they were trained in how to conduct telephone interviews. Enumerators could leave their phone number on the Notice of Visit and encourage respondents to call them back, acquire a phone number from a cooperative respondent who could not complete an interview at that time, or acquire a phone number from a neighbor or other knowledgeable source.

Table 25 shows the distribution of the number of contacts made to a housing unit in order to obtain a completed interview. The first column contains all 1,463,689 housing units in UE. Subsequent columns look strictly at housing units by their final occupancy status.[30] Dummy returns do not have any information available on the Record of Contact and are reflected in the row for 'Unknown' number of contacts. They are the only returns represented in that row.

Table 25: Number of Contact Attempts Made to UE Housing Units

Number of Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent[31]	Vacant Status	Vacant Percent[32]	Delete Status	Delete Percent
0[33]	5,828	0.4%	1,017	0.1%	1,005	0.2%	3,432	3.8%
1	712,895	48.7%	370,422	51.3%	275,381	43.1%	61,165	66.9%
2	366,121	25.0%	167,741	23.2%	180,410	28.3%	15,756	17.2%
3	163,304	11.2%	78,616	10.9%	78,539	12.3%	5,137	5.6%
4	89,904	6.1%	42,241	5.8%	44,607	7.0%	2,508	2.7%
5	46,248	3.2%	24,111	3.3%	20,765	3.3%	1,092	1.2%
6	79,138	5.4%	38,349	5.3%	37,444	5.9%	2,405	2.6%
Unknown	251	<0.1%	157	<0.1%	94	<0.1%	0	0.0%
Total Housing Units	**1,463,689**	**100.0%**	**722,654**	**100.0%**	**638,245**	**100.0%**	**91,495**	**100.0%**

Source: DRF and AUX

Of the 1,463,689 housing units in UE, 48.7 percent of them were contacted only one time. In UE, 3.2 percent of the housing units were visited five times, but 5.4 percent were visited six times. This could happen if an enumerator recorded contacts 1 through 5 but then left the sixth space blank until they were able to complete an interview. Six is the maximum number of contacts we can report, even though that address could have been contacted more than six times.

Comparing the columns in Table 25 that contain the universes of occupied, vacant and deleted housing units, the deleted housing units were much more likely to only require one contact (66.9 percent of the time). They also have a higher percentage of cases that supposedly received zero contacts (3.8 percent). Vacant housing units had the highest percentage of cases requiring six contacts (5.9 percent).

[30]Housing units with an unresolved status are reflected in the "All Housing Units" column but are not reported in their own column.

[31] This column does not total 100.0 percent due to rounding.

[32] This column does not total 100.0 percent due to rounding.

[33] Cases with zero contacts reflect the number of cases that did not meet our criteria for documenting a valid record of contact.

Enumerators could contact an address either in person or over the telephone (after the first personal visit). Table 26 shows the distribution of contacts for personal visits.

Table 26: Number of Personal Contact Attempts Made to UE Housing Units

Number of Personal Contacts Attempts	All Housing Units	All Percent[34]	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	7,092	0.5%	1,628	0.2%	1,573	0.2%	3,496	3.8%
1	826,222	56.4%	425,936	58.9%	328,182	51.4%	65,419	71.5%
2	318,915	21.8%	147,160	20.4%	156,507	24.5%	13,351	14.6%
3	142,500	9.7%	67,848	9.4%	69,256	10.9%	4,483	4.9%
4	73,228	5.0%	33,925	4.7%	36,833	5.8%	2,002	2.2%
5	42,659	2.9%	21,608	3.0%	19,759	3.1%	1,016	1.1%
6	52,822	3.6%	24,392	3.4%	26,041	4.1%	1,728	1.9%
Unknown	251	<0.1%	157	<0.1%	94	<0.1%	0	0.0%
Total Housing Units	**1,463,689**	**100.0%**	**722,654**	**100.0%**	**638,245**	**100.0%**	**91,495**	**100.0%**

Source: DRF and AUX

Even though enumerators were instructed to make a personal visit on the first contact to a housing unit, in some cases there was no record of a personal contact but there was a record of telephone contacts. Housing units classified as vacant were the most likely to require more than one personal contact. For instance, 24.5 percent of vacant housing units received exactly two personal contacts while 20.4 percent of occupied housing units and 14.6 percent of deletes received exactly two personal contacts.

[34] This column does not total 100.0 percent due to rounding.

Table 27 shows the distribution of telephone contacts to housing units in UE.

Table 27: Number of Telephone Contact Attempts Made to UE Housing Units

Number of Telephone Contacts Attempts	All Housing Units	All Percent[35]	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent[36]	Delete Status	Delete Percent
0	1,335,462	91.2%	666,062	92.2%	570,388	89.4%	88,411	96.6%
1	113,993	7.8%	49,864	6.9%	60,721	9.5%	2,801	3.1%
2	10,695	0.7%	4,947	0.7%	5,450	0.9%	231	0.3%
3	2,448	0.2%	1,231	0.2%	1,164	0.2%	37	<0.1%
4	698	<0.1%	325	<0.1%	358	0.1%	11	<0.1%
5	142	<0.1%	68	<0.1%	70	<0.1%	4	<0.1%
Unknown	251	<0.1%	157	<0.1%	94	<0.1%	0	0.0%
Total Housing Units	**1,463,689**	**100.0%**	**722,654**	**100.0%**	**638,245**	**100.0%**	**91,495**	**100.0%**

Source: DRF and AUX

Overall, up to 91.2 percent of the UE housing units were never contacted by telephone. Housing units that were found to be vacant were the most likely to incorporate a telephone contact. This could be a result of calling real estate agents or property management offices. Because the first record of contact row was filled as a personal visit, it was not possible to record six telephone contacts.

Table 28 shows what mode the presumed last contact was with a housing unit. Enumerators had been trained on conducting telephone interviews and were allowed to use that mode when available. Cases with an unknown final contact either had zero contacts identified, were dummy returns, or did not mark the checkbox to distinguish if it was a personal contact or a telephone contact for the last box utilized in the record of contact section.

[35] This column does not total 100.0 percent due to rounding.

[36] This column does not total 100.0 percent due to rounding.

Table 28: Type of Final Contact for Housing Units in UE, by Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Final Contact	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Person	1,266,145	86.5%	627,326	86.8%	547,307	85.8%	81,910	89.5%
Telephone	115,026	7.9%	49,563	6.9%	62,098	9.7%	2,770	3.0%
Unknown	82,518	5.6%	45,765	6.3%	28,840	4.5%	6,815	7.5%
Total Housing Units	**1,463,689**	**100.0%**	**722,654**	**100.0%**	**638,245**	**100.0%**	**91,495**	**100.0%**

Source: DRF and AUX

Table 28 reports that the final mode of contact was in person for 86.5 percent of all UE cases. An additional 7.9 percent were by telephone and 5.6 percent of cases had an unknown mode. Vacant housing units had the largest percentage of final contacts done over the telephone, at 9.7 percent.

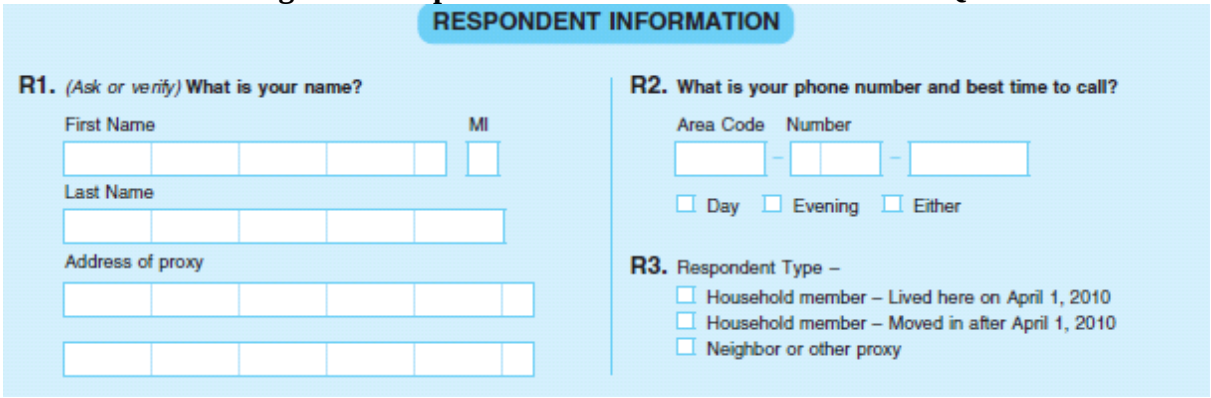
Type of Respondent

To complete a questionnaire to determine who lived at the address on April 1, 2010, an enumerator was instructed to first attempt an interview with the owner or renter but if no such person was available, then an interview could be conducted with another household member who was at least 15 years of age. Household members are preferred respondents because they can generally provide more information about the household than neighbors or another proxy. If a household member that lived at the address on April 1 was not available, or the housing unit was vacant or flagged for deletion, then the enumerator could interview a proxy.

A proxy is someone who provides information about the UE address but is not a member of the UE household. UE enumerators should only have spoken with a proxy respondent if they were unable to talk to a household member. There are two types of proxy respondents. The first type of proxy is a respondent that moved into the address after April 1, called an 'in-mover'. The second type is a neighbor or someone else who is informed about the status of an address on April 1.

On the last page of the EQ, enumerators were to identify who the respondent was for the interview, as seen in Figure 8. Questions R1 and R2 were to be used for a possible reinterview at that address. Question R3 indicates whether the respondent was a household member on April 1 or a proxy respondent.

Figure 8: Respondent Information Section of the EQ



The distribution of respondent type is shown in Table 29, by housing unit status. Housing units with an unresolved status are included in the total but are not reported separately.

Table 29: Type of Respondent for UE Interviews, By Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Respondent Type	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**[37]
Household Member	670,018	45.8%	647,304	89.6%	16,734	2.6%	5,259	5.7%
Unknown Type	23,408	1.6%	6,375	0.9%	6,414	1.0%	8,603	9.4%
All Proxy	770,263	52.6%	68,975	9.5%	615,077	96.4%	77,633	84.8%
Proxy Types								
In-mover	5,744	0.4%	765	0.1%	4,797	0.8%	110	0.1%
Neighbor or other	764,431	52.2%	68,207	9.4%	610,220	95.6%	77,520	84.7%
Both marked	88	<0.1%	3	<0.1%	80	<0.1%	3	<0.1%
Total Housing Units	**1,463,689**	**100.0%**	**722,654**	**100.0%**	**638,245**	**100.0%**	**91,495**	**100.0%**

Source: DRF

[37] This column does not total 100.0 percent due to rounding.

Actual April 1 household members were 45.8 percent of all respondents, but 89.6 percent of occupied housing units. Information was collected by a proxy respondent for more than half of all the UE housing units – either someone who moved in after April 1 or a neighbor or other proxy (landlord, mail carrier, etc.). The majority of the UE workload was found to be either vacant or deletes (shown in Table 15), which accounts for more than half of all UE interviews (52.6 percent) being completed with a proxy.

Housing units marked for deletion had an unknown respondent in 9.4 percent of cases and reported talking with an April 1 household member 5.7 percent of the time. This could be possible for housing units marked as duplicates but otherwise is incompatible with our definitions of household members and deleted units.

5.1.1.6 Characteristics of Occupied Housing Units

The following tables will discuss characteristics of the occupied housing units that were interviewed during UE. This section will include results on occupied housing units' reported population count, answers to the undercount question, and answers to the overcount question.

Household Population Count

After an address has been classified as occupied, the next piece of information collected is the number of people that live or stay there. This is called the population count. The population count can be analyzed by looking at either:

- the preliminary population count that the respondent states at the beginning of the interview,
- the number of data-defined people (DDPs) on the form, or,
- the enumerator- reported population count in Item C of the Interview Summary (seen in Figure 3), the final population count ascertained by the end of the interview by the enumerator. That variable also captures the number of units that were reported to be occupied but had an unknown population count (POP 99 cases).

The preliminary population count could undercount people if the respondent remembered to count some people as the interview progressed. The number of DDPs could also undercount people if respondents did not want to provide the demographic information necessary for an individual to be data-defined.

Table 30 shows the distribution of population count within occupied housing units contacted during UE using both the enumerator-reported population count and the number of data-defined people. The number of data-defined persons and enumerator-reported population count are reported because they are the two population counts that are used for assigning a housing unit status.

Table 30: Population Count of Housing Units found to be Occupied During UE

	Enumerator-Reported		Data-defined People	
Population Count	**Number of Housing Units**	**Percent[38]**	**Number of Housing Units**	**Percent[39]**
0	251	<0.1%	36,253	5.0%
1	164,656	22.8%	160,651	22.2%
2	232,116	32.1%	227,156	31.4%
3	100,112	13.9%	98,698	13.7%
4	88,677	12.3%	86,937	12.0%
5	57,710	8.0%	61,131	8.5%
6	27,159	3.8%	24,070	3.3%
7	14,382	2.0%	13,250	1.8%
8	7,307	1.0%	6,376	0.9%
9	3,676	0.5%	3,589	0.5%
10	2,057	0.3%	1,960	0.3%
11 – 15	2,356	0.3%	2,400	0.3%
16 – 20	165	<0.1%	165	<0.1%
21 – 30	392	0.1%	16	<0.1%
31 – 40	567	0.1%	0	0.0%
41 – 49	54	<0.1%	2	<0.1%
50 – 97	1,115	0.2%	N/A[40]	N/A
98 (Delete)	11	<0.1%	N/A	N/A
99 (Unknown)	19,292	2.7%	N/A	N/A
Missing	599	0.1%	N/A	N/A
Total Occupied Housing Units	**722,654**	**100.0%**	**722,654**	**100.0%**

Source: DRF

There are some enumerator-reported population count values in Table 30 that do not make sense for occupied units: population counts of zero, population counts of 50 or higher (the census had set 49 as the maximum allowable number of people to report living within a housing unit), or population counts of 98 (which indicated that the housing unit should be deleted). On a paper questionnaire, it is possible to have conflicting pieces of information due to enumerator or data capture errors. We report here the data as captured from the questionnaire.

The right column in Table 30 shows that 5.0 percent of occupied housing units in UE did not provide enough information about individuals for anyone to be flagged as a data-defined person. There were also 19,292 cases in UE where the enumerator reported the population count to be unknown. Table 31 reports how many of those cases were also marked as refusals.

[38] This column does not total 100.0 percent due to rounding.

[39] This column does not total 100.0 percent due to rounding.

[40] Not Applicable

Table 31: Unknown Population Counts for UE Occupied Housing Units

Occupied Type	Number of Housing Units	Percent
Refusals	6,214	32.2%
Not Refusals	13,078	67.8%
Unknown Population Counts	**19,292**	**100.0%**

Source: DRF

Over two-thirds of the cases (67.8 percent) with an enumerator-reported unknown population count were not marked as refusals. This indicates that the majority of the time that the enumerator was unable to identify a population count it was not due to respondents refusing to participate but was due to other unknown reasons.

Table 32 shows the number of continuation forms used to enumerate people at each address in UE. The parent EQ only had space to roster five people in a household. If more than five people lived at an address, then enumerators had to use a continuation form. Continuation forms did not have any of the beginning or concluding questions printed on them; they only collected person-level data for up to five persons on each continuation form.

Table 32: Number of Continuation Forms used at Occupied Addresses During UE

Number of Continuation Forms	Number of Housing Units	Percent[41]
0	670,556	92.8%
1	49,459	6.8%
2	2,451	0.3%
3	167	<0.1%
4	18	<0.1%
5	1	<0.1%
6	0	0.0%
7	0	0.0%
8	2	<0.1%
Total Occupied Housing Units	**722,654**	**100.0%**

Source: DRF

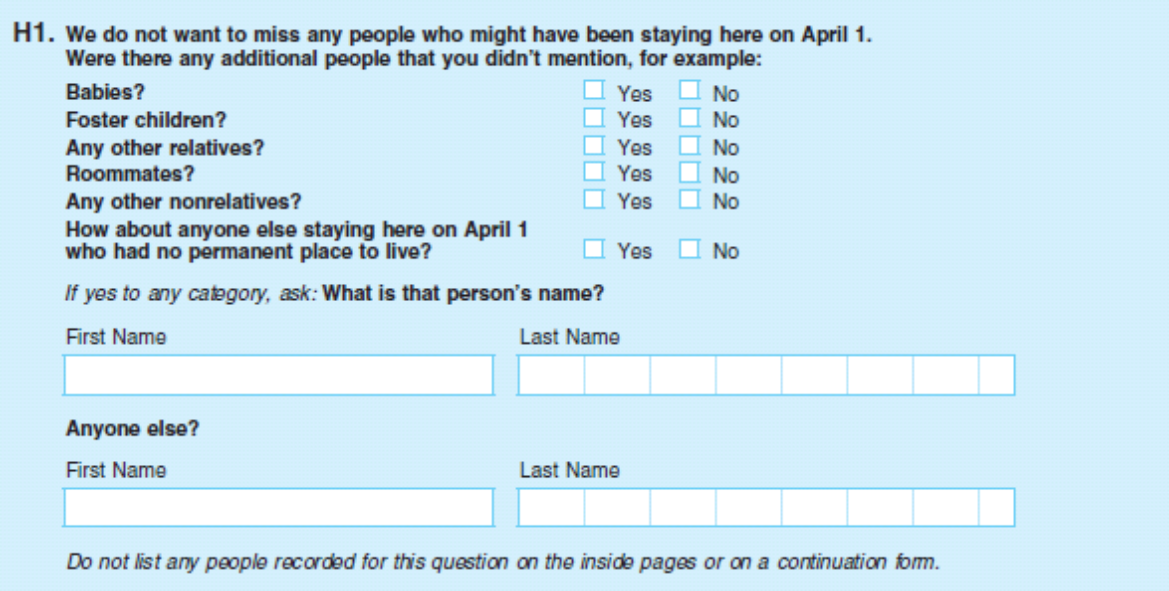
Table 32 shows that the majority of housing units enumerated in UE did not utilize a continuation form. Housing units with six to 10 people enumerated would have required one continuation form. Almost seven percent of the occupied housing units required exactly one continuation form.

Undercount

After the household roster and demographic information were collected during the UE interview, the enumerator asked a series of questions that probed if anyone else might have been staying at the address on Census Day (Figure 9).

[41] This column does not total 100.0 percent due to rounding.

Figure 9: Undercount Question Section of the EQ



These questions are called undercount questions, because they attempt to identify housing units that might not have a complete roster.

Table 33 shows the frequency that each probe was marked with an affirmative answer, including one row for housing units that said 'Yes' to more than one of the probes.

Table 33: Distribution of Answers to the Undercount Probes at Occupied UE Housing Units

Undercount Category	Number of Housing Units	Percent
Only 'No' category marked	664,615	92.0%
At least one category marked	10,088	1.4%
Babies only	*1,125*	*0.2%*
Foster children only	*176*	*<0.1%*
Any other relatives only	*5,404*	*0.7%*
Roommates only	*624*	*0.1%*
Any other nonrelatives only	*1,011*	*0.1%*
Anyone else staying on April 1 who had no permanent place to live only	*1,152*	*0.2%*
Multiple categories marked	*596*	*0.1%*
Missing (All boxes blank)	47,951	6.6%
Total Occupied Housing Units	**722,654**	**100.0%**

Source: DRF

Table 33 shows that the most successful probe was for "other relatives," which 0.7 percent of occupied housing units answered affirmatively. At least one undercount category was marked in 1.4 percent of UE interviews with occupied housing units. None of the undercount category boxes were marked in 6.6 percent of the interviews.

If the respondent answered 'yes' to any of the probes, the UE enumerator was to collect a maximum of two names for the people who were possibly undercounted, as shown in Figure 9. The enumerator was not supposed to open the questionnaire and add these individuals to the previously-collected household roster. Instead, a follow-up telephone call to clarify the household roster was made to eligible housing units as part of the "Coverage Follow-up Operation (Kostanich 2009)".

For all occupied housing units that gave a positive answer to an undercount category,
Table 34 shows how often the name fields were used at the end of the undercount question. For this assessment, the name fields were not inspected for validity; any entry would have been captured as a valid name in the following tables.

Table 34: Number of Undercount Names Reported when any Undercount Category Marked in UE Occupied Housing Units

Total Number of Names	**Total**	**Percent**
Zero Names	527	5.2%
One Name	7,477	74.1%
Two Names	2,084	20.7%
Total Occupied Housing Units with Category Selected	**10,088**	**100.0%**

Source: DRF and AUX

Table 34 shows that two names were provided for 20.7 percent of the housing units that marked an undercount category, while no names were provided at 5.2 percent of the housing units. One name was provided 74.1 percent of the time.

Table 35 shows how often a name was provided to the enumerator for each specific undercount category.

Table 35: Number of Undercount Names Reported for Specific Undercount Category Marked in UE Occupied Housing Units

Undercount Category with Number of Names	Total	Percent[42]
Babies only		
Zero Names	160	14.2%
One Name	778	69.2%
Two Names	187	16.6%
Total	**1,125**	**100.0%**
Foster children only		
Zero Names	31	17.6%
One Name	97	55.1%
Two Names	48	27.3%
Total	**176**	**100.0%**
Any other relatives only		
Zero Names	115	2.1%
One Name	4,151	76.8%
Two Names	1,138	21.1%
Total	**5,404**	**100.0%**
Roommates only		
Zero Names	59	9.5%
One Name	523	83.8%
Two Names	42	6.7%
Total	**624**	**100.0%**
Any other nonrelatives only		
Zero Names	53	5.2%
One Name	846	83.7%
Two Names	112	11.1%
Total	**1,011**	**100.0%**
Anyone else only		
Zero Names	37	3.2%
One Name	966	83.9%
Two Names	149	12.9%
Total	**1,152**	**100.0%**
Multiple		
Zero Names	72	12.1%
One Name	116	19.5%
Two Names	408	68.5%
Total	**596**	**100.0%**
None[43]		
Zero Names	711,721	99.9%
One Name	717	0.1%
Two Names	128	<0.1%
Total	**712,566**	**100.0%**

Source: DRF and AUX

[42] Some totals do not equal 100.0 percent due to rounding.

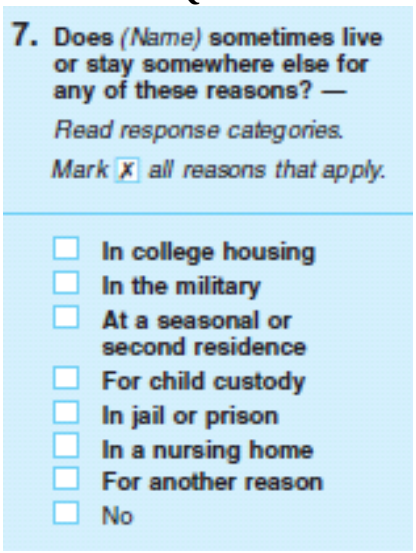
[43]These numbers include both rows "Missing" and "Only 'No' category marked" from Table 33.

In Table 35, the "other relatives" category could be considered the most successful probe since only 2.1 percent of people who answered did not provide a name. Respondents who indicated a foster child might have been undercounted were the least likely to provide a name, 17.6 percent of the time. Respondents who indicated multiple categories of people might have been undercounted were the most likely to provide two names, 68.5 percent of the time. The bottom of the table shows that there were also some housing units that did not mark an undercount category but provided at least one name. As mentioned earlier however, the name fields were not inspected for validity.

Overcount

The overcount question was asked for every person rostered on the EQ. It was the last person-level question and is shown in Figure 10.

Figure 10: Overcount Question Section of the EQ



Results of the overcount question are shown in Table 36. The overcount question seeks to identify if a person might have been counted by the census at an additional location. To clarify these living situations, follow-up contacts were made in the Coverage Follow-up Operation to housing units that met eligibility criteria (Kostanich, 2009). The universe in Table 36 is comprised of each data-defined person in an occupied housing unit. There were 1,936,873 such people captured during UE.

Table 36: Overcount Category for Data-defined People in UE Occupied Housing units

Overcount Category	Number of People	Percent
None	1,866,479	96.4%
At least one category marked	70,394	3.6%
College Housing only	6,513	0.3%
Military only	2,235	0.1%
Seasonal/Second Home only	34,970	1.8%
Child Custody only	9,562	0.5%
Jail or Prison only	846	<0.1%
Nursing Home only	568	<0.1%
Another Reason only	14,502	0.7%
Multiple Categories	1,198	0.1%
Total People in Occupied Housing Units	**1,936,873**	**100.0%**

Source: DRF

The vast majority of people (96.4 percent) did not indicate they lived or stayed anywhere else besides the UE address. The most common positive reply to the overcount question was for a seasonal or second home, which described 1.8 percent of people. An additional 0.5 percent of people indicated somebody stayed elsewhere for child custody and 0.7 percent stayed elsewhere for another undefined reason.

5.1.1.7 Standard Demographic Tables

There were 1,936,873 data-defined persons included on 722,654 UE forms for occupied housing units in the 2010 Census. This section will present the demographic characteristics for these persons on the UE form.

Table 37 gives UE person demographic characteristics: age, Hispanic origin, race, relationship to person 1 on the EQ, and sex. Age was calculated based on the date of birth provided; if no date of birth was provided then the write-in age was used. Age was calculated only if the date of birth fell within valid date ranges. Similarly, the calculated age or write-in age was used only if it fell within valid age ranges; otherwise, it was considered missing.

Table 37 also gives the distribution of tenure responses for housing units included in the UE operation.

Because the demographic data used in this assessment are unedited, direct comparisons with published 2010 Census results are not possible. These tables include a row for people with missing values for the specific characteristic. The data in published census reports have undergone editing and imputation, and therefore will have no missing values.

Table 37: Standard Assessment Demographic Table for UE Interviews

Demographic Item	Number	Percent
Age	**1,936,873**	**100.0%**[44]
Under 5 years	135,900	7.0%
5 to 9 years	134,893	7.0%
10 to 14 years	136,409	7.0%
15 to 19 years	137,669	7.1%
20 to 24 years	106,291	5.5%
25 to 29 years	101,373	5.2%
30 to 34 years	96,653	5.0%
35 to 39 years	100,625	5.2%
40 to 44 years	105,856	5.5%
45 to 49 years	121,592	6.3%
50 to 54 years	122,798	6.3%
55 to 59 years	114,088	5.9%
60 to 64 years	102,044	5.3%
65 years and over	241,450	12.5%
Missing	179,232	9.3%
Hispanic Origin	**1,936,873**	**100.0%**[45]
Not Hispanic or Latino checkbox only	1,341,392	69.3%
Mexican checkbox only	472,339	24.4%
Puerto Rican checkbox only	4,778	0.3%
Cuban checkbox only	7,917	0.4%
Another Hispanic checkbox only	13,002	0.7%
Multiple checkboxes	1,166	0.1%
Both Checkbox and Write-in	55,670	2.9%
Write-in Only	3,024	0.2%
Missing	37,585	1.9%
Demographic Item	**Number**	**Percent**
Race	**1,936,873**	**100.0%**[46]
White checkbox alone	1,267,786	65.5%
Black or African American checkbox alone	17,688	0.9%
American Indian and Alaska Native checkbox alone	11,133	0.6%
Asian Indian checkbox alone	1,670	0.1%
Chinese checkbox alone	1,471	0.1%
Filipino checkbox alone	3,202	0.2%
Japanese checkbox alone	702	<0.1%
Korean checkbox alone	780	<0.1%
Vietnamese checkbox alone	591	<0.1%
Other Asian checkbox alone	40	<0.1%

[44] This column does not total 100.0 percent due to rounding.

[45] This column does not total 100.0 percent due to rounding.

[46] This column does not total 100.0 percent due to rounding.

Native Hawaiian checkbox alone	296	<0.1%
Guamanian or Chamorro checkbox alone	328	<0.1%
Samoan checkbox alone	110	<0.1%
Other Pacific Islander checkbox alone	26	<0.1%
Some Other Race checkbox alone	3,751	0.2%
Multiple checkboxes	11,172	0.6%
Both Checkbox and Write-in	571,701	29.5%
Write-in Only	6,816	0.4%
Missing	37,610	1.9%
Relationship Status to Householder (Person 1)	**1,936,873**	**100.0**%
Householder	685,835	35.4%
Husband or Wife of Householder	343,578	17.7%
Biological Son or Daughter of Householder	556,252	28.7%
Adopted Son or Daughter of Householder	11,186	0.6%
Stepson or Stepdaughter of Householder	24,453	1.3%
Brother or Sister of Householder	24,637	1.3%
Father or Mother of Householder	23,533	1.2%
Grandchild of Householder	90,307	4.7%
Parent-in-law of Householder	4,888	0.3%
Son-in-law or Daughter-in-law of Householder	16,353	0.8%
Other Relative	39,883	2.1%
Roomer or Boarder	5,732	0.3%
Housemate or Roommate	19,636	1.0%
Unmarried Partner	47,200	2.4%
Other Nonrelative	23,671	1.2%
Two or more relationships	1,820	0.1%
Missing	17,909	0.9%

Demographic Item	Number	Percent
Sex	**1,936,873**	**100.0**%
Male	952,347	49.2%
Female	962,465	49.7%
Both	546	<0.1%
Missing	21,515	1.1%
Tenure	**722,654**	**100.0**%
Owned with a mortgage or a loan	229,177	31.7%
Owned without a mortgage or a loan	251,382	34.8%
Rented	162,167	22.4%
Occupied without payment of rent	19,265	2.7%
Multiple	429	0.1%
Missing	60,234	8.3%

Source: DRF

These distributions may vary across different 2010 Census operations due to differences in corresponding populations and procedures.

5.1.1.8 Housing Units Added to the Workload

The following section discusses housing units that were not part of an enumerators' assigned work but were either visited or discussed during the course of an interview, as described below. In Table 14, we noted 4,396 cases were removed from the universe that was the basis for all previous UE analysis. Those cases were added housing units that did not have enough address information to be geocoded and assigned a MAFID so were not eligible for inclusion in the 2010 Census. Since they represent work done by enumerators however, they are included in this section initially and delineated again in Table 40.

UE enumerators visited housing units in their assignment areas using addresses on the Master Address File. Each enumerator received an address list that contained all housing units in an assignment area. However, it was possible for enumerators to discover housing units that were not on the assignment list. These might have been recently constructed housing units, or hard to locate units like basement apartments. If an enumerator discovered a housing unit that was not on their assignment list, they added the housing unit address to their address list and enumerated it with an EQ. These are the only type of cases that the Field Division and PBOCS identified as adds during UE.

However, the decennial census recognizes a second type of housing units added to the workload that were the result of complex living situations. In cases where a respondent moved in after Census Day (In-movers) or where a whole household had a usual home elsewhere (WHUHE), the enumerator could have completed an EQ for the housing unit where the respondent lived on April 1. These housing units were not added to an enumerator's assignment list so they were not considered to be 'adds' by the Field Division. However, since they created an additional EQ with a handwritten address that needed to be geocoded, they were considered potentially added housing units, (in addition to the accepted adds mentioned above) and they will be included in

the discussion in this section. These potentially added housing units could already exist in the 2010 Census housing unit universe.

5.1.1.9 Characteristics of Added Housing Units

Enumerators may encounter atypical situations while in the field. One of the things they are trained to handle but do not encounter very often is the need to add a housing unit to their workload. There are two reasons why an enumerator might have to add a housing unit, as stated in section 5.1.1.8.

- The first reason involves respondent-provided adds. These could either be In-mover cases or WHUHE cases. Housing units that were enumerated for one of these two living situations are called Type A cases.

- The second reason for adding a housing unit was if an enumerator observed or was told about a housing unit that was missing from their address binder. These housing units, which result from an enumerator identifying a housing unit that is visibly in their block but not on the printed address list of their assignment area, are called Type C cases.[47]

The type of add was an important factor in how the add was treated by HQ processing. Type A cases were supposed to have at least one person listed at the address to be processed, since by nature they should be occupied housing units. This was determined if one person at the housing unit had a value of one for the variable Computed Person Number (PNC). Even though Type A cases were to be processed only if at least one person was counted on the form, there were some Type A cases without a person record that were incorrectly included for processing. The variable PNC is used in the subsequent tables to differentiate the Type A cases.

Type C cases were processed regardless of how many people were listed on the added EQ. Table 38 shows the number of added housing units in UE for each type.

Table 38: Type of Potentially Added Housing Units Found in UE

Add Type	Number of Housing Units	Percent
Type A (Computed Person Number=1) Total	1,275	1.8%
Type A (Computed Person Number=0) Total	2,056	2.9%
Type C	67,144	95.3%
Total Cases	**70,475**	**100.0%**

Source: DRF

The majority of added housing units in UE (95.3 percent) were Type C cases. There were just over 2,000 Type A cases that were incorrectly included for processing, more than the 1,275 Type A cases that were correctly included. The added number of housing units in Table 38 differs

[47] There were also Type B cases in the census, which came from Be Counted forms where the checkbox had been marked to indicate the respondent had no address on April 1. Case Types A, B, and C are assigned during Non-ID processing. For further details on this, refer to the 2010 Census Non-ID Processing Assessment.

from the figures reported in section 5.1.1.1. This discrepancy is due to the use of different data sources. The number of added units in Table 38 comes from the DRF while the results in Section 5.1.1.1 were based on the MAF extract. The DRF results do not take into consideration if the UE return was included in the final 2010 Census universe and include every data captured questionnaire from the UE operation. The MAF extract is only the final 2010 Census universe of housing units and does not include every UE Added case. Type A added cases also might not have been included in the MAF extract numbers if they were not located in an UE TEA.

Type A cases can also be further grouped into two living situations, as described earlier in this section. One living situation is for people who have a UHE; the second living situation is for people who moved since Census day but should be considered the living quarters occupants for purposes of the Decennial Census tabulation. These two classifications were supposed to have been indicated by the enumerator on the back side of the EQ, in boxes labeled UHE and MOV. The presence of a mark in either of those boxes was necessary to be classified as Type A for this analysis. Table 39 shows the number of Type A cases that fit each description.

Table 39: Frequency of Living Situations Identified for Type A Cases in UE

	Type A with Computed Person Number=1		Type A with Computed Person Number=0	
Type A Living Situations	**Number**	**Percent**	**Number**	**Percent**
UHE	841	66.0%	1,992	96.9%
Movers	429	33.6%	60	2.9%
Marked both UHE and Movers	5	0.4%	4	0.2%
Total Type A Adds	**1,275**	**100.0%**	**2,056**	**100.0%**

Source: DRF

For the Type A cases that listed at least person on the EQ, Table 39 shows that 66.0 percent of them were UHE. For the Type A cases without person data however, 96.9 percent were addresses reported as a UHE.

All added housing units went through a process by the Geography Division that first attempted to match the address to the existing addresses to avoid duplication then GEO attempted to geocode and then assign a MAFID to the address. Addresses with a MAFID are eligible to be in the 2010 Census. If the address information provided by the enumerator was not sufficient for Geography Division to identify a geocode (state, county and census block must be identifiable), then it was not assigned a MAFID and not included on the state-level data files. Table 40 shows the frequency with which GEO was able to successfully geocode, assign MAFIDs to added housing units, and thus allocate them to a state for apportionment.

Table 40: Frequency that Added Housing Units from UE Associated with a State

Add Type	Number of Housing Units	Percent
In a State	66,079	93.8%
Not associated with a State	4,396	6.2%
Total Adds	**70,475**	**100.0%**

Source: DRF

Table 40 reports that 6.2 percent of all added housing units were not able to be placed in a state and so were not included in the final census count. Since Type C cases were physically visible to the enumerator, we assume that those cases should have a high rate of being successfully geocoded during processing. Table 41 shows the distribution of processing results by type of add.

Table 41: Frequency that Added Housing Units from UE Associated with a State, by Type

	Type A (Computed Person Number =1)		Type A (Computed Person Number =0)		Type C	
Outcome	**Number of Housing Units**	**Percent**	**Number of Housing Units**	**Percent**	**Number of Housing Units**	**Percent**
In a State	909	71.3%	1,505	73.2%	63,665	94.8%
Not associated with a State	366	28.7%	551	26.8%	3,479	5.2%
Total Adds	**1,275**	**100.0%**	**2,056**	**100.0%**	**67,144**	**100.0%**

Source: DRF

Table 41 shows that Type A cases with a valid person record were the most likely to not be associated with a state after Geography Division's processing (28.7 percent of the time). Type C addresses were not associated with a state in 5.2 percent of the cases. Since the enumerator is able to collect information on the block number for Type C cases it is more likely to be associated with a state than Type A cases where an enumerator is unable to collect that information.

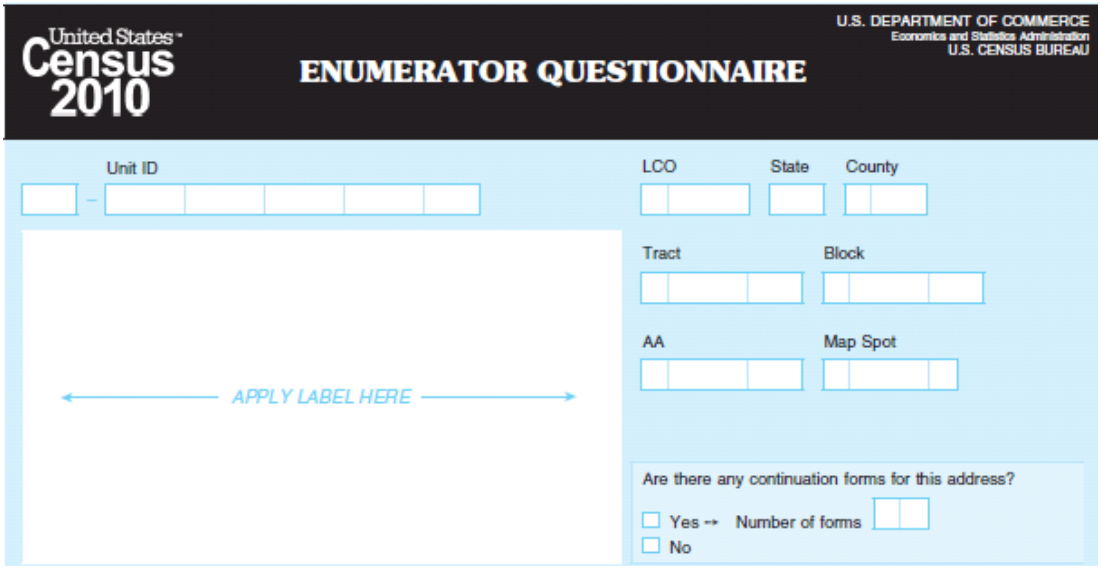
Geography of Potentially Added Housing Units

The address information necessary for geocoding was always the same for Type A and Type C cases (State, County, and Block). However, for Type A cases, the only information that enumerators could provide GEO about the added housing unit was the standard address information (street name, city, state), since the respondent was discussing their previous address or other address that might have been in another state. This information had to be complete enough for GEO to identify a county and block during processing. The enumerator would not have known the LCO, County Code, Tract Code, or Block Code for those addresses. For Type C cases however, the enumerator was expected to provide the information to be geocoded since the added housing unit should have been in their assignment area. The state, county, and block codes were printed on the Address List Page and Add Page that enumerators received with their assignments (shown in Appendix B and Appendix C, respectively). The Type C added housing unit was expected to have the same state, county and block code as the addresses printed on their Address List Page, since the addresses would have been added while the enumerator was working an assignment in that geographic area.

Because of the differences in when enumerators collected address information and the availability of it, there were two places on an EQ where enumerators could record address information about the added housing units. First, on the front of the EQ, there were fields to be filled for a Type C Add that captured the Collection Geography - LCO, State, County, Tract,

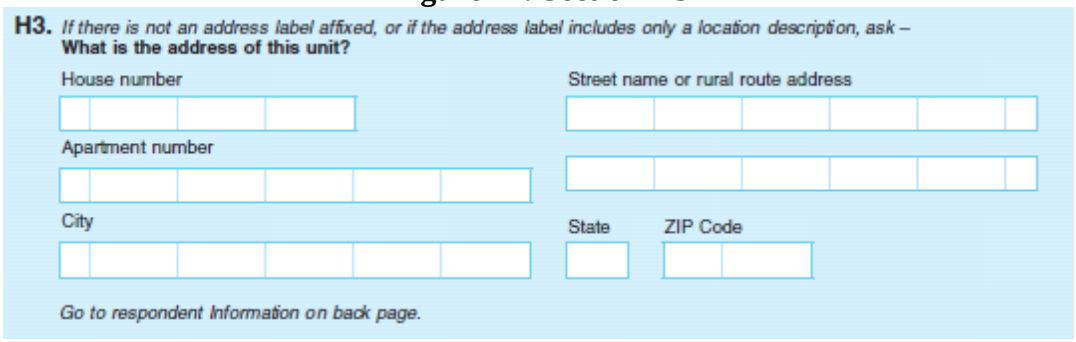
Block, Assignment Area (AA) and map spot. These fields are shown on the right side of Figure 11.

Figure 11: Address Field Section



Address information was captured for added housing units near the end of the questionnaire, in question H3, when the scripted interview with the respondent was ending. This was to be used with Type A (UHE) cases. The design of question H3 indicates an enumerator could collect both city-style address and rural route address information, as shown in Figure 12.

Figure 12: Section H3



However, there was no clear instruction to the Enumerator on which type of address information to collect for different situations. For instance, the enumerator should not have collected a hybrid of city-style and rural route information (i.e. a street name and rural route if the respondent had both to provide). When this did happen, it created complications for the automated address matching. GEO had to do considerable pre-processing to try to identify what type of address was collected, because the appropriate indicators (i.e., a checkbox that indicates whether the address is rural route or city-style) were not included in the questionnaire design. In the future, there should be clear instructions to the enumerator about what to do in different types of situations. Some examples of potentially difficult address situations are:

- A respondent might have indicated he or she lived at a structure that had a city-style address for emergency services but a rural route address for mailing purposes.
- A respondent could have lived in an area without posted house numbers, but there were street names, and the rural route addresses were generally used as the formal addresses.

These ambiguities led to questions about how the address information was captured, and therefore present limitations in assessing the completeness, and indirectly the quality, of the address data.

In H3, EQs collected:

- House number,
- Street name or rural route address,
- Apartment number,
- City,
- State, and
- ZIP Code

To assess if the adds can be found on the ground by an enumerator in the future, the information collected in the address fields is extremely important. Some of the address components, and combinations thereof, are critical to locate the structure on the ground. These combinations were created with guidance from the Geography Division.

Address Information of Type A Cases

For Type A cases, the address fields necessary for a complete record came only from the H3 question and were:

- House Number,
- Street Name, and
- ZIP Code.

The analysis on address information confirms only that the necessary fields were filled, but not that the data in the fields are valid and correct. Table 42 shows the address combinations for all Type A cases**.**

Table 42: Content of Address Fields for All Type A Cases from UE

	Type A with Computed Person Number=1		Type A with Computed Person Number=0	
House Number, Street Name, and ZIP Code	**Number**	**Percent**	**Number**	**Percent**
All filled	1,048	82.2%	1,064	51.8%
All blank	122	9.6%	755	36.7%
At least one field filled but not all fields filled	105	8.2%	237	11.5%
Total Type A Cases	**1,275**	**100.0%**	**2,056**	**100.0%**

Source: DRF

The Type A cases with a valid person record had complete information provided in 82.2 percent of the cases, while Type A cases without a valid person record only had complete information 51.8 percent of the time. The cases without a person record had no information written in to the three key address fields (house number, street name, and ZIP code) 36.7 percent of the time as compared to only 9.6 percent of the time when a valid person record was present.

Address Information of Type C Cases

The address fields necessary to geocode Type C cases were different from those for Type A cases. Recall that Type C cases were the added housing units that the enumerator visibly saw in front of them. For Census Bureau field staff to quickly find a Type C case in the future, it would require a combination of address fields from question H3 and address fields on the front of the EQ. The necessary fields for Type C addresses, and the place on the EQ that they come from, are:

- House Number (H3), (this could have also contained rural address data)
- Street Name (H3),
- Block (EQ front),
- County (EQ front), and
- State (EQ front)

The next table shows the number of Type C cases with these address fields filled. Table 43 reports the completeness of address information collected on all stateside Type C cases.

Table 43: Content of Address Fields for All Type C Cases from UE

House Number, Street Name, Block, County, and State	Number	Percent[48]
All filled	39,720	59.2%
All blank	389	0.6%
At least one field filled but not all fields filled	27,035	40.3%
Total Type C Cases	**67,144**	**100.0%**

Source: DRF

[48] This column does not total 100.0 percent due to rounding.

Table 43 reports that 59.2 percent of Type C cases had all five of the address fields filled. Only 0.6 percent were entirely blank.

5.1.2 Cost, Staffing, and Production Rates

5.1.2.1 Summary of the UE Field Operational Costs

The field costs for UE were 50.8 percent lower than expected. The operation ran under budget by $45,365,759 due to the following factors:

- Higher than expected production rate,
- Lower than expected mileage per case,
- Lower CLA cost than budgeted, and
- Lower training costs than budgeted.

Higher Than Expected Production Rate
The budgeted production rate was 0.73 cases per hour; however, we achieved a production rate of 1.17 cases per hour.[49] Attaining this production rate was the main contributor to our costs being under budget. Improved targeted recruiting and work assignment delineation may have led to increased enumerator productivity. Additionally, the operation had a larger than expected pool of qualified applicants, and the enumeration of larger than expected resorts. The latter contained the seasonal vacants which required fewer personal visits to complete.

Lower Than Expected Mileage per Case
With respect to the mileage, we budgeted 19.3 miles per case; however, on average, enumerators only traveled 7.9 miles per case. Just as with the production rate, we believe that the lower miles per case may have been in part because of improved targeted recruiting and work assignment delineation. We believe we were able to hire more local enumerators who may not have had to travel as far to complete their assigned work.

Lower CLA Costs than Budgeted
The actual CLA fieldwork cost was 75.4 percent of its budget. We attribute part of this underspending to be a result of employing only 51.3 percent of the budgeted number of CLAs.

Lower Training Costs than Budgeted
Cost savings achieved in training also contributed to the budget surplus. We budgeted $11,420,501 for enumerator training. However, the actual training costs were $6,993,106.

Table 44 depicts the budgeted and actual UE workload and costs by four cost factors: production salary, training salary, cost of mileage, and miscellaneous cost. The miscellaneous cost includes the cost of lodging, per diem, and telephone calls. The table also shows the percent of budget used for each cost factor. The percent of budget used is the actual cost divided by the budgeted

[49] The production rate reflects the average number of cases completed per hour. We calculate it dividing the total workload by the total enumerator production hours worked.

cost for each individual cost factor. In addition, the table shows each individual cost factor as a percentage of the actual total UE cost of $44,018,284.

Table 44: Summary of UE Field Operation Costs

	Budget	Actual	Percent of Budget Used	Percent of Actual Total Cost
Total	**$89,384,043**	**$44,018,284**	**49.3%**	**100.0%**[50]
Workload	1,497,514	1,463,283	--	--
Production Salary	$53,445,656	$28,125,121	52.6%	63.9%
Training Salary	$11,420,501	$6,993,106	61.2%	15.9%
Mileage Cost	$24,165,508	$8,342,122	34.5%	19.0%
Miscellaneous[51]	$352,378	$557,935	158.3%	1.3%

Source: DMD C&P

Most of the UE cost factors were under budget, however, the largest contributor was production salary, where we spent 52.6 percent of the production salary budget. Mileage cost was the next significant contributor with almost 65 percent of its budget going unspent. Training salary contributed to the lower than expected cost, although to a lesser degree, with 61.2 percent of the budget spent. The largest discrepancies between the budgeted and actual costs exists in the mileage and miscellaneous categories, where the percent of the budget used was 34.5 percent and 158.3 percent respectively. At slightly over 1 percent of the total cost, the overspending in miscellaneous expenses (158.3 percent) had little impact on the overall UEO budget.

Production salary was the largest category of spending accounting for 63.9 percent of the total costs. Despite the fact that the mileage costs were only 19.0 percent of the total operational costs, the large discrepancy between budgeted and actual mileage costs contributed significantly to the overall budget surplus.

5.1.2.2 UE Cost per Case

The actual cost per case was almost 50 percent less than planned. The total cost per case was budgeted at $59.69; however, the actual was $30.08.

5.1.2.3 UE Cases per Hour and Miles per Case

We can deduce from Table 45 that the cost savings in enumerator production hours and miles cost was a result of enumerators working fewer hours and traveling fewer miles than budgeted per case. Table 45 portrays the average number of cases worked per hour and average miles

[50] Due to rounding, the sum of the individual cost factor percentages is 99.9 percent.

[51] Miscellaneous cost includes lodging, per diem, and telephone calls.

driven per case. The variance in the following tables is the difference between the budgeted and actual variables. The percent variance is the difference between the actual and budget divided by the budget.

Table 45: UE Cases per Hour and Miles per Case

	Budgeted	Actual	Percent Variance[52]
Cases Per Hour	**0.73**	**1.17**	**-60.66%**
Miles Per Case	**19.31**	**7.85**	**59.35%**

Source: DMD C&P

According to the budget, we expected enumerators to work 0.73 cases per hour; however, the actual cases per hour worked were higher at 1.17. The miles per case budgeted were 19.31; however, our enumerators traveled an average of 7.85 miles per case.

5.1.2.4 UE Variance by Position Type

To analyze the cost variance, we categorized the variance by position type with separate category for miscellaneous charges not associated with the four field positions. (See Figure 2 in Section 2.4 for the hierarchy of field staff.) Table 46 depicts the dollar and percent variance by position type, and the variance by position type as a percentage of the Total UE variance.

Table 46: UE Variance by Position Type

Position Type	Variance	Percent Variance of Position Type Budget	Percent of Total Variance
Total	**$45,365,759**	**50.8%**	**100.0%[53]**
Enumerator	$28,272,327	48.5%	62.3%
Crew leader	$4,995,097	93.4%	11.0%
Crew leader Assistant	$11,753,375	75.4%	25.9%
Field Operations Supervisor	$550,517	21.6%	1.2%
Miscellaneous	-$205,557	-58.3%	-0.5%

Source: DMD C&P

The total UE cost variance was $45,365,759 or 50.8 percent of the total UE budget. The largest variances in terms of dollars and percent occurred in the enumerator and CLA costs. The enumerator cost variance is $28,272,327 or 48.5 percent of the enumerator budget; the CLA cost variance was $11,753,375 or 75.4 percent of the CLA budget. The enumerator and CLA

[52] We calculated the percent variance using unrounded numbers; they are slightly different from the percentage derived using the rounded budgeted and actual numbers in Table 44.

[53] Due to rounding, the sum of the individual cost factor percentages is 99.9 percent .

positions account for 62.3 percent and 25.9 percent of the total variance respectively. The sections that follow contain more information on the cost factors by position type.

5.1.2.5 UE Variance by Cost Factor

The cost factors that significantly contributed to the UE total cost variance of 50.8 percent were the funding budgeted for training, salary, and mileage. We grouped the amount of money budgeted and spent by the four different position types: enumerator, CLA, CL, and FOS. Table 47 shows the dollar and percent variances by cost factor and further by employee type and miscellaneous costs. In addition, the table also shows each variance as a percent of the UE total cost variance.

Table 47: UE Variance by Cost Factor and Position Type

Cost Factor	Variance	Percent Variance of Cost Factor Budget	Percent of Total UE Cost Variance
Total	**$45,365,759**[54]	**50.8%**[55]	**100.0%**[56]
Total Production Salary Cost	**$25,320,535**	**47.4%**	**55.8%**
Enumerator	$14,184,691	43.8%	31.3%
CLA	$7,319,675	71.5%	16.1%
CL	$3,381,166	37.8%	7.5%
FOS	$435,003	23.2%	1.0%
Total Training Salary Cost	**$4,427,395**	**38.8%**	**9.8%**
Enumerator	$3,993,261	39.9%	8.8%
CLA	$308,460	79.9%	0.7%
CL	$115,901	13.0%	0.3%
FOS	$9,773	8.1%	<0.1%
Total Mileage Cost	**$15,823,386**	**65.5%**	**34.9%**
Enumerator	$10,094,375	63.7%	22.3%
CLA	$4,125.240	83.2%	9.1%
CL	$1,498,030	53.3%	3.3%
FOS	$105,741	19.1%	0.2%
Miscellaneous Cost	**-$205,557**	**-58.3%**	**-0.5%**

Source: DMD C&P

[54] Due to rounding, total actual costs are approximately $1 less than the sum of the individual cost factors depicted in Table 47.

[55] Due to rounding, total actual costs are approximately $1 less than the sum of the individual cost factors depicted in Table 47.

[56] Due to rounding, the sum of the individual cost factor percentages is 99.9 percent.

The most significant budget cost variances are the enumerator production salary and miles costs variables. The enumerator production salary variance comprised 43.8 percent or $14.2 million of the production salary budget cost variance. The enumerator mile budget cost variance was $10.1 million or 63.7 percent of the enumerator miles cost budget. The crew leader assistant production salary was the third largest contributing factor at $7.3 million or 71.5 percent of the production salary budget. The crew leader assistant miles cost also has a substantial variance at $4.1 million, or 83.2 percent of the CLA miles cost budget.

Production hours cost and mileage cost account for 55.8 percent and 34.9 percent of the UE total cost variance, respectively. The enumerator production salary cost variance was the largest contributing factor to the overall variance, with 31.3 percent of the UE total cost variance. The second largest contributor was the enumerator miles cost, comprising 22.3 percent of the UE total variance. The variance in CLA production salary cost accounted for 16.1 percent of the UE total cost variance.

The miscellaneous cost variance factor was not a large contributor to the UE total variance. Although miscellaneous costs had a negative cost variance of -$205,557, it only represents -0.5 percent of the UE total cost variance.

5.1.2.6 UE Production Staffing

Table 48 depicts the budgeted and actual number of field positions along with the frontloading rate and the percent variance. The table represents how many field staff worked in UE. If a person worked multiple operations, they were counted in each operation. If a person worked in multiple positions, within an operation, they were counted in the position in which they worked the most hours.

Table 48: UE Production Staffing

Position	Frontloading Rate	Number of Positions Budgeted	Number of Positions Actual	Percent Variance
Total	**--**	**20,076**	**16,962**	**25.4%**
Enumerator	50%	16,461	14,326	13.0%
CLA	0%	2,093	1, 020	51.3%
CL	25%	1,353	1,369	-1.2%
FOS	0%	169	247	46.2%

Source: DMD Cost Model and DAPPS

For UE production, we budgeted for 20,076 total field staff positions. However, we only filled 16,962 positions. The FOS position was the only position type where we required more positions than budgeted. The budget called for 169 FOS positions but 247 FOSs actually worked on UE. The most significant staffing variance was for the CLA position. Although we budgeted for 2,093 CLA positions, only 1,020 CLAs worked in UE, a variance of 51.3 percent.

5.1.3 Training

There were no debriefings conducted for UE. All training started and finished on schedule. Even though the verbatim training method has many drawbacks, it was the best-proven method available in 2010 for ensuring consistency in training.

5.1.4 Schedule

The operation started on schedule, beginning March 22. Of the 88 LCOs with UE workloads, 98.9 percent finished UE on schedule; only one LCO in Wisconsin completed the enumeration and check-in late, on June 29, 2010. This particular LCO was the largest in the nation and its workload was larger in UE (170,915 HUs) than it was in NRFU (35,069 HUs). It contained sparsely populated areas and a large population of seasonal vacants. In addition, recruiting posed some challenges.

The Census Bureau used the 2010 DMD Master Activities Schedule (MAS) to monitor and track scheduled activities related to the conduct of the population and housing census. The Cost and Progress system monitored field operations production work and provided a daily status. The MAS was created and maintained by the Decennial Census staff through a web-based version of Primavera scheduling software and included 10,875 activity lines. Of the 10,875 lines, UE and UE QC directly related to 497 (or 3.7 percent of all activities). Of the 497 activities, 52 were housed under the 'UDE'[57] Work Breakdown Structure (WBS), and the remaining 445 activities spanned all functional areas related to UDE (e.g. MTS (MAF/TIGER system), FDCA (Field Data Collection Automation), UCM (Universe Control and Management), and ASE (Assessments)).

As shown in Table 49 (below), of the finished activities, 279 activities (58.9 percent) both started and finished on time or ahead of schedule according to baseline dates.

Table 49: UE Activities that Started and Finished On Time

	Number of Activities	Percent of Activities
Activities that Started and Finished on Time or Ahead	279	58.9%
Activities that Started or Finished Late	195	41.1%
Completed UE Activities	**474**[58]	**100.0%**

Source: Master Activities Schedule

Table 50 shows the counts and percentages of activities that started and finished on time, by all activities, milestone starts, milestone finishes, and task dependent activities (all other activities that are not contingent on just a start or finish date). There were 317 (66.9 percent) activities that

[57] The UDE WBS identified the Update Enumerate Operation in the Primavera project management scheduling software.

[58] There are 497 total UE and UE QC schedule activities. The schedule lines that are not finished relate to the UEO assessment and are not reported here.

started on time or early and 322 (67.9 percent) activities that finished on time or ahead of schedule. Overall, the milestone activities, particularly the milestone finishes were less frequently on schedule than task dependent activities.

Table 50: UE Activities that Started or Finished on Time, by Activity Type

	All Activities		Milestone Starts		Milestone Finishes		Task Dependent Activities	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Activities Started on Time or Early	317	66.9%	13	51.7%	NA	NA	304	75.4%
Activities Finished on Time or Early	322	67.9%	NA	NA	24	51.1%	298	74.0%
Completed Activities	**474**	**100.0%**	**24**	**100.0%**	**47**	**100.0%**	**403**	**100.0%**

Source: Master Activities Schedule

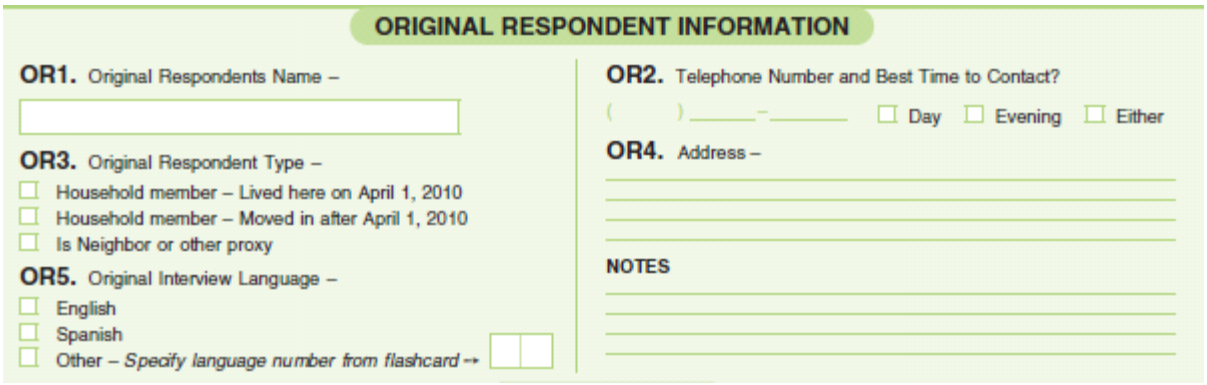
To generate the count of all activities that started on time or early, we added the milestone starts that started on time or early, the milestone finishes that finished on time or early, and the task dependent activities that started on time or early. Similarly, to calculate the count of all activities that finished on time or early, we added the milestone starts that started on time or early, the milestone finishes that finished on time or early, and the task dependent activities that finished on time or early. Tracking these activities provided understanding as to schedule development.

5.2 Update Enumerate Quality Control

A sample of UE quality control cases were selected for the UE RI operation for a second contact by a different enumerator to ensure that UE enumerators followed procedures and did not falsify data, either intentionally or unintentionally. The background to the RI operation was provided in Section 2.4.3.

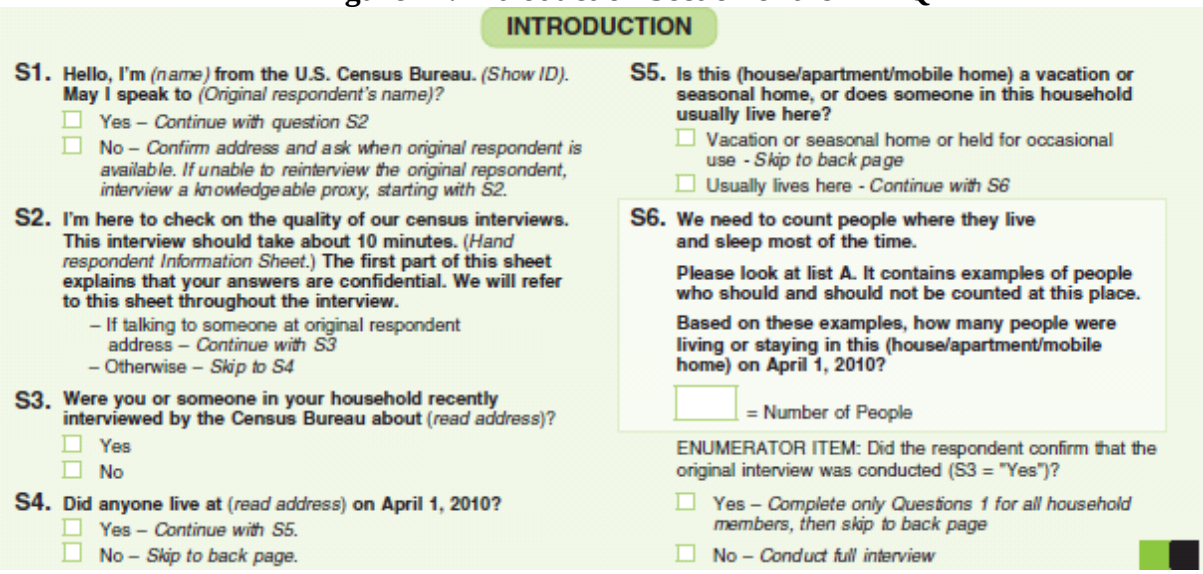
The LCO RI staff first attempted to contact RI cases by telephone. Figure 13 shows the information that was transcribed from the UE EQ onto each RI questionnaire to facilitate contact with the original respondent.

Figure 13: Original Respondent Information on the RI EQ



Cases that could not be completed by telephone were assigned to a RI field enumerator to be completed by personal visit. The RI consisted of verifying that a UE enumerator had conducted an interview, obtaining the census day status for the unit and, if occupied, the housing unit roster. The RI enumerator completed a full interview only if the respondent was not contacted or could not confirm that someone from the household completed a questionnaire with a UE enumerator. Because of the difference in purpose and procedures, the RI questionnaire had a different introduction than the UE questionnaire, as shown in Figure 14: Introduction Section of the RI EQ

Figure 14: Introduction Section of the RI EQ



INTRODUCTION

S1. **Hello, I'm** *(name)* **from the U.S. Census Bureau.** *(Show ID).* **May I speak to** *(Original respondent's name)?*

- ☐ Yes – *Continue with question S2*
- ☐ No – *Confirm address and ask when original respondent is available. If unable to reinterview the original repsondent, interview a knowledgeable proxy, starting with S2.*

S2. **I'm here to check on the quality of our census interviews. This interview should take about 10 minutes.** (*Hand respondent Information Sheet.*) **The first part of this sheet explains that your answers are confidential. We will refer to this sheet throughout the interview.**

- – If talking to someone at original respondent address – *Continue with S3*
- – Otherwise – *Skip to S4*

S3. **Were you or someone in your household recently interviewed by the Census Bureau about** (*read address*)?

- ☐ Yes
- ☐ No

S4. **Did anyone live at** (*read address*) **on April 1, 2010?**

- ☐ Yes – *Continue with S5.*
- ☐ No – *Skip to back page.*

S5. **Is this (house/apartment/mobile home) a vacation or seasonal home, or does someone in this household usually live here?**

- ☐ Vacation or seasonal home or held for occasional use - *Skip to back page*
- ☐ Usually lives here - *Continue with S6*

S6. **We need to count people where they live and sleep most of the time.**

Please look at list A. It contains examples of people who should and should not be counted at this place.

Based on these examples, how many people were living or staying in this (house/apartment/mobile home) on April 1, 2010?

☐ = Number of People

ENUMERATOR ITEM: Did the respondent confirm that the original interview was conducted (S3 = "Yes")?

- ☐ Yes – *Complete only Questions 1 for all household members, then skip to back page*
- ☐ No – *Conduct full interview*

A detailed description of the UE RI operation will be reported in the DSSD Memorandum "2010 Census Update Enumerate Reinterview Quality Profile". Section 5.2.1 contains highlights from that forthcoming report. Subsequent sections contain data similar to what was reported for UE:

- Section 5.2.1 discusses the RI workload and quality control outcomes.
- Section 5.2.2 discusses the cost, staffing, and production rates of the operation.
- Section 5.2.3 discusses the training.
- Section 5.2.4 discusses the schedule.

5.2.1 Workload and Outcomes

The following section will document results obtained from UE RI enumerators' work in the field. The first sections to be discussed will be the results found using the MaRCS data file, which describe the quality control purpose of the operation. Section 5.2.1is divided into the following sections:

- Section 5.2.1.1 discusses the Dependent Quality Control (DQC) outcomes.
- Section 5.2.1.2 discusses the Delete Verification (DV) outcomes.
- Section 5.2.1.3 discusses the outcomes of the RI quality control.
- Section 5.2.1.4 discusses the formation of the RI DRF analysis universe
- Section 5.2.1.5 discusses the housing unit status of cases worked in RI.
- Section 5.2.1.6 discusses the timing when RI interviews were completed and when they were checked-in.
- Section 5.2.1.7 discusses characteristics of RI interviews, notably key paradata results.
- Section 5.2.1.8 discusses characteristics of occupied housing units.
- Section 5.2.1.9 presents the standard demographic tables for RI.
- Section 5.2.1.10 states that no housing units were added during RI.

5.2.1.1 Dependent Quality Control

During UE DQC, every AA was expected to be canvassed with addresses and maps as needed. The UE DQC was performed on a sample of HUs within every AA using a random "start-with" and specified "take-every" number depending on AA size. Of the 32,574 AAs in UE, DQC data were received for 31,656 AAs, or 97.2 percent of all UE AAs. Of the 1,465,869 HUs listed in UE, 109,016 (7.4 percent) were checked during DQC. The budgeted amount was five percent, but the overall sample was expected to be higher because the sample size of each range of total units in the AA was five percent of the maximum size of the range. As a result, some AAs had more than five percent of the housing units sampled if that AA's size was closer to the minimum size of the range. For example, an AA of size 50 would fall into the 0-50 AA size range, which had a sample size of three, while an AA of size 51 would fall into the 55-100 AA size range, which had a sample size of five. For the AA of size 50, the actual sample size was within the expected five percent, but for the AA of size 51, the sample size was double the expected rate (10 percent).

During the DQC, the QC enumerator dependently verified the completeness and accuracy of the sample of UE HUs within the AA. The QC enumerator also determined if any errors detected on the selected UE HUs were critical or non-critical as specified on the DQC form. An AA passed the DQC if the number of critical and non-critical errors detected were less than or equal to the acceptance numbers designated for the AA size. For example, any AA with 275 or less HUs is allowed one non-critical error and zero critical errors. If an AA failed the DQC, the QC enumerator recanvassed the entire AA. Table 51 below shows the distribution of DQC results.

Table 51: DQC Results

DQC Result	Number of Assignment Areas	Percent
Pass	29,863	94.3%
Fail	1,439	4.6%
Missing	354	1.1%
Total	**31,656**	**100%**

Source: NPC Keyed Data

There were 4.6 percent of the AAs in DQC that failed the check and required a recanvass. Data were missing for 1.1 percent of AAs.

For enumerators that had at least one of their AAs fail DQC, we took a look at how often there were repeated fails. Table 52 shows the total number of enumerators that had a given number of their AAs fail DQC.

Table 52: Number of Enumerators that had a Given Amount of their AAs Fail DQC

Number of AAs Failed	Number of Enumerators	Percent
0	8,926	88.9%
At least 1	1,116	11.1%
1	994	9.9%
2	103	1.0%
3	14	0.1%
4	3	<0.1%
5	0	0.0%
6	2	<0.1%
Total	**10,042**	**100%**

Source: NPC Keyed Data

Table 52 shows that the largest number of AAs that were failed for a single enumerator was six. The majority of enumerators (88.9 percent) did not have any AAs fail DQC, while 11.1 percent of enumerators had at least one AA fail. The majority of these enumerators only had one AA fail. This analysis only includes forms that had a captured applicant ID.

Table 53 shows the frequency of Critical DQC errors keyed from the 2010 Census UE DQC form at the NPC.

Table 53: Total Number and Type of Critical DQC Errors

Type of Error	Count	Percent
Production Enumerator missed an Add that Quality Control found	506	21.5%
Production Enumerator said Exists, Quality Control Enum said Delete	874	37.1%
Production Enumerator said Delete, Quality Control Enum said Exists	978	41.5%
Total Critical Errors	**2,358**	**100.0%**

Source: 2010 Census UE Dependent Quality Control Form D-950 (UE QC)

There were 2,358 critical errors. The most common critical DQC error was when the production enumerator marked a housing unit as a type of delete, while the QC enumerator said it existed (41.5 percent). The assumption was that the QC enumerator was always right, but there were no checks on the QC enumerator's work.

Table 54 shows the frequency of non-critical DQC errors.

Table 54: Total Number and Type of Non-critical DQC Errors

Type of Error	Count	Percent
House Number Incorrect	896	26.2%
Error in Street Name on Address List Page	765	22.4%
Incorrect or Missing Unit Designation	321	9.4%
No Location Description for Address with no House Number	132	3.9%
Map Spot Error: Not Added or Not Deleted on Map	936	27.4%
Street or Road Name Not Corrected on Map	370	10.8%
Total Non-Critical Errors	**3,420**	**100.0%**

Source: NPC Keyed Data

There were 3,420 non-critical DQC errors. The two most common non-critical DQC errors were map spot errors (27.4 percent) and incorrect house numbers (26.2 percent). Errors in the street name on the Address List Page also accounted for over twenty percent (22.4 percent) of non-critical errors.

We set the allowable critical errors to achieve the lowest Average Outgoing Quality Limit (AOQL) that is practical based on the five percent sample size budgeted for the operation. The selected plan has an overall AOQL of 5.5 percent for critical errors. This is the worst possible outgoing error rate if procedures are followed, but we expected to achieve a lower rate in production.

During the 2010 UE operation, our incoming DQC critical error rate was lower than expected, at 1.6 percent. Our corresponding outgoing critical error rate after recanvassing AAs that failed the DQC was 0.2 percent, which is well below the AOQL limit. There are many possible explanations for these lower-than-expected error rates. For example, the Address Canvassing operation improved the quality of the address list used for the UE operation, which would make the UE updating work easier and less error prone. In addition, the economic situation and low staff turnover experienced during the 2010 Census led to higher quality and more experienced staff who were less likely to make errors.

5.2.1.2 Delete Verification

The Census Bureau policy is that a unit cannot be deleted from the Master Address File (MAF) unless it is marked as a delete by two different operations or two different enumerators in the same operation. The Update Enumerate Delete Verification (DV) and Final Delete Verification (FDV) components were designed to meet this requirement. If an existing address (with a MAF ID) was deleted during production UE, a QC enumerator had to verify that the unit should be deleted from the MAF. This DV was conducted in the same visit as the DQC.

If a QC enumerator deleted an existing address during DQC or recanvassing, then a different QC enumerator (or the crew leader) had to verify the delete. This "Final" DV is completed after all DQC and/or recanvassing was completed for the AA. There were a total of 81,332 deletes that went through DV and 11 that went through FDV. Table 55 below shows the distribution of DV and FDV results.

Table 55: DV and FDV Results

Type	DV		FDV	
	Number	Percent	Number	Percent
No, Do Not Delete	12,527	15.4%	3	27.3%
Yes, Delete	68,805	84.6%	8	72.7%
Total	**81,332**	**100.0%**	**11**	**100.0%**

Source: NPC Keyed Data

The majority of deletes should have been deletes. However, 15.4 percent of the DV cases were considered incorrect deletes.

When a QC enumerator marked a case as a mistaken delete during DV, the enumerator was supposed to write-in what the action code should be. We expected this to be either "Verified" or "Correction." Table 56 below shows the distribution of this write-in field. All write-ins that started with the correct letter were recoded to "Verified" or "Correction," and anything else was recoded to "Other."

Table 56: DV and FDV Recodes

Type of Recode	DV		FDV	
	Number	Percent	Number	Percent
Verify	4,182	33.4%	0	0.0%
Correction	986	7.9%	3	100.0%
Other	4,049	32.3%	0	0.0%
Missing	3,310	26.4%	0	0.0%
Total	**12,527**	**100.0%**	**3**	**100.0%**

Source: NPC Keyed Data

A large proportion of cases was coded as "Other" or "Missing". These could both be greatly reduced if we used an automated instrument or at least had checkboxes instead of a write-in box on the paper form.

5.2.1.3 Reinterview Workload and Quality Control Outcomes

The UE RI workload included a sample of eligible UE cases selected for RI through one of five classifications.

1. Random– a sample of all eligible UE cases was automatically selected for each enumerator.
2. Outlier– additional RI was automatically selected for enumerators whose work differed significantly from all work within their crew leader district.
3. Supplemental – additional RI could have been manually selected by the LCO QC staff.
4. Hard Fail – when an enumerator received a Hard Fail outcome, all eligible UE cases completed by that enumerator were selected for RI.
5. Vacant – all Housing Units with a status of Vacant–Regular were selected for RI.

Cases were ineligible for RI if any of the following were true:

- Unit Status = Demolished/burned out/cannot locate, Nonresidential, Uninhabitable or Duplicate
- Population count = 99
- Questionnaire Status = Count Only, Mover, or Usual Home Elsewhere
- Version > 1 and a previous version was already selected for RI
- The case was completed by a QC enumerator

Data were used from MaRCS to analyze the number of cases selected by RI type and their RI outcome. As stated in Section 3.2, the universe in MaRCS differs from the universe in the DRF that will be used in subsequent tables.[59]

Of the 1,465,869 UE cases in MaRCS, 1,387,564 cases (94.7 percent) were eligible for UE RI. During the UE RI operation, there were a total of 232,276 cases selected for RI. Table 57 shows the cases selected for RI by selection type.

Table 57: RI Selected by RI Type

RI Type	Number Selected	Percent
Outlier	16,913	7.3%
Random	74,932	32.3%
Supplemental	72	<0.1%
Vacant	136,913	58.9%
Hard Fail	3,446	1.5%
Total	**232,276**	**100.0%**

Source: Census MaRCS

The largest amount of RI cases were selected due to Vacant RI; Vacant RI accounted for 58.9 percent of the RI cases. The second largest RI type was Random RI, which comprised 32.3 percent of the RI workload.

Even though a total of 232,276 housing units were selected for UE RI, Census MaRCS only received data for 215,833 cases. Table 58 displays the distribution of cases received by RI type. As Table 58 shows, Census MaRCS did not receive any data for a large number of the selected RI cases. Due to substantial operational and systems issues experienced during the UE operation, there is no way to know exactly what happened with the cases for which MaRCS did

[59] The differing universes are due to several factors. One factor causing the difference is that the MaRCS UE workload includes UE Adds that were not geocoded to an address. The vintage of the MaRCS data is before the GEO received the data for geocoding added housing units to an address and the linking of duplicate addresses. The cases that were not able to be geocoded to an address were not included in the previous DRF UE workload analysis because they did not represent an actual address. If two Census IDs were linked because they were the same address, only one of those questionnaires was included in the previous analysis. The MaRCS data also include all cases with an original UE operation code. The corrections made from the operation code recode were not made to the MaRCS data. The MaRCS data also do not contain any records for the dummy returns that were created by HQ processing.

not receive data. The Outlier and Hard Fail RI cases appear to have been impacted more by the data loss than the other RI types, which is disturbing since those two RI types are most likely to represent problematic situations and/or possible falsification.

Table 58: RI Received by RI Type

RI Type	Number Received	Percent
Outlier	10,161	4.7%
Random	72,638	33.7%
Supplemental	66	<0.1%
Vacant	130,696	60.6%
Hard Fail	2,272	1.1%
Total	**215,833**	**100.0%**

Source: Census MaRCS

The proportion of Outlier RI cases received (4.7 percent) was smaller than the proportion of Outlier RI cases selected (7.3 percent).

After the UE RI cases were completed, they were matched to their corresponding UE case in Census MaRCS as explained in Section 2.4.3. An outcome was attributed to the case, based on how the RI interview data compared to the original UE interview data. There were seven possible final outcomes that an RI case could be assigned.

- Pass – the case passed RI computer matching, clerical matching at NPC, and final clerical matching and review at the LCO; the original data were verified to be consistent with the RI data; and there was no suspicion of falsification.
- Soft Fail - the LCO QC staff determined that the discrepant data were the result of unintentional enumerator error (an honest mistake) and not the result of falsification or deliberate violation of procedures.
- Hard Fail - after investigating a case, the Assistant Manager for Quality Assurance (AMQA) determined that the case showed deliberate falsification or deliberate violation of procedures by the enumerator. The Assistant Manager of Field Operations (AMFO) and/or LCO Manager agreed with this determination.
- Don't Know - Suspect (DK - Suspect) – the LCO QC staff suspected that there might have been falsification, but the outcome of the investigation was inconclusive.
- Don't Know- No Suspect (DK - No Suspect) – the LCO QC staff did not suspect falsification, but the outcome of the investigation was inconclusive.
- LCO Relief – the AMQA used this outcome to close out cases when there was not enough time to complete the investigation process. This should have been used as a last resort and only after the RCC activated this outcome for the LCO.
- RINI - RI Noninterviews

The distribution of final matching outcomes for all UE RI cases is shown in Table 59.

Table 59: UE RI Final Matching Outcomes

Matching Outcome	Number of Cases	Percent
Pass	175,247	81.2%
LCO Relief	21,845	10.1%
RI NI	13,788	6.4%
Soft Fail	2,698	1.3%
Don't Know/No Suspect	1,983	0.9%
Don't Know/Suspect	186	0.1%
Hard Fail	80	<0.1%
Other	6	<0.1%
Total	**215,833**	**100.0%**

Source: Census MaRCS

Of the 215,833 cases in UE RI, 81.2 percent of the interviews matched to the production data, meaning enumerators were following procedures. There were 80 housing units that ended up with a final matching outcome of "Hard Fail".

Additionally, each of the reasons why a case could have been sent to RI (Random RI, Supplemental, etc.) has a different distribution of outcomes, as shown in Table 60 below.

Table 60: UE RI Final Outcomes by RI Type

Outcome	Random		Vacant		Outlier		Supplemental		Hard Fail	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Pass	53,939	74.3%	114,324	87.5%	5,993	59.0%	43	65.2%	948	41.7%
Soft Fail	395	0.5%	2,237	1.7%	60	0.6%	0	0.0%	6	0.3%
Hard Fail	4	<0.1%	45	<0.1%	0	0.0%	0	0.0%	31	1.4%
Don't Know-Suspect	43	0.1%	133	0.1%	7	0.1%	2	3.0%	1	<0.1%
Don't Know- No Suspect	381	0.5%	1,522	1.2%	78	0.8%	1	1.5%	1	<0.1%
LCO Relief	11,726	16.1%	7,352	5.6%	2,160	21.3%	14	21.2%	593	26.1%
RINI	6,146	8.5%	5,081	3.9%	1,863	18.3%	6	9.1%	692	30.5%
None	4	<0.1%	2	<0.1%	0	0.0%	0	0.0%	0	0.0%
Total	**72,638**	**100.0%**	**130,696**	**100.0%**	**10,161**	**100.0%**	**66**	**100.0%**	**2,272**	**100.0%**

Source: Census MaRCS

Cases selected for reinterview through Vacant RI were the most likely to pass (87.5 percent). A large portion of cases received the LCO Relief outcome.

There were two different ways a UE RI case could have ended with a final matching outcome of "LCO Relief." The first way was when an LCO ran out of time at the close of the UE RI operation and assigned remaining cases that had not been worked were coded as "LCO Relief." The second way was when MaRCS received additional RI cases after the close of the UE RI operation. MaRCS attempted to send these cases through a computer match, and those that would normally have been deferred to NPC (and potentially to the LCO) automatically received an "LCO Relief" outcome since NPC and the LCOs were no longer working at that point. The total number of cases with a final outcome code of LCO Relief was 21,845. The distribution of LCO Relief by source is shown below. This shows that MaRCS received many cases after the close of the UE RI operation. The operational and systems issues experienced during the UE operation prevented much of the RI workload from being processed appropriately, which led to many cases not being processed until after the operation was complete.

Table 61: UE RI LCO Relief Cases

Source of LCO Relief	Number of Cases	Percent
By LCO	239	1.1%
By MaRCS	21,606	98.9%
Total	**21,845**	**100.0%**

Source: Census MaRCS

When the AMQA determined the enumerator falsified data or intentionally violated procedures, the Census MaRCS allowed the AMQA to code the case as a "Hard Fail." The LCO's AMQA was the only person who could assign a "Hard Fail" code. When a "Hard Fail" case occurred, the Census MaRCS identified the enumerator as "Hard Fail," and initiated Hard Fail RI. Hard Fail RI entailed placing all eligible cases completed by the "Hard Fail" enumerator that were not previously reinterviewed into RI. These Hard Fail RI cases were completed in the field in the same manner as other UE RI cases. Thus, all cases completed by a "Hard Fail" enumerator went to RI. All cases previously assigned to the "Hard Fail" enumerator but not yet completed were reassigned to another UE enumerator. When the UE RI operation was complete, the Census MaRCS created the Fail File, to be delivered to DSPO. The Fail File contained a list of UE cases that should be replaced by the UE RI case in 2010 Census processing because the UE RI case was of better quality. The Fail File contained the following cases:

- All Hard Fail Cases
- All Soft Fail Cases
- All Don't Know- Suspect Cases
- Don't Know- No Suspect Cases for "Hard Fail" enumerators
- LCO Relief Cases for "Hard Fail" enumerators

Table 62 shows the count of cases on the Fail File by final RI outcome.

Table 62: UE RI Fail File Cases

Matching Outcome	Number Marked	Percent
Hard Fail	80	2.2%
Soft Fail	2,698	74.7%
Don't Know/Suspect	186	5.2%
Don't Know/No Suspect	27	0.8%
LCO Relief	619	17.2%
Total	**3,610**	**100.0%**

Source: Census MaRCS

There were 3,610 UE cases listed on the fail file. There were 27 cases on the fail file flagged as "Don't Know – No Suspect" cases for Hard Fail enumerators and 619 cases flagged as LCO Relief for Hard Fail enumerators. Table 63 reports how many enumerators received a hard fail status.

Table 63: UE RI Hard Fail Enumerators

Fail Type	Number Failed	Percent
Hard Fail	32	97.0%
Non-RI Fail	1	3.0%
Total	**33**	**100.0%**

Source: Census MaRCS

There were 15,082 UE production enumerators who completed at least one interview. Table 63 shows that only 33 (or 0.2 percent of all production enumerators) were hard failed. When an enumerator was discovered falsifying data outside the RI program (usually by their UE supervisors), they were flagged as Non-RI fail. There was only one of these hard-failed enumerators. The remaining 32 enumerators found through the RI program had at least one RI case with a hard fail outcome.

5.2.1.4 Formation of the UE RI DRF Analysis Universe

The first few sections on UE RI have discussed the quality control results of RI enumerators' work. The rest of Section 5.2.1 discusses the general results of the interviews, as was done for UE interviews, though few of the UE RI interviews were retained as the definitive enumeration of a housing unit. The universe for these results came from the DRF, which identified a slightly different number of cases worked in the RI operation than the MaRCS file had identified in Section 5.2.1.3. Section 5.2.1.4 presents how the DRF universe was identified.

The top row in Table 64 is the total number of enumerator questionnaires associated with UE RI on the DRF, including multiple copies of the same questionnaire. The second row removes the multiple copies of the same questionnaire. The last row in the table removes duplicated questionnaires generated for an address that were due to rework. The universe of cases worked in UE RI from the DRF in this assessment is 218,977 unique housing units.

Table 64: UE RI Universe

UE RI Universe Characteristics	Number of Questionnaires
All Questionnaires on the DRF	239,610
Unique Questionnaires on the DRF	238,521
Unique Housing Units on the DRF	218,977

Source: DRF

5.2.1.5 UE RI Housing Unit Status

The RI EQ contained a different set of introduction questions for the enumerator to ask than the standard enumerator questionnaire had. The RI introductory questions were shown in Figure 14.

Table 65 shows the housing unit status distribution for the housing units contacted in UE RI.

Table 65: UE RI Housing Unit Status

Housing Unit Status	Number of Housing Units	Percent
Occupied	58,479	26.7%
Vacant	143,956	65.7%
Delete	6,212	2.8%
Unresolved	10,330	4.7%
Total Housing Units	**218,977**	**100.0%**

Source: DRF

Of the 218,977 housing units visited in UE RI, only 26.7 percent were found to be occupied while 65.7 percent were vacant. This makes sense given the large number of cases worked in UE RI through the vacant RI selection, as shown in Table 58. An additional 2.8 percent of UE RI cases were marked as deletes, and 4.7 percent were considered unresolved.

Table 66 reports how many UE RI cases were reported to be refusals, by housing unit status.

Table 66: UE RI Refusals

Housing Unit Status	Number of Housing Units	Number of Refusals	Refusal Percentage
Occupied	58,479	851	1.5%
Vacant	143,956	292	0.2%
Delete	6,212	30	0.5%
Unresolved	10,330	470	4.5%
Total Housing Units	**218,977**	**1,643**	**0.8%**

Source: DRF

Of the 218,977 housing units in UE RI, there were 1,643 (0.8 percent) that were marked as a refusal on the questionnaire. Of the housing units that had an unresolved status, 4.5 percent were flagged as refusals.

The following tables explore the occupied, vacant and deleted housing units in more depth.

Occupied Housing Units

The reported population count of an occupied housing unit (as captured in Item C from Figure 3) was considered valid if it was from 1 to 49, inclusive. A population count for an occupied housing unit was considered invalid if it was either blank, zero, or ranged from 50 to 98. A value of 99 indicated the population count was unknown to the enumerator. Table 67 shows how often each of these three types of population counts was recorded in conjunction with a reported refusal.

Table 67: Types of Refusals for UE RI Occupied Housing Units

Type of Population Count	Number of Housing Units	Percent
Valid population count	201	23.6%
Invalid population count	38	4.5%
Unknown population count	612	71.9%
Occupied Refusals	**851**	**100.0%**

Source: DRF

Table 67 shows that over seventy percent of the refusals (71.9 percent) at occupied housing units in UE RI had an unknown population count.

Vacant Housing Units

Table 65 showed that 143,956 of the housing units in UE RI were identified as vacant. There are two categories of vacant housing units: regular vacant and UHE vacant. Table 68 describes the distribution of vacant housing units between those two categories.

Table 68: Types of UE RI Vacant Housing Units

Vacant Type	Number of Housing Units	Percent
Regular	69,995	48.6%
Usual Home Elsewhere (UHE)	73,653	51.2%
Unknown	308	0.2%
Total Vacant Housing Units	**143,956**	**100.0%**

Source: DRF

Of the 143,956 housing units identified as vacant, 51.2 percent were classified as UHEs, while 48.6 percent were classified as regular vacants.

Deleted Housing Units

Table 65 showed that 6,212 housing units were marked to be deleted during UE RI. Table 69 shows the distribution of deletes in UE RI.

Table 69: Types of UE RI Deleted Housing Units

Delete Type	Number of Housing Units	Percent
Demolished/Burned Out/Cannot Locate	1,776	28.6%
Nonresidential	1,683	27.1%
Empty Mobile Home/Trailer Site	602	9.7%
Uninhabitable	1,895	30.5%
Duplicate	211	3.4%
Delete Unknown	45	0.7%
Total Deleted Housing Units	**6,212**	**100.0%**

Source: DRF

The largest number of deletes (30.5 percent) were classified as housing units that were uninhabitable, but there were almost as many marked as "demolished/burned out/cannot locate" (28.6 percent) and nonresidential (27.1 percent). The cases classified as duplicates are noteworthy since the enumerators in RI did not have an address list with which to compare addresses.

5.2.1.6 Interview Completion

This section will discuss when UE RI enumerators completed interviews in the field with respondents. Given the difficulties with PBOCS (discussed in Section 5.5), all data in this section come from the data-captured EQs. There are no reliable data from PBOCS to report when EQs were checked-in or how long it took LCOs to finish their UE assignments.

The UE RI operation was officially scheduled to begin on March 29, 2010, one week after the UE operation. The following tables and graphs show the progress of UE RI cases through spring and summer 2010. These results use the dates reported by the enumerator or crew leader in the Certification section of the EQ, which should best reflect the actual date that an interview was completed. Figure 5 showed the Certification section of the production EQ, which was the same as that on the RI EQ.

Table 70: UE RI Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		55	<0.1%	<0.1%
3/07 - 3/13		67	<0.1%	0.1%
3/14 - 3/20		58	<0.1%	0.1%
3/21 - 3/28		1,281	0.6%	0.7%
3/29 - 4/03	Official Start of UE RI	14,685	6.7%	7.4%
4/04 - 4/10		26,666	12.2%	19.6%
4/11 - 4/17		31,789	14.5%	34.1%
4/18 - 4/24		23,674	10.8%	44.9%
4/25 - 5/01		18,398	8.4%	53.3%
5/02 - 5/08		20,482	9.4%	62.6%
5/09 - 5/15		16,186	7.4%	70.0%
5/16 - 5/22		12,008	5.5%	75.5%
5/23 - 5/29		10,431	4.8%	80.3%
5/30 - 6/04	Official End of UE RI	8,072	3.7%	84.0%
6/05 - 6/12		15,731	7.2%	91.1%
6/13 - 6/19		9,895	4.5%	95.7%
6/20 - 6/26		5,156	2.4%	98.0%
6/27 - 6/30		295	0.1%	98.2%
Missing/Out of Range		4,048	1.8%	100.0%
Total Housing Units		**218,977**	**100.0%**	**100.0%**

Source: DRF and AUX

By the official end of RI, June 4, the workload was only 84 percent finished. May 31 was Memorial Day so there would likely be a decrease in work around the holiday and have made the closeout effort difficult. There seems to have been an increased effort after the holiday however. It was not until June 26 that 98.0 percent of the UE RI workload was finished. The UE RI workload was built from UE cases, after the UE cases were checked in to PBOCS by LCO office staff. As will be discussed more in Section 5.5, there were difficulties checking UE questionnaires into PBOCS, creating a lag between the completion of the UE questionnaires and their check-in into PBOCS. This impacted the timing of when the UE RI workload was established and worked and likely also attributed to the delayed closeout of the UE RI operation.

The next three tables show the percentage of occupied, vacant, and deleted housing units completed by week.

Table 71: UE RI Occupied Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		14	<0.1%	<0.1%
3/07 - 3/13		22	<0.1%	0.1%
3/14 - 3/20		21	<0.1%	0.1%
3/21 - 3/28		261	0.4%	0.5%
3/29 - 4/03	Official Start of UE RI	4,010	6.9%	7.4%
4/04 - 4/10		6,039	10.3%	17.7%
4/11 - 4/17		5,592	9.6%	27.3%
4/18 - 4/24		4,822	8.2%	35.5%
4/25 - 5/01		4,014	6.9%	42.4%
5/02 - 5/08		5,183	8.9%	51.3%
5/09 - 5/15		4,912	8.4%	59.7%
5/16 - 5/22		4,100	7.0%	66.7%
5/23 - 5/29		3,659	6.3%	72.9%
5/30 - 6/04	Official End of UE RI	2,709	4.6%	77.6%
6/05 - 6/12		5,874	10.0%	87.6%
6/13 - 6/19		3,421	5.8%	93.5%
6/20 - 6/26		3,003	5.1%	98.6%
6/27 - 6/30		107	0.2%	98.8%
Missing/Out of Range		716	1.2%	100.0%
Total Occupied Housing Units		**58,479**	**100.0%**	**100.0%**

Source: DRF and AUX

The vacant housing units were finished slightly sooner than the occupied and deleted housing units. Approximately 78 percent of the occupied housing units were finished by June 4 while almost 90 percent of the vacant housing units were completed by then. Of the deleted housing units, 79 percent were completed by June 4.

Table 72: UE RI Vacant Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		37	<0.1%	<0.1%
3/07 - 3/13		40	<0.1%	0.1%
3/14 - 3/20		33	<0.1%	0.1%
3/21 - 3/28		966	0.7%	0.7%
3/29 - 4/03	Official Start of UE RI	10,163	7.1%	7.8%
4/04 - 4/10		19,343	13.4%	21.2%
4/11 - 4/17		24,803	17.2%	38.5%
4/18 - 4/24		17,764	12.3%	50.8%
4/25 - 5/01		13,410	9.3%	60.1%
5/02 - 5/08		14,103	9.8%	69.9%
5/09 - 5/15		10,272	7.1%	77.1%
5/16 - 5/22		6,841	4.8%	81.8%
5/23 - 5/29		5,705	4.0%	85.8%
5/30 - 6/04	Official End of UE RI	4,546	3.2%	88.9%
6/05 - 6/12		8,153	5.7%	94.6%
6/13 - 6/19		4,608	3.2%	97.8%
6/20 - 6/26		1,595	1.1%	98.9%
6/27 - 6/30		134	0.1%	99.0%
Missing/Out of Range		1,440	1.0%	100.0%
Total Vacant Housing Units		**143,956**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 73: UE RI Deleted Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		1	<0.1%	<0.1%
3/07 - 3/13		3	<0.1%	0.1%
3/14 - 3/20		1	<0.1%	0.1%
3/21 - 3/28		6	0.1%	0.2%
3/29 - 4/03	Official Start of UE RI	149	2.4%	2.6%
4/04 - 4/10		471	7.6%	10.2%
4/11 - 4/17		500	8.0%	18.2%
4/18 - 4/24		469	7.5%	25.8%
4/25 - 5/01		503	8.1%	33.9%
5/02 - 5/08		689	11.1%	44.9%
5/09 - 5/15		545	8.8%	53.7%
5/16 - 5/22		577	9.3%	63.0%
5/23 - 5/29		619	10.0%	73.0%
5/30 - 6/04	Official End of UE RI	370	6.0%	78.9%
6/05 - 6/12		655	10.5%	89.5%
6/13 - 6/19		405	6.5%	96.0%
6/20 - 6/26		109	1.8%	97.7%
6/27 - 6/30		13	0.2%	98.0%
Missing/Out of Range		127	2.0%	100.0%
Total Deleted Housing Units		**6,212**	**100.0%**	**100.0%**

Source: DRF and AUX

5.2.1.7 Interview Characteristics

The following section presents some paradata about the interviews with UE RI respondents, including the language that interviews were conducted in, the number of contacts that enumerators made to enumerate a housing unit, and the type of respondents who completed UE RI interviews.

Language

Table 74 on the next page shows the top five languages that the UE RI enumerators used to complete an interview.

Table 74: Top Five Languages in which UE RI Interviews Were Conducted

Language	Total	Percent
English	189,489	86.5%
Spanish	9,647	4.4%
Navajo	1,993	0.9%
Hindi	11	<0.1%
Nepali	9	<0.1%
All other languages	31	<0.1%
Multiple languages indicated	671	0.3%
Unknown	17,126	7.8%
Total Housing Units	**218,977**	**100.0%**

Source: DRF and AUX

English was the most frequent language used; 86.5 percent of the interviews were conducted in English. Spanish was the second most used language to complete an interview with 4.4 percent of interviews completed in Spanish. However, there were more interviews conducted in an unknown language (7.8 percent) than in any single language besides English.

The 'All other languages' row condenses the 45 additional languages that were on the language identification flashcard. The distribution of those languages is provided in Appendix F. The 'Multiple languages indicated' row reflects the interviews where both the English and Spanish boxes were marked, or where one of those boxes was marked and a number was also written in to indicate a different language from the flashcard.

Record of Contact

Table 75 shows the distribution of the number of contacts made to an address in order to obtain a completed interview. The first column contains all 218,977 housing units in UE RI. Subsequent columns look at housing units by their final occupancy status.[60]

Table 75: Number of Contact Attempts Made to UE RI Housing Units

Number of Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	8,952	4.1%	1,048	1.8%	5,610	3.9%	399	6.4%
1	94,265	43.0%	23,826	40.7%	64,071	44.5%	2,663	42.9%
2	45,008	20.6%	12,260	21.0%	29,654	20.6%	1,243	20.0%
3	27,906	12.7%	7,695	13.2%	18,424	12.8%	725	11.7%
4	23,853	10.9%	6,990	12.0%	15,442	10.7%	649	10.4%
5	10,069	4.6%	3,418	5.8%	6,013	4.2%	251	4.0%
6	8,924	4.1%	3,242	5.5%	4,742	3.3%	282	4.5%
Total Housing Units	**218,977**	**100.0%**	**58,479**	**100.0%**	**143,956**	**100.0%**	**6,212**	**100.0%**

Source: DRF and AUX

Of the 218,977 housing units in UE RI, 4.1 percent of EQs did not have enough information reported to indicate any contact was made. One contact was made to 43.0 percent of UE RI housing units. In UE RI, 4.6 percent of the housing units were contacted five times and 4.1 percent were contacted six times, which are both higher rates than was seen in UE. In UE, 2.9 percent of the housing units were visited five times, while 3.6 percent were visited six times.

Comparing the occupied, vacant, and delete columns in Table 75, the deleted housing units have a high percentage of no contacts documented, at 6.4 percent. This makes sense if the unit was demolished or could not be located and there was no one to confirm that visual conclusion, so the enumerator might not have considered it a 'contact'. Occupied housing units had the highest percentage of cases requiring six contacts (5.5 percent).

[60] Cases with an unresolved housing unit status are included in the total housing unit column but do not have a subsequent, distinct column.

Enumerators could contact an address either in person or over the telephone. Table 76 shows the distribution of contacts for telephone calls. The UE RI operation relied heavily on telephone calls to recontact respondents, as the first contact should have been by phone from the LCO, if a phone number was provided.

Table 76: Number of Telephone Contact Attempts made to UE RI Housing Units

Number of Telephone Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	109,735	50.1%	27,540	47.1%	74,009	51.4%	2,422	39.0%
1	74,378	34.0%	19,081	32.6%	49,773	34.6%	2,776	44.7%
2	20,481	9.4%	6,622	11.3%	12,421	8.6%	583	9.4%
3	11,828	5.4%	4,211	7.2%	6,468	4.5%	351	5.7%
4	1,736	0.8%	674	1.2%	920	0.6%	45	0.7%
5	529	0.2%	225	0.4%	242	0.2%	25	0.4%
6	290	0.1%	126	0.2%	123	0.1%	10	0.2%
Total Housing Units	**218,977**	**100.0%**	**58,479**	**100.0%**	**143,956**	**100.0%**	**6,212**	**100.0%**

Source: DRF and AUX

As seen in Table 76, just over half of the UE RI cases (50.1 percent) received no telephone contacts. Over one-third (34.0 percent) received one telephone contact.

Table 77 shows the distribution of personal contacts.

Table 77: Number of Personal Contact Attempts made to UE RI Housing Units

Number of Personal Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	58,171	26.6%	15,479	26.5%	35,824	24.9%	2,496	40.2%
1	79,279	36.2%	19,798	33.9%	54,980	38.2%	1,710	27.5%
2	37,474	17.1%	9,896	16.9%	25,314	17.6%	845	13.6%
3	38,083	17.4%	11,412	19.5%	24,202	16.8%	981	15.8%
4	5,049	2.3%	1,547	2.6%	3,165	2.2%	121	1.9%
5	739	0.3%	263	0.4%	413	0.3%	25	0.4%
6	182	0.1%	84	0.1%	58	<0.1%	34	0.5%
Total Housing Units	**218,977**	**100.0%**	**58,479**	**100.0%**	**143,956**	**100.0%**	**6,212**	**100.0%**

Source: DRF and AUX

Table 77 shows that 26.6 percent of UE RI cases received no personal contacts.

Table 78 shows the final contact made by an enumerator to complete the UE RI questionnaire.

Table 78: Type of Final Contact for Housing Units in UE RI, by Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Final Contact	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Person	98,511	45.0%	27,704	47.4%	63,176	43.9%	3,514	56.6%
Telephone	104,612	47.8%	26,610	45.5%	72,099	50.1%	2,097	33.8%
Unknown	15,854	7.2%	4,165	7.1%	8,681	6.0%	601	9.7%
Total Housing Units	**218,977**	**100.0%**	**58,479**	**100.0%**	**143,956**	**100.0%**	**6,212**	**100.0%**

Source: DRF and AUX

Approximately 48 percent of UE RI interviews were completed over the telephone. There were 33.8 percent of deletes completed with a telephone call.

Type of Respondent

Table 79 shows the respondent types for all of the UE RI interviews. Housing units with an unresolved status are included in the column with all cases but are not given their own column in this table.

Table 79: Type of Respondent for UE RI Interviews, by Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Respondent Type	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Household Member	42,365	19.3%	39,376	67.3%	2,289	1.6%	316	5.1%
Unknown Type	29,823	13.6%	7,724	13.2%	15,399	10.7%	1,324	21.3%
All Proxy	146,789	67.0%	11,279	19.3%	126,268	87.7%	4,572	73.6%
Proxy Type								
In-mover	2,100	1.0%	222	0.4%	1,784	1.2%	24	0.4%
Neighbor or other	144,684	66.1%	11,157	19.1%	124,479	86.5%	4,548	73.2%
Both marked	5	<0.1%	0	0.0%	5	<0.0%	0	0.0%
Total Housing Units	**218,977**	**100.0%**	**58,479**	**100.0%**	**143,956**	**100.0%**	**6,212**	**100.0%**

Source: DRF and AUX

Only 19.3 percent of the UE RI interviews were completed with a household member. This result makes sense given the high percentage of UE RI cases that were found to be vacant or deletes. However, there was a high rate of unknown respondents (13.6 percent).

When the universe is narrowed to occupied housing units, the percent of interviews conducted with a household member increases to 67.3 percent.

As seen in UE, both vacant and deleted housing units reported interviewing April 1 household members, which is incompatible with our definitions.

5.2.1.8 Characteristics of Occupied Housing Units

The following tables will discuss characteristics of the occupied housing units that completed a full interview during UE RI. The tables in this section will discuss characteristics of the occupied housing units that completed a full interview during RI. The UE RI questionnaire only collected a full roster if the UE RI respondent did not report that they were interviewed previously in UE. If they did report they were interviewed previously, only the first and last names were collected. If only a name was provided, then the person record was not considered data-defined.

Household Population Count

Table 80 shows the distribution of the enumerator-reported population counts and the number of data-defined people at each address.

Table 80: Population Count of Occupied Housing Units in UE RI

	Enumerator-Reported		Data-defined People	
Population Count	**Number of Addresses**	**Percent**	**Number of Addresses**	**Percent**
0	18	0.1%	0	0.0%
1	3,884	25.6%	5,251	34.6%
2	4,996	32.9%	4,594	30.3%
3	2,033	13.4%	1,926	12.7%
4	1,739	11.5%	1,591	10.5%
5	1,084	7.2%	1,057	7.0%
6	569	3.8%	365	2.4%
7	349	2.3%	172	1.1%
8	140	0.9%	95	0.6%
9	70	0.5%	45	0.3%
10	46	0.3%	41	0.3%
11 – 15	55	0.4%	29	0.2%
16 – 20	6	<0.1%	2	<0.1%
21 – 30	4	<0.1%	0	0.0%
31 – 40	6	<0.1%	0	0.0%
41 – 49	0	0.0%	0	0.0%
50 – 97	21	0.1%	0	0.0%
98	0	0.0%	N/A	N/A
99	26	0.2	N/A	N/A
Missing	122	0.8%	N/A	N/A
Total Occupied Housing Units	**15,168**	**100.0%**	**15,168**	**100.0%**

Source: DRF

The distribution of enumerator-reported population counts is similar to the UE distribution of enumerator-reported population counts.

The parent EQ had space to roster five people in a household. If more than five people lived at an address, then enumerators used a continuation form. Continuation forms did not have any of the beginning or concluding questions printed on them; they collected only person-level data for up to five persons on each continuation form.

Table 81 shows the number of continuation forms used to enumerate people at each address in UE RI.

Table 81: Number of Continuation Forms used During UE RI

Number of Continuation Forms	Number of Addresses	Percent
0	11,956	78.8%
1	3,082	20.3%
2	121	0.8%
3	9	<0.1%
Total Occupied Housing Units	**15,168**	**100.0%**

Source: DRF

Table 81 shows that the majority of housing units enumerated in UE RI did not utilize a continuation form (78.8 percent) but over twenty percent used a continuation form.

Undercount

Table 82 shows the frequency that each probe was marked with an affirmative answer, including one row for housing units that said multiple undercount categories marked.

Table 82: Distribution of Answers to the Undercount Probes at Occupied UE RI Housing Units

Undercount Category	Number of Housing Units	Percent
Only 'No' category marked	8,276	54.6%
At least one category marked	108	0.7%
Babies	*19*	*0.1%*
Foster children	*1*	*<0.1%*
Any other relatives	*43*	*0.3%*
Roommates	*12*	*0.1%*
Any other nonrelatives	*10*	*0.1%*
Anyone else staying on April 1 who had no permanent place to live	*14*	*0.1%*
Multiple categories marked	*9*	*0.1%*
Missing (All boxes blank)	6,784	44.7%
Total Occupied Housing Units	**15,168**	**100.0%**

Source: DRF

Only 108 cases in UE RI gave an indication of a possible undercount for their housing unit.

If the respondent answered ‘yes’ to any of the undercount probes, the UE RI enumerator was to collect a maximum of two names for the people who were possibly undercounted. Table 83 shows how often the name fields were used at the end of the undercount question. For this assessment, the name fields were not inspected for validity; any non-blank entry would have been captured as a name in the following tables.

Table 83: Number of Undercount Names Reported when any Undercount Category Marked in UE RI Occupied Housing Units

Total Number of Names	Total	Percent
Zero Names	11	10.2%
One Name	82	75.9%
Two Names	15	13.9%
Total Occupied Addresses with Category Selected	**108**	**100.0%**

Source: DRF and AUX

Table 83 shows that 75.9 percent of the occupied cases that answered ‘yes’ to the undercount category provided one name, 13.9 percent provided two names, and 10.2 percent did not provide a name.

Table 84 delineates by the specific undercount categories how often a name was provided to the enumerator.

Table 84: Number of Undercount Names Reported for Specific Undercount Category Marked in UE RI Occupied Housing Units

Undercount Category with Number of Names	Total	Percent
Babies only		
Zero Names	6	31.6%
One Name	13	68.4%
Two Names	0	0.0%
Total	**19**	**100.0%**
Foster children only		
Zero Names	0	0.0%
One Name	0	0.0%
Two Names	1	100.0%
Total	**1**	**100.0%**
Any other relatives only		
Zero Names	2	4.7%
One Name	33	76.7%
Two Names	8	18.6%
Total	**43**	**100.0%**
Roommates only		
Zero Names	0	0.0%
One Name	10	83.3%
Two Names	2	16.7%
Total	**12**	**100.0%**
Any other nonrelatives only		
Zero Names	1	10.0%
One Name	9	90.0%
Two Names	0	0.0%
Total	**10**	**100.0%**
Anyone else only		
Zero Names	0	0.0%
One Name	13	92.9%
Two Names	1	7.1%
Total	**14**	**100.0%**
Multiple		
Zero Names	2	22.2%
One Name	4	44.4%
Two Names	3	33.3%
Total	**9**	**100.0%**
None[61]		
Zero Names	15,015	99.7%
One Name	43	0.3%
Two Names	2	<0.1%
Total	**15,060**	**100.0%**

Source: DRF and AUX

[61]These numbers include both rows "Missing" and "Only 'No' category marked" from Table 82.

Housing units that answered 'yes' to multiple undercount categories were the most likely to provide the names of two people (33.3 percent). Housing units that answered 'yes' to having possibly undercounting a baby were the most likely to not have provided any names (68.4 percent). Additionally, there were 43 housing units that did not positively mark an undercount probe but had names listed anyway, which is more housing units with names than under any of the actual undercount probes.

Overcount

Table 85 describes the outcome of the overcount question, asked for each person. The universe in Table 85 consists of data-defined persons in an occupied housing unit. There were 37,221 such people captured during UE RI.

Table 85: Overcount Category for Data-defined People in UE RI Occupied Housing units

Overcount Category	Number of People	Percent
None	36,348	97.7%
At least one category marked	873	2.3%
College Housing only	*61*	*0.2%*
Military only	*23*	*0.1%*
Seasonal/Second Home only	*402*	*1.1%*
Child Custody only	*79*	*0.2%*
Jail or Prison only	*11*	*<0.1%*
Nursing Home only	*7*	*<0.1%*
Another Reason only	*264*	*0.7%*
Multiple Categories	*26*	*0.1%*
Total People in Occupied Housing Units	**37,221**	**100.0%**

Source: DRF

The vast majority of people (97.7 percent) did not indicate they lived or stayed anywhere else besides the UE RI address. Of those that replied they did live somewhere else, "seasonal/second home" was the most frequent response with 1.1 percent.

5.2.1.9 Standard Demographic Tables

There were 37,221 data-defined persons included on 15,168 UE RI forms in the 2010 Census. This section will present the demographic characteristics for these persons on the UE RI form. Table 86 gives UE RI person demographic characteristics: age, Hispanic origin, race, relationship to person 1, and sex. Age was calculated based on the date of birth provided; if no date of birth was provided then the write-in age was used. Age was calculated only if the date of birth fell within valid date ranges. Similarly, the calculated age or write-in age was used only if it fell within valid age ranges; otherwise, it was considered missing. Table 86 also gives the distribution of tenure responses for housing units included in the UE RI operation.

Because the demographic data used in this assessment are unedited, direct comparisons with published 2010 Census results are not possible. These tables include a row for people with missing values for the specific characteristic. The data in published 2010 Census reports have undergone editing and imputation, and therefore will have no missing values.

Table 86: UE RI Standard Assessment Demographic Table

Demographic Item	Number	Percent
Age	**37,221**	**100.0**%
Under 5 years	1,531	4.1%
5 to 9 years	1,470	4.0%
10 to 14 years	1,402	3.8%
15 to 19 years	1,558	4.2%
20 to 24 years	1,336	3.6%
25 to 29 years	1,209	3.3%
30 to 34 years	1,107	3.0%
35 to 39 years	1,153	3.1%
40 to 44 years	1,074	2.9%
45 to 49 years	1,282	3.4%
50 to 54 years	1,219	3.3%
55 to 59 years	1,139	3.1%
60 to 64 years	1,063	2.9%
65 years and over	2,417	6.5%
Missing	18,261	49.1%
Hispanic Origin	**37,221**	**100.0**%
Not Hispanic or Latino checkbox only	13,884	37.3
Mexican checkbox only	6,385	17.2
Puerto Rican checkbox only	51	0.1
Cuban checkbox only	88	0.2
Another Hispanic checkbox only	291	0.8
Multiple checkboxes	14	<0.1
Both Checkbox and Write-in	516	1.4
Write-in Only	181	0.5
Missing	15,811	42.5

Demographic Item	Number	Percent
Race	**37,221**	**100.0**%
White checkbox alone	14,717	39.5%
Black or African American checkbox alone	183	0.5%
American Indian and Alaska Native checkbox alone	490	1.3%
Asian Indian checkbox alone	37	0.1%
Chinese checkbox alone	11	<0.1%
Filipino checkbox alone	52	0.1%
Japanese checkbox alone	8	<0.1%
Korean checkbox alone	8	<0.1%
Vietnamese checkbox alone	12	<0.1%
Other Asian checkbox alone	0	0.0%
Native Hawaiian checkbox alone	7	<0.1%
Guamanian or Chamorro checkbox alone	2	<0.1%
Samoan checkbox alone	0	0.0%
Other Pacific Islander checkbox alone	1	<0.1%
Some Other Race checkbox alone	30	0.1%
Multiple checkboxes	78	0.2%
Both Checkbox and Write-in	6,638	17.8%
Write-in Only	218	0.6%
Missing	14,729	39.6%
Relationship Status to Householder (Person 1)	**37,221**	**100.0**%
Householder	13,430	36.1%
Husband or Wife of Householder	6,468	17.4%
Biological Son or Daughter of Householder	9,708	26.1%
Adopted Son or Daughter of Householder	188	0.5%
Stepson or Stepdaughter of Householder	326	0.9%
Brother or Sister of Householder	630	1.7%
Father or Mother of Householder	574	1.5%
Grandchild of Householder	1,439	3.9%
Parent-in-law of Householder	79	0.2%
Son-in-law or Daughter-in-law of Householder	264	0.7%
Other Relative	680	1.8%
Roomer or Boarder	104	0.3%
Housemate or Roommate	420	1.1%
Unmarried Partner	728	2.0%
Other Nonrelative	680	1.8%
Two or more relationships	17	<0.1%
Missing	1,838	4.9%
Sex	**37,221**	**100.0**%
Male	16,351	43.9%
Female	16,282	43.7%
Both	8	<0.1%
Missing	4,580	12.3%

Tenure	**15,168**	**100.0**%
Owned with a mortgage or a loan	2,222	14.6%
Owned without a mortgage or a loan	3,005	19.8%
Rented	2,326	15.3%
Occupied without payment of rent	292	1.9%
Multiple	7	<0.1%
Missing	7,316	48.2%

Source: DRF

These distributions may vary across different 2010 Census operations due to differences in corresponding populations and procedures.

5.2.1.10 Added Housing Units to the Workload

The Reinterview operation did not allow for enumerators to add housing units, since the enumerators did not have the complete Address Listing Pages and binders from the production enumerators. The RI enumerators were strictly tasked with verifying the work of the UE enumerators. Adding housing units was not part of their training and there were no address fields on the RI EQ in which to collect address information. Thus, there are no data to present in this section.

5.2.2 Cost, Staffing, and Production Rates

5.2.2.1 Summary of the UE QC Field Operation

The total cost of UE QC was $15,840,629 or 45.8 percent of the $34,553,982 UE QC field budget. These costs reflect all the QC enumeration activities completed by field enumerators to include:

1. Reinterview Field
    a. Regular RI
    b. Vacant RI
2. Reinterview Office
3. Delete Verification (including Final DV)
4. DQC
5. Recanvassed HUs (AA Fail DQC)

We calculate the cost or mile per case by dividing total UE QC cost or miles by the total UE QC cases to derive an average actual cost per case. We assume that our denominator is homogeneous, but it is not. All UE QC field activities were operationally different; consequently, we are limited in our analysis to establish the average cost and miles per case. In addition, the developers of the PBOCS lacked the time and requirements to develop the UE QC reports to track each UE QC activity, and the PBOCS reports developed did not work properly for the UEOs. Hence, our source for actual cases completed in the field and in the office is the Census MaRCS, and other back-end processing files.

Estimating the distribution of the UE QC workload was challenging considering the design changes and available production data from prior decades. Nevertheless, we utilized a per-case analysis to estimate our costs. Therefore, we have opted to show the UE QC workload budget estimate, actual workload[62] and derive a cost and miles per case to provide a point of reference for future planning.

The Census Bureau estimated the UE workload net of regular vacants to be 1,351,178 cases. We projected that PBOCS would select (in MaRCS) 74,314 RI cases, or 5.5 percent. Additionally, we anticipated the regular vacant and delete cases; and assumed that every AA would undergo DQC. We obtained the actual workload for the operation from Census MaRCS, CEE, and NPC DQC and DV files. Table 87 shows the budgeted workload and actual workload categorized by each UE QC field activity.

Table 87: UE QC Workload Distribution

	Budgeted Cases[63]	Percent of Budgeted Cases	Actual Cases	Actual Percent of Cases
Total	**608,773**	**100.0%**	**494,911**	**100%**
Field Regular RI	74,315	12.2%	85,137	18.3%
Regular Vacant RI	146,336	24.0%	130,696	28.1%
Office RI	--	--	--	--
Delete Verification	69,977	11.5%	81,343	17.5%
DQC	127,310	20.9%	109,016	23.5%
DQC Recanvass	190,835	31.4%	58,719	12.6%

Source: DMD C&P and DSSD Quality Profile

Our UE RI estimates and the Census MaRCS UE RI selection (conducted by PBOCS) did not use the total number of UE cases; we utilized an algorithm based on the number of eligible cases to show the actual RI distribution between cases completed in the office by telephone and in field staff by personal visit. Table 87 shows the budgeted and actual workload distribution for all UE QC workload. In addition, it shows the actual RI cases completed by telephone and by field staff.

In contrast to the actual UE actual workload, which was only 2.3 percent lower than expected, the UE QC workload was 143,862 cases or 23.6 percent lower than estimated. According to data shown in Table 88, the primary variance factor affecting the UE QC workload variance is the DQC recanvass workload.

The UE QC costs of **$**15,840,629 represent a 54.2 percent variance of the budgeted cost. The cases requiring recanvass because of the DQC recanvass were 69.2 percent or 132,116 cases

[62] Actual workload data provided by DSSD from the UE QC Quality Profile.

[63] We opted not to disaggregate the UE QC RI workload estimates by RI field and RI office given that we expected a small amount of total regular RI cases (as compared to NRFU) and the TEAs that comprise the UE operation.

lower than anticipated. Since the UE QC workload variance excluding DQC Recanvass was only 2.8 percent; and given the additional operational field effort to conduct this QC activity, we surmise that the significant smaller recanvass workload was the reason of our under-spending of $18,713,353.

Table 88: UE QC Workload Distribution Variances

	Budgeted Cases	Actual Cases	Variance	Percent of Budget Variance
Total	**608,773**	**494,911**	**143,862**	**23.6%**
Field Regular RI	74,315	85,137	-10,822	-14.6%
Regular Vacant RI	146,336	130,696	15,460	10.7%
Office RI	0	--	--	--
Delete Verification	69,977	81,343	-11,366	-16.2%
DQC	127,310	109,016	18,294	14.4%
DQC Recanvass	190,835	58,719	132,116	69.2%

Source: Census MaRCS, DRF, Quality profile

Table 89 is a summary of the budgeted, actual UE QC operation costs and their variances along with the total UE QC budgeted and actual workload. We show the cost grouped by factors: production salary, training salary, mileage, and miscellaneous cost. The miscellaneous cost includes the cost of lodging, per diem, and telephone calls. In addition, the table also shows the percent of budget used for each cost factor. The percent of budget used is the actual cost divided by the budgeted cost for each individual cost factor. The table also shows each individual cost factor as a percentage of the actual total UE QC cost of $15,840,629.

Table 89: UE QC Summary of Field Operation Costs

	Budget	Actual	Percent of Budget Used	Percent of Actual Total Cost
Workload	**608,773**	**464,911**	**--**	**--**
Total Cost	**$34,553,982**	**$15,840,629**	**45.8%**	**100.0%**
Production Salary	$18,924,350	$9,038,312	47.8%	57.1%
Training Salary	$4,283,653	$2,327,424	54.3%	14.7%
Mileage Cost	$11,221,190	$4,183,154	37.3%	26.4%
Miscellaneous	$124,789	$291,739	233.8%	1.8%

Source: DMD C&P

All except for miscellaneous expenditures of the UE QC cost factors were notably under budget, however, the largest contributor to the underspending was production salary cost where we spent 47.8 percent of the production salary budget. Mileage cost was the next significant contributor to the underspending with 62.7 percent of its budget being unspent. The training salary cost contribution to the budget surplus to a lesser degree, with only 54.3 percent of the budget spent.

The largest discrepancy between the budgeted and actual costs occurred in the miscellaneous category, where the percent of the budget used was 233.8 percent. The miscellaneous cost, although considerably overspent, was a negligible amount compared to the total budget to have a real impact on the total underspending.

Production salary was the largest spending category making up 57.1 percent of the total costs. The mileage costs made was second largest, at 26.4 percent of the total operational costs contributing $4,183,154 million to the overall underspending.

5.2.2.2 UE QC Cost per Case[64]

There were limitations[65] in accurately deriving cost and miles per case. The UE QC unit level costs were by far lower than planned. The total cost per case was budgeted at $56.76; however, the actual was $34.07.

5.2.2.3 UE QC Cases per Hour and Miles per Case[66]

As with costs per case, we are assuming that all UE QC are equal in deriving the average cases per hour and miles per case. To arrive at the cases per hour and miles per case we divided the total workload by the total number of enumerator hours, budgeted and actual respectively. For the miles per case we again used the enumerator miles driven and divided the total workload, budgeted and actual respectively. To calculate the percent variance in Table 90 we calculated the difference between the actual and budget, and then divided by the budgeted amount.

Table 90: UE QC Cases per Hour and Miles per Case

	Budgeted	Actual	Percent Variance
Cases Per Hour	0.82	1.39	-68.9%
Miles Per Case	24.94	11.11	55.5%

Source: DMD C&P and DSSD Quality Profile

The original budget had enumerators working 0.82 cases per hour; however, the actual cases per hour were higher at 1.39. The miles per case budgeted was 24.94 while the actual was only 11.11 miles per case. We suspect that these significant differences resulted from achieving a considerably less than expected DQC Recanvass workload. The actual DQC Recanvass was 69.23 percent of our estimated workload.

[64] Each UE QC field activity is operationally different from each other; especially the DQC and Recanvass.

[65] To alleviate the limitation, future UE QC planning may benefit from a time and motion study.

[66] Refer to the UE QC description section in this assessment; UE QC cases may require different levels of effort to complete.

5.2.2.4 UE QC Variance by Position Type

In analyzing the cost variance, we reviewed the variance by position type: including enumerators, CLA, CL, FOS, and added a separate category for miscellaneous charges not directly associated with the four field positions. See Figure 2 in Section 2.4 for the hierarchy of field staff. Table 91 illustrates the dollar and percent variance by position type. It also shows the variance by position type as a percentage of the Total UE QC variance.

Table 91: UE QC Variance by Position Type

Position Type	Variance	Percent Variance of Position Type Budget	Percent of Total Variance
Total	**$18,713,353**	**54.2%**	**100.0%**
Enumerator	$13,173,792	58.5%	70.4%
CLA	$1,406,579	28.8%	7.5%
CL	$4,220,483	69.5%	22.6%
FOS	$79,449	8.4%	0.4%
Miscellaneous	-$166,950	-133.8%	-0.9%

Source: DMD C&P

The total UE QC cost variance is $18,713,353 or 54.2 percent of the total UE QC budget. The enumerator and CLA costs contributed the largest variances in terms of dollars and percent. The enumerator cost variance is $13,173,792 or 58.5 percent of the enumerator budget and the CLA cost variance is $4,220,483 or 69.5 percent of the CLA budget.

The enumerator and CLA positions account for 70.4 percent and 22.6 percent of the total variance respectively. There is more information on the cost factors by position type in the following sections.

5.2.2.5 UE QC Variance by Cost Factor

All the cost factors contributed to the total underspending. Those factors consist of the money allocated for training, salary, mileage, and miscellaneous cost, which include expenditures not classified by employee position type. Table 92 shows the dollar and percent variances by cost factor and each variance as a percent of the total variance.

The most significant underspent variances were the enumerator production salary and miles costs. The cost variance for the enumerator production salary was 56.50 percent or $6.26 million of the production salary budget. The enumerator mile cost variance generated the second largest variance of $7.04 million or 62.7 percent of the enumerator miles cost budget. The crew leader assistant production salary was the third largest contributing factor at $2.5 million or 66.3 percent of the crew leader assistant production salary budget. The CLA miles cost also has a noteworthy variance at $1.44 million, or 73.0 percent of the CLA miles cost.

Production hours cost and mileage cost account for 57 percent and 26.4 percent of the total cost variance, respectively. The enumerator production salary cost variance was the largest contributing factor to the overall variance, at 30.4 percent. The other factor to be noted is the enumerator miles cost, with 16.3 percent of the total UE QC variance. The variance in CLA production salary cost was 14.8 percent of the total UE variance.

Table 92: UE QC Variance by Cost Factor and Position Type

Cost Factor	Variance	Percent Variance of Cost Factor Budget	Percent of Total Variance
Total	**$18,713,353**	**54.2%**	**100.0%**[67]
Production Salary	**$9,886,038**	**52.2%**	**57.1%**
Enumerator	$6,258,888	56.5%	30.4%
CLA	$2,492,788	66.3%	8.0%
CL	$1,042,937	30.7%	14.9%
FOS	$91,425	13.3%	3.8%
Training Salary	**$1,956,229**	**45.7%**	**14.7%**
Enumerator	$1,616,228	45.4%	12.3%
CLA	$291,416	83.3%	0.4%
CL	$43,448	13.1%	1.8%
FOS	$5,137	11.9%	0.2%
Mileage Cost	**$7,038,036**	**62.7%**	**26.4%**
Enumerator	$5,298,676	67.2%	16.3%
CLA	$1,436,279	73.0%	3.4%
CL	$320,194	27.7%	5.3%
FOS	-$17,113	-7.9%	1.5%
Miscellaneous	**-166,950**	**-133.8%**	**1.8%**

Source: DMD C&P

5.2.2.6 UE QC Production Staffing

Table 93 depicts the budgeted and actual number of field positions and the percent variance. The table shows how many field staff worked in UE QC. If a person worked multiple operations, they were counted in each operation. If a person worked in multiple positions, within an operation, they were counted in the position they worked the most hours in. For UE QC, we budgeted for 7,587 total field staff positions. However, we filled 8,187 positions. All positions

[67] Due to rounding, the sum of the individual cost factor percentages is 100.1 percent.

required more positions than were budgeted. The position with the largest variance was the FOS position. The budget called for 64 FOSs positions but 150 FOSs actually worked on UE QC.

Table 93: UE QC Staffing

Position	Frontloading Rate	Number of Positions Budgeted	Number of Positions Actual	Percent Variance
Total	**-**	**7,587**	**8,187**	**-7.9**
Enumerator	50.00%	6,181	6,399	-3.5%
CLA	0.00%	808	884	-41.2%
CL	0.00%	534	754	-9.4%
FOS	0.00%	64	150	-134.4%

Source: DMD Cost Model and DAPPS

5.2.3 Training

There were three rounds of training on MaRCS at NPC, shown in Table 94. All training for LCO staff happened on May 19.

Table 94: MaRCS Training Schedule

Training	Scheduled	Actual
NPC MaRCS 1	5/17/10	5/17/10
NPC MaRCS 2	6/7/10	6/7/10
NPC MaRCS 3	6/10/10	6/3/10
LCO MaRCS	5/19/10	5/19/10

Source: 2010 Master Activity Schedule

Note that NPC round three was actually conducted earlier than scheduled. This round was just training the UE clerks to work on NRFU. The UE clerks did not have enough cases to work and NRFU clerks had more cases than they could keep up with, so we trained the UE clerks on NRFU early so they could work on NRFU cases once they were done with their UE workload for the day.

For the most part, the NPC MaRCS training prepared NPC clerks for their job conducting clerical matching in the UE MaRCS application. They learned how to navigate the software to investigate cases, view reports, and assign RI matching outcomes to their cases. Once they began working on production cases, however, they encountered many situations that had not been covered during the training.

Some examples are the following situations:

- Either the production case or the RI case is not occupied
- The RI enumerator incorrectly lists the household members at the proxy address and not the UE address, and
- Data capture errors result in inconsistent data for one case (i.e. population count is seven but only one household member is listed).

  Three weeks after conducting the NPC MaRCS training, we held a debriefing with a sample of UE MaRCS NPC clerks. When asked if the training prepared them for their jobs, the majority of the clerks said yes but with the following suggestions:

  1. Make the training longer to allow for more examples,
  2. Include better training on the field enumerator procedures for both production and RI so they have a better understanding of the resulting data,
  3. Include more instructions on what exactly to put into their notes when deferring a case, and,
  4. Schedule question and answer sessions a week into production so clerks can have questions resolved in a setting that would share the knowledge with all clerks.

For field enumerators, CLs were supposed to observe all enumerators on the job in the days after training ended. This was to ensure that enumerators were following procedures and getting feedback early about any improvements they needed to make. The CLs were to record results of an observation on a printed observation checklist. The checklists were collected and shipped to NPC for data capture.

The table below shows the results of the initial observations. There were 15,082 UE enumerators, but initial observation checklists were only received for 7,539 enumerators, or 50.0 percent of enumerators.

Table 95: Final Outcome of Observation

Observation Result	Number	Percent
Pass	6,812	90.4%
Fail	53	0.7%
Other	50	0.7%
Missing	624	8.3%
Total	**7,539**	**100.0%**

Source: CEE (D-1222 Form, Observation Checklist)

The number of enumerators that failed based on the CL's observation of their work was 53 (0.7 percent), which could be an indicator of how well the training prepared the field staff.

There were 7,446 observation checklists received for a first observation of an enumerator and 1,174 checklists for a second observation of an enumerator. Of those, 1,567 of the first observations (21.0 percent) indicated the enumerator made an error during the observation and 255 of the second observations (21.7 percent) indicated the enumerator made an error.

The table below shows how often each item on the checklist was not performed adequately by the enumerator, by first and second observations.

Table 96: Error Rate of Specific Tasks on Observation Checklist

	First Observation		Second Observation	
Observed Error Actions	**Number with this error**	**Percent**	**Number with this error**	**Percent**
1 – Introduction/show badge	41	2.6%	6	2.4%
2 – Provide Information Sheet	86	5.5%	19	7.5%
3 – Wore seatbelt when driving	59	3.8%	6	2.4%
4 – Used map to find address	140	8.9%	18	7.1%
5 – Made corrections as necessary to block maps	142	9.1%	21	8.2%
6 – Used Census maps to confirm locations	102	6.5%	15	5.9%
7 – Correctly map-spotted multi-unit structure	117	7.5%	12	4.7%
8 – Correctly added HU	104	6.6%	16	6.3%
9 – Correctly deleted HU	103	6.6%	16	6.3%
10 – Assigned correct address status	81	5.2%	24	9.4%
11 – Correctly made changes to address	95	6.1%	22	8.6%
12 – Plan efficient route	86	5.5%	10	3.9%
13 – Interview eligible respondent	21	1.3%	7	2.7%
14 – Read questions as worded	173	11.0%	22	8.6%
15 – Fill out questionnaire	125	8.0%	23	9.0%
16 – Use various forms	62	4.0%	8	3.1%
17 – Protect confidentiality	30	1.9%	10	3.9%
Total with an Error	**1,567**	**100.0%**	**255**	**100.0%**

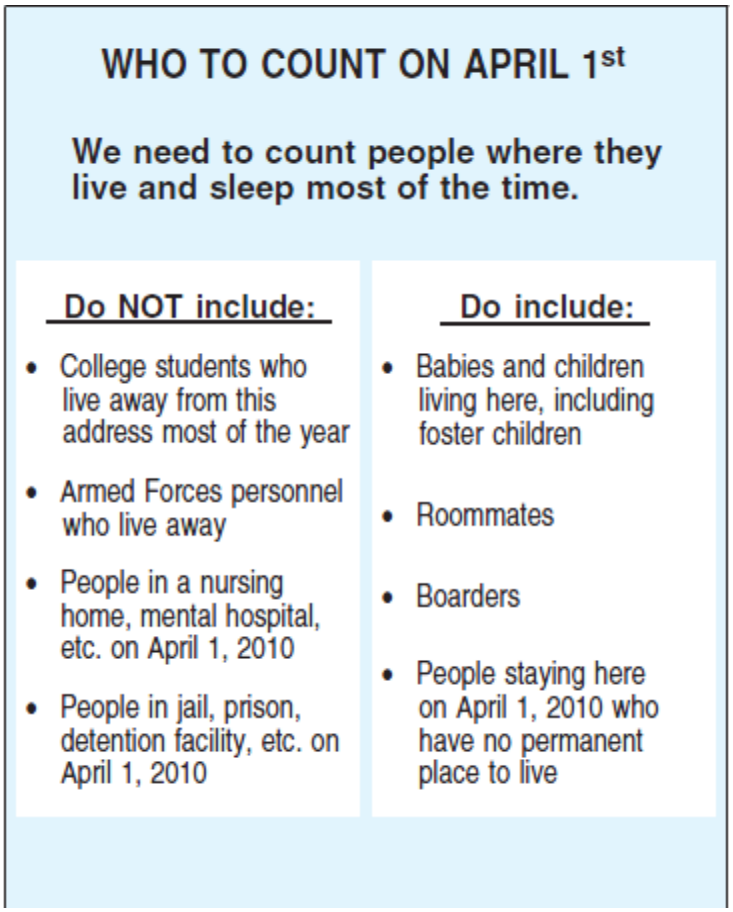
Source: CEE (D-1222 Form, Observation Checklist)

Some of the enumerator tasks that had the highest error rates were reading questions as worded, making corrections to block maps, using the map to find an address, filling out the questionnaire correctly, and correctly map spotting a multi-unit structure. Although the QC enumerator was tasked with reviewing production enumerator's work, there is no proof that the QC enumerator was more accurate. Both production and QC enumerators received the same training.

These observation checklists are helpful in answering one of the research questions, about enumerators following field procedures regarding the Residence Rules section of the Information Sheet. During every UE interview, the UE enumerator was instructed to give each respondent an Information Sheet, as past census tests have shown a need for a visual aid to assist the respondent in answering some of the questions in the UE interview. The Information Sheet used in the 2010 Census included information about confidentiality, who to include in the housing unit,

relationship categories, Hispanic origin categories, and race categories. The Information Sheet (also referred to as the flashcard) can be found in Appendix E. When the enumerator asked the respondent how many people lived in the housing unit, they were to direct the respondent to read the "Who To Count on April 1st" section of the Information Sheet, which summarized the 2010 Census residence rules and situations (shown in Figure 15).

Figure 15: "Who to Count" Section of the Information Sheet



Census Bureau enumerator procedures instructed the enumerator to:

1. Hand the Information Sheet to the respondent at the beginning of the interview, and
2. Read verbatim the text in Question S5 that says,
   "We need to count people where they live and sleep most of the time. Please look at List A. It contains examples of people who should and should not be counted at this place. Based on these examples, how many people were living or staying in this (house/apartment/mobile home) on April 1?"

There were few sources available to assess if enumerators followed field procedures regarding the Residence Rules section of the Information Sheet in the UE operation. Notably, there were no debriefings of enumerators and few trip reports from UE. The crew leader observations of enumerators is perhaps the best source of data to answer this research question. Of the 7,539

initial observation checklists collected (out of 15,082 enumerators), 86 of the observed enumerators (1.1 percent) failed to provide the Information Sheet to the respondent.

Additionally, a NRFU Behavior Coding study was conducted, which was an audio-taped study with 204 recordings from field interviews that aimed to identify problems with how enumerators asked questions and how respondents answered questions. Though the evaluation was focused at evaluating the use of the enumerator questionnaire during the NRFU operation, a small sample of interviews from the UE population (from an American Indian reservation) were obtained and coded as well, though they were not available for separate analysis. The sample of interviews was not intended to be a representative sample but a sample of convenience. Since the behavior coding study relied on audiotapes, there was no information captured on how often an Information Sheet was handed to respondents. However, when reading of Question S5, the "Who to Count" list (List A) was not referred to in 35 percent of cases. The NRFU population is different from the UE population, notably consisting of less cooperative respondents who are in NRFU since they already failed to return their mail form. Enumerators might have been more likely to follow procedures in the UE operation where respondents are thought to be more cooperative.

HQ could still consider including more emphasis on key concepts and the importance of verbatim reading in future census trainings.

5.2.4 Schedule

UE QC plan was for an 11-week operation that began one week after the start of UE Production and would end approximately one week after UE Production. All cases selected for RI should have been completed by the end of the RI operation. To ensure this objective was attainable, the Census Bureau planned for selection of RI cases to end one week before the end of Reinterview. In the event that at the end of the RI operation cases were not complete, the LCO would invoke the LCO Relief option, which allows the Assistant Manager for Quality Assurance (AMQA) to close out any un-worked RI cases remaining in the system.

UE QC completion was originally scheduled to end on June 4, 2010 and was then pushed back to June 9 as the baseline finish. Fieldwork completed on June 16 and PBOCS was finished checking work on July 1. As of May 24, and as a result of load issues in PBOCS and the start of NRFU, there were backlogs in the LCOs for UE. The UE operation was 99 percent complete, but there was a backlog of about 110,189 EQs for check-in. The UE RI was 46 percent complete and had a backlog of about 28,837 EQs. Of the total 32,574 AA workload, about 20,815 AAs were in the backlog.

As of June 3, LCOs were instructed to no longer use PBOCS to check-in the UE RI and DQC work. UE Reinterview was tracked using an Excel spreadsheet managed by the FLD DDCB (Decennial Data Collection Branch). DQC and DV occurred outside of PBOCS via Excel and the D-950 Dependent Quality Control and D-957 Delete Verification Form respectively. The LCOs were instructed to attempt to complete and ship their Reinterview work by Friday, June 11. Completion of all coding in MaRCS finished the week of June 16, on schedule.

There were expected completion rates for Update Enumerate Quality Control, including the budget at the national and LCO levels.

Table 97: QC Expected Completion

	Week 2 Ending April 11	Week 4 Ending April 25	Week 6 Ending May 9	Week 8 Ending May 23	Week 10 Ending June 6	Week 11 Ending June 13
Expected Cases Completed Production	37%	67%	88%	98%	100%	100%
Expected QC Cases Completed QC	.04%	32%	57%	83%	98.5%	100%
Expected % of Total Budget Used	38%	56%	73%	89%	99%	100%

Source: 2010 Master Activity Schedule

5.3 Remote Update Enumerate

Remote Update Enumerate was the smallest of the UEOs. It was conducted in remote parts of Maine and Southeast Alaska. The following sections will report on results of the RUE operation:

- Section 5.3.1 will discuss the workload and operational results from RUE.
- Section 5.3.2 will discuss the cost and staffing of RUE.
- Section 5.3.3 will discuss the training provided to RUE staff.
- Section 5.3.4 will discuss the schedule for RUE.

5.3.1 Workload and Outcomes

This section presents the RUE workload, results to the operation-specific research questions, and results to the specific assessment questions.

The results presented within Section 5.3.1 cover the following topics:

- Section 5.3.1.1 discusses address record characteristics during RUE.
- Section 5.3.1.2 discusses the formation of the RUE DRF analysis universe.
- Section 5.3.1.3 discusses the housing unit status of cases worked in RUE.
- Section 5.3.1.4 discusses the timing when RUE interviews were completed and when they were checked-in.
- Section 5.3.1.5 discusses characteristics of RUE interviews, notably key paradata results.
- Section 5.3.1.6 discusses characteristics of occupied housing units.
- Section 5.3.1.7 presents the standard demographic tables for RUE.
- Section 5.3.1.8 discusses housing units added during RUE.

Updating the Address Listing Pages was the first thing an enumerator was to do when working on a case, so results of that component are presented first.

5.3.1.1 Address Record Characteristics

This section provides results on the address listing updates done by the RUE enumerators in the field. Section 5.1.1.1 discussed the possible outcomes that enumerators could assign to an address in their AA.

Once the updates for the RUE operation were completed in the field, they were captured and delivered to GEO to update the MTdb for subsequent 2010 Census operations. The Address Registers and Enumeration Questionnaires underwent processing within GEO where the address updates were either accepted or rejected. Table 98 identifies the RUE cases rejected in MTdb.

Table 98: RUE Cases Rejected in MTdb

	Number of Housing Units	Percent
Records Accepted	8,148	100.0%
Record Rejected	1	<0.1%
Total Records	**8,149**	**100.0**%

Data Source: 2010 UE/RUE/RA assessment tally files

A total of 8,149 RUE address records were received by GEO; only one record was rejected because the same MAFID was treated as a survivor and retired record during GEO processing, leaving 8,148 accepted records.

Enumerators were expected to provide a status code for each address in their AA binder. Table 99 reports the distribution of final field outcome codes from the assessment tally files.

Table 99: RUE final field outcomes

Field Action Code	Number of Housing Units	Percent
Verified	3,240	39.8%
Correction	2,030	24.9%
Uninhabitable	102	1.3%
Empty Mobile Home/Trailer Site	16	0.2%
Delete	1,062	13.0%
Duplicates	138	1.7%
Nonresidential	109	1.3%
Add	1,451	17.8%
Total Housing Units Processed	**8,148**	**100.0**%

Data Source: 2010 U/E/RUE/RA assessment tally files

A total of 3,240, or 39.8 percent, of the total RUE HUs were assigned a Verify action. A total of 2,030, or 24.9 percent, of the total RUE HUs were assigned a Correction action. A total of 1,062, or 13.0 percent, of the total RUE HUs were assigned a Delete action. Table 99 also shows that there were 1,451 housing units assigned an Add action, which accounted for 17.8 percent of the entire RUE universe. Table 100 provides more details on those cases.

Table 100: Outcomes of Added Addresses in RUE

Outcome	Number of Housing Units	Percent
Total New MAF Units Created	1,436	99.0%
New Records Added	1,181	81.4%
Matches Ignored and New MAF Unit created	255	17.6%
Total Records Merged (Updated Matched)	15	1.0%
Total Adds	**1,451**	**100.0%**

Data Source: 2010 UE/RUE/RA assessment tally files

Table 100 shows, of the total RUE adds, 1,436 (99 percent) resulted in the creation of new MAF Units in the MTdb, while 1,181 (81.4 percent) were new addresses to the MTdb (they did not match to existing records in the MTdb). Overall, 255 (17.6 percent) of the updates matched to existing records in the MTdb, but only 15 (1 percent) added during RUE updated existing records in the MTdb.

Types of Addresses

Addresses were classified into five categories based on the highest criterion met. The categories are complete city-style, complete rural route, complete P.O. Box, incomplete address, and no address information. Location house number and street name fields were used while location ZIP Code was not included in the criteria for determining a complete city-style address. Addresses were further delineated by the presence or absence of a physical/location description provided during a census field operation.

Table 101 shows the RUE HUs in the Final Tabulation MAF extract by address type.

Table 101: RUE MTdb update by Address Type

	Number of Housing Units	Percent
Complete City-Style Address	**2,885**	**35.4**%
with location description	1,355	16.6%
without location description	1,530	18.8%
Complete Rural Route Address	**18**	**0.2**%
with location description	18	0.2%
without location description	0	0.0%
Complete Post Office Box Address	**464**	**5.7**%
with location description	462	5.7%
without location description	2	<0.1%
Incomplete Address	**1,292**	**15.9**%
with location description	1,265	15.5%
without location description	27	0.3%
No Address Information	**3,490**	**42.8**%
with location description	3,412	41.9%
without location description	78	1.0%
Total	**8,149**	**100.0**%
with location description	6,512	
without location description	1,637	

Data Source: 2010 Final Tabulation MAF extract

Table 101 shows that 35.4 percent of the addresses in RUE were complete city-style type addresses. The complete rural route address category and complete post office box address category represented 0.2 percent and 5.7 percent respectively of all RUE addresses. In both of these categories, the majority of addresses had an associated location description. There were 42.8 percent of RUE addresses with no address information. Of these addresses, 97.8 percent had a location description. Close to 16 percent of the total RUE units had an incomplete address. It is possible there may have been complete address information contained in one address field due to inconsistencies in form completion and/or data capture issues. A complete house number and street name could be contained in the street name field or location description field on the listing pages.

Table 102 contains a summary of the RUE MTdb update action codes.

Table 102: RUE MTdb update by Action

Action Codes	Number of Housing Units	Percent
Verify	3,240	39.8%
Correction*	2,030	24.9%
Add	1,452	17.8%
Delete	1,062	13.0%
Duplicate	138	1.7%
Nonresidential	109	1.3%
Uninhabitable*	102	1.3%
Empty Mobile Home/Trailer Site*	16	0.2%
Total	**8,149**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Notes: * *All three of these actions were represented by the same action code on the MTdb. The distributions reported here are the breakdown of "C" actions approximated using the percent of each field action from the UE/RUE/RA assessment tally file. The 2010 Final Tabulation MAF extract reported 159,351 for the combination of these three.*

There were 1,452 housing units assigned an Add action, which accounted for 17.8 percent of the entire RUE universe. A total of 3,240, or 39.8 percent, of the total RUE housing units were assigned a Verify action. Correction and Delete actions comprised 24.9 percent and 13.0 percent of the total workload, respectively.

Table 103 shows the number of RUE housing units in the census as a percent of each RUE block that matches to a residential address on the DSF. The DSF is a list of the addresses serviced by the USPS.

Table 103: RUE MTdb update by blocks that match the Delivery Sequence File

Percent of housing units in a block that match the DSF	Number of blocks	Percent	Number of Housing Units	Percent
0 percent	428	92.0%	5,007	61.4%
0 < percent ≤ 25	16	3.4%	1,012	12.4%
25 < percent ≤ 50	10	2.2%	1,099	13.5%
50 < percent ≤ 75	6	1.3%	953	11.7%
75 < percent < 100	0	0.0%	0	0.0%
100 percent	5	1.1%	78	1.0%
Total	**465**	**100.0**%	**8,149**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

There were only 1.1 percent of blocks and 1 percent of housing units in blocks with more than 75 percent of the housing units in the block matching the DSF. These are blocks for which we would expect successful mail delivery. On the other hand, the huge majority of the blocks (95.4 percent) and the housing units (73.8 percent) were in blocks where no more than 25 percent of the housing units in the block matched to the DSF. Such blocks, which in this case were a substantial percentage of all RUE blocks, would presumably present mail delivery challenges for the USPS.

Table 104 presents the RUE HUs in the Final Tabulation MAF extract by the size of the structure at the basic street address. A basic address was defined by a house number and a street name, in addition to other street name prefixes and suffixes (e.g. East, Old, Bypass) within a collection block and ZIP code.

Table 104: RUE MTdb update by Basic Street Address

Size of Structure	Number of Housing Units	Percent
Single Unit	7,521	92.3%
Multi-Unit	628	7.7%
2 – 4 units	478	5.9%
5 – 9 units	42	0.5%
10 – 19 units	36	0.4%
20 – 49 units	0	0.0%
50+ units	72	0.9%
Total	**8,149**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Single unit housing structures comprised 92.3 percent of the total RUE workload. Among the 628 addresses with a multi-unit structure, over 76 percent contained two to four units.

Table 105 shows the distribution of original sources for addresses in the Final Tabulation MAFX. The methodology for calculating the 2010 MAF Original Source variable was to compare the corresponding earliest census operation date by MAFID on the Final Tabulation MAF extract to the DSF refresh variable.

Table 105: RUE MTdb update by Original Source

Original Source	Number of Housing Units	Percent
1990 Census	296	3.6%
2000-2010 survey updates	503	6.2%
2010 Non-ID Processing	4	<0.1%
2010 RA/RUE/UE	1,448	17.8%
Census 2000 operations	5,736	70.4%
DSF: Census 2000 and before	27	0.3%
DSF: pre-Address Canvassing	134	1.6%
DSF: pre-Supplemental delivery	1	<0.1%
Total	**8,149**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Census 2000 operations had the highest percentage of RUE Original Source with 70.4 percent, followed by 2010 RA/RUE/UE at 17.8 percent and 2000-2010 survey updates with 6.2 percent.

5.3.1.2 Formation of the DRF Analysis Universe

Section 5.3.1.1 discussed the address update component of RUE enumerators' work. The rest of Section 5.3.1.2 discusses results of the enumeration component of the enumerators' work. The universe for these results came from the DRF, which identified a slightly different number of cases worked in the RUE operation than the MAF extract and assessment tally files had identified (as reported in Section 5.3.1.1). Section 5.3.1.2 presents how the DRF universe was identified, before subsequent sections show the results obtained from the EQs completed in RUE.

The top row in Table 106 is the total number of enumerator questionnaires on the DRF from Remote Update Enumerate, including multiple copies of the same questionnaire and added questionnaires that were not able to be associated with an address. The second row removes the multiple copies of the same questionnaire. The third row removes all questionnaires that were for an added housing unit which were not associated with an address. There were 100 of those from the RUE universe. The last row in the table removes duplicated questionnaires generated for an address due to rework. There were 60 additional questionnaires completed for housing units in the RUE universe. The universe to analyze the results of the RUE operation from the DRF in this assessment is 8,281 unique housing units.

Table 106: RUE Universe Characteristics

Remote UE Universe Characteristics	Number of Questionnaires
All Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	8,451
Unique Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	8,441
Unique Questionnaires on the DRF (only including Adds geocoded and assigned to an address)	8,341
Unique Housing Units on the DRF (only including Adds geocoded and assigned to an address)	8,281

Source: DRF

5.3.1.3 RUE Housing Unit Status

Table 107 reports the distribution of housing unit status for the cases worked in RUE.

Table 107: RUE Housing Unit Status

Housing Unit Status	Number of Housing Units	Percent
Occupied	2,571	31.0%
Vacant	4,248	51.3%
Delete	1,439	17.4%
Unresolved	23	0.3%
Total Housing Units	**8,281**	**100.0%**

Source: DRF

Of the entire RUE workload, Table 107 shows that the majority of housing units (51.3 percent) were found to be vacant. Occupied housing units accounted for 31.0 percent of the universe, nonexistent housing units were 17.4 percent, and housing units whose status could not be resolved were 0.3 percent of the universe. The high rate of vacant units makes sense for this part of Maine and Alaska.

Table 108 shows the number of housing units marked as refusals during the RUE operation, by housing unit status.

Table 108: RUE Refusals

Housing Unit Status	Number of Housing Units	Number of Refusals	Refusal Percentage
Occupied	2,571	92	3.6%
Vacant	4,248	2	<0.1%
Delete	1,439	1	0.1%
Unresolved	23	1	4.3%
Total Housing Units	**8,281**	**96**	**1.2%**

Source: DRF

Of the housing units in RUE, there were 96 (1.2 percent) that were marked as a refusal on the questionnaire; 92 of those were from occupied housing units.

Occupied Housing Units

The reported population count of an occupied housing unit (as captured in Item C from Figure 3) was considered valid if it was from 1 to 49, inclusive. A population count for an occupied housing unit was considered invalid if it was either blank, zero, or ranged from 50 to 98. A value of 99 indicated the population count was unknown to the enumerator. Table 109 shows how often each of these three types of population counts was recorded in conjunction with a reported refusal.

Table 109: Types of Refusals for RUE Occupied Housing Units

Type of Pop Count	Number of Housing Units	Percent
Valid population count	47	51.1%
Invalid population count	0	0.0%
Unknown population count	45	48.9%
Refusals	**92**	**100.0%**

Source: DRF

Table 109 shows that roughly half of the refusals (51.1 percent) had a valid population count, while roughly half (48.9 percent) had an unknown population count.

Vacant Housing Units

Table 107 showed that 4,248 housing units were determined to be vacant during RUE. Table 110 describes the distribution of those vacant housing units.

Table 110: Types of RUE Vacant Housing Units

Vacant Type	Number of Housing Units	Percent
Regular	1,083	25.5%
Usual Home Elsewhere (UHE)	3,121	73.5%
Unknown	44	1.0%
Total Vacant Housing Units	**4,248**	**100.0%**

Source: DRF

The majority (73.5 percent) were found to be seasonally vacant while 25.5 percent were regular vacants.

Deleted Housing Units

Table 107 showed that 1,439 housing units were marked to be deleted during RUE. There are five classes of deletes and Table 111 shows their distribution in RUE. If an enumerator indicated two or more delete classifications for an address, then it was coded as a Delete Unknown.

Table 111: Types of RUE Deleted Housing Units

Delete Type	Number of Housing Units	Percent
Demolished/Burned Out/Cannot Locate	1,095	76.1%
Nonresidential	117	8.1%
Empty Mobile Home/Trailer Site	16	1.1%
Uninhabitable	95	6.6%
Duplicate	107	7.4%
Delete Unknown	9	0.6%
Total Deleted Housing Units	**1,439**	**100.0%**

Source: DRF

Table 111 shows that the majority of cases (76.1 percent) marked for deletion by RUE enumerators were classified as 'demolished/burned out/cannot locate'.

5.3.1.4 Interview Completion

The following section will discuss the timing of when RUE interviews were conducted in the field with respondents. Given the difficulties with PBOCS (discussed in Section 5.5), all data in this section come from the data-captured EQs. There are no reliable data from PBOCS to report when EQs were checked-in or how long it took LCOs to finish their UE assignments. These results answer the research questions regarding how the planned start and finish dates for the RUE operation compared to the actual start and finish dates, and how the accumulation of outcomes changed over time.

RUE was scheduled to start on March 21. Table 112 shows the distribution of cases completed by week.

Table 112: RUE Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		3	<0.1%	<0.1%
3/07 - 3/13		4	<0.1%	0.1%
3/14 - 3/20		160	1.9%	2.0%
3/21 - 3/27	Official Start of RUE	1,422	17.2%	19.2%
3/28 - 4/03		1,548	18.7%	37.9%
4/04 - 4/10		2,037	24.6%	62.5%
4/11 - 4/17		1,302	15.7%	78.2%
4/18 - 4/24		928	11.2%	89.4%
4/25 - 5/01		391	4.7%	94.1%
5/02 - 5/08		316	3.8%	97.9%
5/09 - 5/15		90	1.1%	99.0%
5/16 - 5/22		67	0.8%	99.8%
5/23 - 5/29	Official End of RUE	7	0.1%	99.9%
5/30 - 6/05		1	<0.1%	99.9%
6/06 - 6/12		1	<0.1%	100.0%
6/13 - 6/19		1	<0.1%	100.0%
Missing/Out of Range		3	<0.1%	100.0%
Total Housing Units		**8,281**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 112 shows that over half of the cases were completed by April 10. Over ninety percent of the cases were completed by the end of April. May 29 was the official end date for RUE; only three cases had reported completion dates after that point.

The next three tables looks at when occupied, vacant, and deleted housing units were completed. The first table, Table 113 looks at the amount of occupied housing units completed by week.

Table 113: RUE Occupied Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		0	0.0%	0.0%
3/07 - 3/13		4	0.2%	0.2%
3/14 - 3/20		55	2.1%	2.3%
3/21 - 3/27	Official Start of RUE	495	19.3%	21.5%
3/28 - 4/03		548	21.3%	42.9%
4/04 - 4/10		708	27.5%	70.4%
4/11 - 4/17		469	18.2%	88.6%
4/18 - 4/24		184	7.2%	95.8%
4/25 - 5/01		21	0.8%	96.6%
5/02 - 5/08		49	1.9%	98.5%
5/09 - 5/15		8	0.3%	98.8%
5/16 - 5/22		25	1.0%	99.8%
5/23 - 5/29	Official End of RUE	2	0.1%	99.9%
5/30 - 6/05		1	<0.1%	99.9%
6/06 - 6/12		0	0.0%	99.9%
6/13 - 6/19		0	0.0%	99.9%
Missing/Out of Range		2	0.1%	100.0%
Total Occupied Housing Units		**2,571**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 113 shows that by April 10, 70.4 percent of all housing units eventually identified as occupied had been completed by an enumerator. In contrast, Table 114 shows that 61.7 percent of vacants had been completed by April 10. Table 115 shows that 50.3 percent of deletes were completed by April 10.

Table 114: RUE Vacant Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		3	0.1%	0.1%
3/07 - 3/13		0	0.0%	0.1%
3/14 - 3/20		59	1.4%	1.5%
3/21 - 3/27	Official Start of RUE	841	19.8%	21.3%
3/28 - 4/03		819	19.3%	40.5%
4/04 - 4/10		901	21.2%	61.7%
4/11 - 4/17		545	12.8%	74.6%
4/18 - 4/24		585	13.8%	88.3%
4/25 - 5/01		209	4.9%	93.3%
5/02 - 5/08		190	4.5%	97.7%
5/09 - 5/15		56	1.3%	99.1%
5/16 - 5/22		34	0.8%	99.9%
5/23 - 5/29	Official End of RUE	3	0.1%	99.9%
5/30 - 6/05		0	0.0%	99.9%
6/06 - 6/12		1	<0.1%	100.0%
6/13 - 6/19		1	<0.1%	100.0%
Missing/Out of Range		1	<0.1%	100.0%
Total Vacant Housing Units		**4,248**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 115: RUE Deleted Housing Units completed by week

Week		Total for that Time Period	Percent for that Time Period	Cumulative Percent
3/01 - 3/06		0	0.0%	0.0%
3/07 - 3/13		0	0.0%	0.0%
3/14 - 3/20		0	0.0%	0.0%
3/21 - 3/27	Official Start of RUE	121	8.4%	8.4%
3/28 - 4/03		175	12.2%	20.6%
4/04 - 4/10		428	29.7%	50.3%
4/11 - 4/17		286	19.9%	70.2%
4/18 - 4/24		157	10.9%	81.1%
4/25 - 5/01		160	11.1%	92.2%
5/02 - 5/08		77	5.4%	97.6%
5/09 - 5/15		26	1.8%	99.4%
5/16 - 5/22		7	0.5%	99.9%
5/23 - 5/29	Official End of RUE	2	0.1%	100.0%
5/30 - 6/05		0	0.0%	100.0%
6/06 - 6/12		0	0.0%	100.0%
6/13 - 6/19		0	0.0%	100.0%
Missing/Out of Range		0	0.0%	100.0%
Total Deleted Housing Units		**1,439**	**100.0%**	**100.0%**

Source: DRF and AUX

5.3.1.5 Interview Characteristics

The following section presents some paradata about the interviews with RUE respondents, including the language that interviews were conducted in, the number of contacts that enumerators made to enumerate a housing unit, and the type of respondents who completed RUE interviews.

Language

Since RUE was a small universe in just one state, only three languages were recorded for interviews in RUE. Those languages are shown in Table 116.

Table 116: Languages in Which RUE Interviews Were Conducted

Language	Total	Percent
English	7,894	95.3%
French	7	0.1%
Spanish	3	<0.1%
Unknown	377	4.6%
Total Housing Units	**8,281**	**100.0%**

Source: DRF and AUX

The majority of interviews were completed in English. Seven interviews were reported to be conducted in French, and three in Spanish.

Record of Contact

Table 117 shows the distribution of the number of contacts made to an address in order to obtain a completed interview. The first column contains all 8,281 housing units in RUE. Subsequent columns look strictly at housing units by their final occupancy status. The occupied, vacant, and delete columns do not add up to the total of 8,281 housing units because some housing units had unresolved occupancy statuses, which are not presented in a separate column in Table 117.

Table 117: Number of Contact Attempts Made to RUE Housing Units

Number of Contact Attempts	All Addresses	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	15	0.2%	2	0.1%	5	0.1%	8	0.6%
1	7,470	90.2%	2,196	85.4%	3,862	90.9%	1,393	96.8%
2	589	7.1%	209	8.1%	350	8.2%	29	2.0%
3	121	1.5%	92	3.6%	17	0.4%	9	0.6%
4	55	0.7%	46	1.8%	9	0.2%	0	0.0%
5	15	0.2%	12	0.5%	3	0.1%	0	0.0%
6	16	0.2%	14	0.5%	2	<0.1%	0	0.0%
Total Housing Units	**8,281**	**100.0%**	**2,571**	**100.0%**	**4,248**	**100.0%**	**1,439**	**100.0%**

Source: DRF and AUX

A vast majority of the interviews with RUE housing units were completed in one contact (90.2 percent). In theory, there should have been zero housing units with more than one contact since RUE was considered a one-pass only operation. Interviews with occupied housing units required the most contacts. Over six percent of the occupied housing units required more than two contacts, while only 0.7 percent of the vacant and 0.6 percent of the delete housing units required more than two contacts.

Table 118 shows the distribution of contacts made in person to RUE housing units.

Table 118: Number of Personal Contact Attempts Made to RUE Housing Units

Number of Personal Contact Attempts	All Addresses	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	94	1.1%	4	0.2%	46	1.1%	44	3.1%
1	7,590	91.7%	2,268	88.2%	3,936	92.7%	1,366	94.9%
2	431	5.2%	167	6.5%	242	5.7%	22	1.5%
3	110	1.3%	85	3.3%	15	0.4%	7	0.5%
4	38	0.5%	32	1.2%	6	0.1%	0	0.0%
5	14	0.2%	11	0.4%	3	0.1%	0	0.0%
6	4	<0.1%	4	0.2%	0	0.0%	0	0.0%
Total Housing Units	**8,281**	**100.0%**	**2,571**	**100.0%**	**4,248**	**100.0%**	**1,439**	**100.0%**

Source: DRF and AUX

Table 119 shows the number of telephone contacts made to housing units in RUE.

Table 119: Number of Telephone Contact Attempts Made to RUE Housing Units

Number of Telephone Contact Attempts	All Addresses	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	8,004	96.7%	2,475	96.3%	4,101	96.5%	1,406	97.7%
1	252	3.0%	78	3.0%	140	3.3%	33	2.3%
2	18	0.2%	12	0.5%	6	0.1%	0	0.0%
3	6	0.1%	5	0.2%	1	<0.1%	0	0.0%
4	0	0.0%	0	0.0%	0	0.0%	0	0.0%
5	1	<0.1%	1	<0.1%	0	0.0%	0	0.0%
Total Housing Units	**8,281**	**100.0%**	**2,571**	**100.0%**	**4,248**	**100.0%**	**1,439**	**100.0%**

Source: DRF and AUX

The majority of housing units in RUE were not contacted by telephone (96.7 percent).

Table 120 shows what mode the presumed last contact was with a housing unit. Cases with an unknown mode either had zero contacts identified or did not mark the checkbox to distinguish if it was a personal contact or a telephone call for the last box utilized in the record of contact section.

Table 120: Type of Final Contact for Housing Units in RUE, by Housing Unit Status

Final Contact	All Addresses	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
Person	7,966	96.2	2,475	96.3	4,083	96.1	1,386	96.3
Telephone	242	2.9	65	2.5	144	3.4	32	2.2
Unknown	73	0.9	31	1.2	21	0.5	21	1.5
Total Housing Units	**8,281**	**100.0%**	**2,571**	**100.0%**	**4,248**	**100.0%**	**1,439**	**100.0%**

Source: DRF and AUX

Table 120 shows that the majority of RUE cases (96.2 percent) were completed by a personal visit from an enumerator.

Type of Respondent

Table 121 reports the distribution of respondent type for all RUE interviews.

Table 121: Type of Respondent for RUE Interviews

	Total Cases		Occupied		Vacant		Delete	
Respondent Type	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Household Member	2,008	24.2%	1,966	76.5%	27	0.6%	13	0.9%
Unknown Type	157	1.9%	4	0.2%	15	0.4%	134	9.3%
All Proxy	6,116	73.9%	601	23.4%	4,206	99.0%	1,292	89.8%
Proxy Type								
In-mover	34	0.4%	1	<0.1%	33	0.8%	0	0.0%
Neighbor or other	6,081	73.4%	600	23.3%	4,172	98.2%	1,292	89.8%
Both marked	1	<0.1%	0	0.0%	1	<0.1%	0	0.0%
Total Housing Units	**8,281**	**100.0%**	**2,571**	**100.0%**	**4,248**	**100.0%**	**1,439**	**100.0%**

Source: DRF

A neighbor or other proxy accounted for 73.4 percent of all RUE respondents while in-mover proxies were 0.4 percent of all respondents. Actual April 1 household members were only 24.2 percent of all respondents. There were an additional 1.9 percent of respondents who could not be categorized, either because the enumerator left this question blank or because the boxes were marked for being both a household member on April 1 and for being a proxy.

The percent of respondents who were household members increases to 76.5 percent when the universe contains only occupied housing units. A proxy was the respondent for 23.4 percent of all occupied interviews.

5.3.1.6 Characteristics of Occupied Housing Units

The tables in this section will discuss characteristics of the occupied housing units that were interviewed during RUE. This section will include results on occupied housing units' reported population count, answers to the undercount question, and answers to the overcount question.

Population Count for Occupied Housing Units

Table 122 shows the distribution of population count within occupied housing units contacted during RUE using both the enumerator-reported population count and the number of data-defined people.

Table 122: Population Count of Occupied Housing Units in RUE

	Enumerator-Reported		Data-defined People	
Population Count	**Number of Addresses**	**Percent**	**Number of Addresses**	**Percent**
0	0	0.0%	251	9.8%
1	607	23.6%	580	22.6%
2	1,018	39.6%	957	37.2%
3	374	14.5%	342	13.3%
4	295	11.5%	265	10.3%
5	123	4.8%	118	4.6%
6	47	1.8%	36	1.4%
7	16	0.6%	13	0.5%
8	8	0.3%	5	0.2%
9	3	0.1%	2	0.1%
10	3	0.1%	2	0.1%
11 – 15	1	<0.1%	0	0.0%
16 – 20	0	0.0%	0	0.0%
21 – 30	0	0.0%	0	0.0%
31 – 40	2	0.1%	0	0.0%
41 – 49	0	0.0%	0	0.0%
50 – 97	1	<0.1%	N/A	N/A
98 (Delete)	0	0.0%	N/A	N/A
99 (Unknown)	73	2.8%	N/A	N/A
Missing	0	0.0%	N/A	N/A
Total Occupied Housing Units	**2,571**	**100.0%**	**2,571**	**100.0%**

Source: DRF

The right column in Table 122 shows that 9.8 percent of occupied housing units did not provide enough information about individuals for anyone to be flagged as a data-defined person. There were also 73 cases in RUE where the enumerator-reported the population count to be unknown. Table 123 reports how many of those cases were also marked as refusals.

Table 123: Unknown Population Counts in RUE Occupied Housing Units

Occupied Type	**Number of Housing Units**	**Percent**
Not Refusals	28	38.4
Refusals	45	61.6
Unknown Population Counts	**73**	**100.0%**

Source: DRF

Over half of the cases (61.6 percent) with an enumerator-reported unknown population count were also marked as refusals. Table 124 shows the number of continuation forms used to enumerate people at each address in RUE.

Table 124: Number of Continuation Forms used at an Occupied Address during RUE

Number of Continuation Forms	Number of Addresses	Percent
0	2,512	97.7%
1	59	2.3%
Total Occupied Housing Units	**2,571**	**100.0%**

Source: DRF

Table 122 showed that no housing units in RUE had more than ten data-defined people, so it makes sense in Table 124 that there would be no housing units enumerated with more than one continuation form.

Undercount

Table 125 shows the frequency that each undercount probe was marked with an affirmative answer.

Table 125: Distribution of Answers to the Undercount Probes at Occupied RUE Housing Units

Undercount Category	Number of Housing Units	Percent
Only 'No' category marked	2,173	84.5%
At least one category marked	28	1.1%
Babies only	*2*	*0.1%*
Foster children only	*2*	*0.1%*
Any other relatives only	*17*	*0.7%*
Roommates only	*1*	*<0.1%*
Any other nonrelatives only	*2*	*0.1%*
Anyone else staying on April 1 who had no permanent place to live only	*4*	*0.2%*
Multiple categories marked	*0*	*0.0%*
Missing (All boxes blank)	370	14.4%
Total Occupied Housing Units	**2,571**	**100.0%**

Source: DRF

Table 125 shows that only 28 housing units affirmatively answered the undercount probe in RUE. The most common category cited was "any other relatives", which was indicated by 0.7 percent of all occupied housing units.

If the respondent answered 'yes' to any of the probes, the UE enumerator was to collect a maximum of two names for the people who were possibly undercounted, as shown in Figure 9. For all occupied housing units that gave a positive answer to an undercount category, Table 104 shows how often the name fields were used at the end of the undercount question. For this

assessment, the name fields were not inspected for validity; any entry would have been captured as a valid name in the following tables.

Table 126: Number of Undercount Names Reported When Any Undercount Category Marked in RUE Occupied Housing Units

Total Number of Names	Housing Units	Percent
Zero Names	3	10.7%
One Name	21	75.0%
Two Names	4	14.3%
Total Occupied Addresses	**28**	**100.0%**

Source: DRF and AUX

Table 126 shows that four housing units in RUE provided two names to the undercount question, after indicating a category.

Table 127 on the next page shows how often a name was provided to the enumerator when a respondent had replied affirmatively to specific undercount categories.

Table 127: Number of Undercount Names Reported for Specific Undercount Category Marked in RUE Occupied Housing Units

Undercount Category with Number of Names	Total	Percent
Babies only		
Zero Names	0	0.0%
One Name	2	100.0%
Two Names	0	0.0%
Total	**2**	**100.0%**
Foster children only		
Zero Names	0	0.0%
One Name	2	100.0%
Two Names	0	0.0%
Total	**2**	**100.0%**
Any other relatives only		
Zero Names	1	5.9%
One Name	13	76.5%
Two Names	3	17.6%
Total	**17**	**100.0%**
Roommates only		
Zero Names	0	0.0%
One Name	1	100.0%
Two Names	0	0.0%
Total	**1**	**100.0%**
Any other nonrelatives only		
Zero Names	1	50.0%
One Name	1	50.0%
Two Names	0	0.0%
Total	**2**	**100.0%**
Anyone else only		
Zero Names	1	25.0%
One Name	2	50.0%
Two Names	1	25.0%
Total	**4**	**100.0%**
Multiple		
Zero Names	0	n/a
One Name	0	n/a
Two Names	0	n/a
Total	**0**	n/a
None[68]		
Zero Names	2,542	100.0%
One Name	1	<0.1%
Two Names	0	0.0%
Total	**2,543**	**100.0%**

Source: DRF and AUX

[68]These numbers include both rows "Missing" and "Only 'No' category marked" from Table 125.

Overcount

Results of the overcount question are shown in Table 128. The overcount question was asked for each person so the universe in Table 128 is made up of each data-defined person in an occupied housing unit. There were 5,555 data-defined people from occupied housing units captured during RUE.

Table 128: Overcount Category for Data-defined People in RUE Occupied Housing Units

Overcount Category	Number of People	Percent
None	5,250	94.5%
At least one category marked	305	5.5%
College Housing only	10	0.2%
Military only	19	0.3%
Seasonal/Second Home only	116	2.1%
Child Custody only	67	1.2%
Jail or Prison only	2	<0.1%
Nursing Home only	0	0.0%
Another Reason only	84	1.5%
Multiple Categories	7	0.1%
Total People in Occupied Housing Units	**5,555**	**100.0%**

Source: DRF

The majority of people (94.5 percent) did not indicate they lived or stayed anywhere else besides the RUE address. The most common positive reply to the overcount question was for a seasonal or second home, which described 2.1 percent of people. An additional 1.5 percent of people indicated they stayed elsewhere for an undefined reason and 1.2 percent of people stayed elsewhere for child custody.

5.3.1.7 Standard Demographic Tables

There were 5,555 data-defined persons included on 2,571 RUE questionnaires from occupied housing units in the 2010 Census. This section will present the demographic characteristics for these persons on the RUE form. Table 129 gives RUE person demographic characteristics: age, Hispanic origin, race, relationship to person 1, and sex. Age was calculated based on the date of birth provided; if no date of birth was provided then the write-in age was used. Age was calculated only if the date of birth fell within valid date ranges. Similarly, the calculated age or write-in age was used only if it fell within valid age ranges; otherwise it was considered missing. Table 129 also gives the distribution of tenure responses for housing units included in the RUE operation.

Because the demographic data used in this assessment are unedited, direct comparisons with published 2010 Census results are not possible. These tables include a row for people with missing values for the specific characteristic. The data in published Census reports have undergone editing and imputation, and therefore will have no missing values.

Table 129: Standard Assessment Demographic Table

Demographic Item	Number	Percent
Age	**5,555**	**100.0**%
Under 5 years	245	4.4%
5 to 9 years	263	4.7%
10 to 14 years	275	5.0%
15 to 19 years	312	5.6%
20 to 24 years	159	2.9%
25 to 29 years	215	3.9%
30 to 34 years	226	4.1%
35 to 39 years	269	4.8%
40 to 44 years	302	5.4%
45 to 49 years	374	6.7%
50 to 54 years	461	8.3%
55 to 59 years	486	8.8%
60 to 64 years	339	6.1%
65 years and over	485	8.7%
Missing	1,144	20.6%
Hispanic Origin	**5,555**	**100.0**%
Not Hispanic or Latino checkbox only	5,132	92.4%
Mexican checkbox only	68	1.2%
Puerto Rican checkbox only	10	0.2%
Cuban checkbox only	4	0.1%
Another Hispanic checkbox only	8	0.1%
Multiple checkboxes	1	<0.1%
Both Checkbox and Write-in	34	0.6%
Write-in Only	0	0.0%
Missing	298	5.4%

Demographic Item	Number	Percent
Race	**5,555**	**100.0**%
White checkbox alone	4,461	80.3%
Black or African American checkbox alone	12	0.2%
American Indian and Alaska Native checkbox alone	35	0.6%
Asian Indian checkbox alone	4	0.1%
Chinese checkbox alone	9	0.2%
Filipino checkbox alone	15	0.3%
Japanese checkbox alone	3	0.1%
Korean checkbox alone	9	0.2%
Vietnamese checkbox alone	5	0.1%
Other Asian checkbox alone	0	0.0%
Native Hawaiian checkbox alone	2	<0.1%
Guamanian or Chamorro checkbox alone	0	0.0%
Samoan checkbox alone	0	0.0%
Other Pacific Islander checkbox alone	0	0.0%
Some Other Race checkbox alone	8	0.1%
Multiple checkboxes	107	1.9%
Both Checkbox and Write-in	606	10.9%
Write-in Only	4	0.1%
Missing	275	5.0%
Relationship Status to Householder (Person 1)	**5,555**	**100.0**%
Householder	2,308	41.6%
Husband or Wife of Householder	1,316	23.7%
Biological Son or Daughter of Householder	1,169	21.0%
Adopted Son or Daughter of Householder	49	0.9%
Stepson or Stepdaughter of Householder	108	1.9%
Brother or Sister of Householder	24	0.4%
Father or Mother of Householder	42	0.8%
Grandchild of Householder	86	1.6%
Parent-in-law of Householder	10	0.2%
Son-in-law or Daughter-in-law of Householder	17	0.3%
Other Relative	34	0.6%
Roomer or Boarder	20	0.4%
Housemate or Roommate	54	1.0%
Unmarried Partner	172	3.1%
Other Nonrelative	84	1.5%
Two or more relationships	3	0.1%
Missing	59	1.1%
Sex	**5,555**	**100.0**%
Male	2,968	53.4%
Female	2,554	46.0%
Both	2	<0.1%
Missing	31	0.6%

Demographic Item	Number	Percent
Tenure	**2,571**	**100.0**%
Owned with a mortgage or a loan	826	32.1%
Owned without a mortgage or a loan	681	26.5%
Rented	458	17.8%
Occupied without payment of rent	93	3.6%
Multiple	1	<0.1%
Missing	512	19.9%

Source: DRF

These distributions may vary across different 2010 Census operations due to differences in corresponding populations and procedures.

5.3.1.8 Characteristics of Added Housing Units

The following section discusses housing units that were not part of a RUE enumerators' assigned work but were either visited or discussed during the course of an interview. As stated earlier in section 5.1.1.8, there are two types of added housing units that are relevant to this field operation: Type A and Type C cases. Type A cases consist of a case where the respondent at a RUE address claimed that they really lived or stayed at another address on Census Day where they should have been counted (called a Usual Home Elsewhere (UHE)). Adds that were added for Type A cases were to only be processed if at least one person was listed on the questionnaire (i.e., one person had a value of one for the variable Computed Person Number). However, some Type A cases without a person record were incorrectly included for processing. An enumerator that observes a housing unit that was missing from their address binder and completes an EQ for the housing unit created a Type C case. Type C cases were processed regardless of how many people were listed. Table 130 shows the number of each type of added housing unit found in RUE.

Table 130: Type of Added Housing Units Found in RUE

Add Type	Number of Housing Units	Percent
Type A (Computed Person Number=1) Total	7	0.4%
Type A (Computed Person Number=0) Total	64	4.1%
Type C	1,486	95.4%
Total Adds	**1,557**	**100.0%**

Source: DRF

Table 130 reports that 1,557 housing units were added during RUE. Type C cases (enumerator adds) account for 95.4 percent of those adds. There were more Type A cases without a person record (64) than Type A cases with a valid person record (seven).

Type A Adds can also be further grouped into two living situations, as described earlier in section 5.1.1.8. Table 131 shows the number of Type A cases that fit each of the two possible living situations.

Table 131: Frequency of Living Situations Identified for Type A Adds in RUE

	Type A with Computed Person Number=1		Type A with Computed Person Number=0	
Type A Living Situations	**Number**	**Percent**	**Number**	**Percent**
UHE	6	85.7%	62	96.9%
Movers	1	14.3%	2	3.1%
Marked both UHE and Movers	0	0.0%	0	0.0%
Total Type A Adds	**7**	**100.0%**	**64**	**100.0%**

Source: DRF

The majority of Type A adds were classified by the enumerator as UHEs.

All added housing units went through a process by the Geography Division that attempted to assign a MAFID to the address. Addresses with a MAFID are considered valid Census addresses. If the address information provided by the enumerator was not sufficient for Geography Division to associate the address with a census block, then it was not included on the DRF state files or given a MAFID. Table 132 shows the frequency of that occurrence.

Table 132: Frequency that Added Housing Units from RUE Associated with a State

Add Type	**Number of Housing Units**	**Percent**
In a State	1,457	93.6%
Not associated with a State	100	6.4%
Total Adds	**1,557**	**100.0%**

Source: DRF

Table 132 shows that 93.6 percent of the added housing units were able to be associated with a state. However, 6.4 percent of the added housing units were not able to be placed in a state and so were not included in the final 2010 Census count.

Since Type C adds are physically visible in front of the enumerator, those adds should have a high rate of being successfully located in a state during Geography Division's processing. Table 133 shows the distribution of processing results by type of add.

Table 133: Frequency that Added Housing Units from RUE Associated with a State, by Type

	Type A (Computed Person Number=1)		Type A (Computed Person Number=0)		Type C	
Add Type	**Number of Housing Units**	**Percent**	**Number of Housing Units**	**Percent**	**Number of Housing Units**	**Percent**
In a State	4	57.1%	53	82.8%	1,400	94.2%
Not associated with a State	3	42.9%	11	17.2%	86	5.8%
Total Adds	**7**	**100.0%**	**64**	**100.0%**	**1,486**	**100.0%**

Source: DRF

Type A cases with a valid person record were the likely to be associated with a state after Geography Division's processing, 57.1 percent of the time. Type C addresses were associated with a state in 94.2 percent of the cases.

To assess if the adds can be found on the ground by an enumerator in the future, the information collected in the address fields is extremely important. Some of the address components, and combinations thereof, are critical to locate the structure on the ground. The analysis on address information confirms only that the necessary fields were filled, but not that the data in the fields are valid and correct. As first described in section 5.1.1.9 for Type A cases, the address fields necessary for a complete record came only from the H3 question and were:

- House Number,
- Street Name,
- And ZIP Code.

The analysis on address information confirms only that the necessary fields were filled, but not that the data in the fields are valid and correct. Table 134 shows the address combinations for all Type A Adds from RUE**.**

Table 134: Content of Address Fields for All Type A Adds from RUE

	Type A with Computed Person Number=1		Type A with Computed Person Number=0	
House Number, Street Name, and ZIP Code	**Number**	**Percent**	**Number**	**Percent**
All filled	4	57.1%	4	6.3%
All blank	0	0.0%	56	87.5%
At least one field filled but not all fields filled	3	42.9%	4	6.3%
Total Type A Adds	**7**	**100.0%**	**64**	**100.0%**

Source: DRF

The Type A Adds with a valid person record were more likely to have complete information provided for these selected address fields than the Type A Adds without a valid person record (57.1 percent compared to 6.3 percent). The Adds without a person record had no information written in to the three key address fields (house number, street name and ZIP code) 87.5 percent of the time.

Type C cases were the added housing units that the enumerator visibly saw in front of them. For an enumerator to find a Type C case in the future, a combination of address fields from question H3 and geographic fields near the label on the front of the EQ are needed. The necessary fields of stateside Type C addresses are:

- House Number (H3),
- Street Name (H3),
- Block (EQ front),
- County (EQ front), and
- State (EQ front)

Table 135 reports the completeness of address information collected on all Type C adds.

Table 135: Content of Address Fields for All Type C Adds from RUE

House Number, Street Name, Block, County, and State	Number	Percent
All filled	388	26.1%
All blank	1	0.1%
At least one field filled but not all fields filled	1,097	73.8%
Total Type C Adds	**1,486**	**100.0%**

Source: DRF

The majority of Type C adds from RUE (73.8 percent) had at least one of the five desired address fields filled, but did not have all of them filled. All five address fields were filled in 26.1 percent of the cases.

5.3.2 Cost, Staffing, and Production Rates

5.3.2.1 Summary of RUE Field Operation Costs

The total cost of RUE was $820,874, or 40.9 percent of the $1,388,698 RUE field budget. The $567,824 variance is mainly because of less than expected production salary and mileage costs. The following factors contributed to overall underspending:

- Higher than expected production rate,
- Lower CLA cost than budgeted
- Lower than expected mileage per case

Higher Than Expected Production Rate
The budgeted production rate was 0.37 cases per hour; however, we achieved a production rate of 0.42 cases per hour.[69] The increased production may be because of improved targeted recruiting and work assignment. We believe we were able to hire more local enumerators who may not have had to travel as far to complete their assigned work.

Lower CLA Costs than Budgeted
Because of having fewer CLAs working than budgeted, the actual CLA fieldwork cost was only $7,215. We surmise that the crew leaders required less than expected support from CLAs, resulting in underspending of $180,976, representing 31.9 percent of the total RUE cost variance.

[69] The production rate reflects the average number of cases completed per hour as calculated by dividing the total workload by the total enumerator production hours worked.

Lower Than Expected Mileage per Case

The increased productivity affected the total number of miles driven by the enumerators. With respect to the mileage, we budgeted 42.5 miles per case; however, on average, enumerators only traveled 36.1 miles per case. Just as with the production rate, we believe that the lower miles per case may have been in part because of improved targeted recruiting and work assignment. We believe we were able to hire more local enumerators who may not have had to travel as far to complete their assigned work.

Table 136 depicts the budgeted and actual RUE workload as well as the RUE budgeted and actual costs by four cost factors: production salary, training salary, cost of mileage, and miscellaneous cost. As is the case for UE, the miscellaneous cost includes the cost of lodging, per diem, and telephone calls. The table also shows the percent of budget used for each cost factor. The percent of budget used is the actual cost divided by the budgeted cost for each individual cost factor. Additionally, the table shows each individual cost factor as a percentage of the actual total RUE cost of $567,824.

Table 136: RUE Summary of Field Operation Costs

	Budget	Actual	Percent of Budget Used	Percent of Actual Total Cost
Total	**$1,388,698**	**$820,874**	**59.1%**	**100.0%**
Workload	7,393	8,114	--	--
Production Salary	$860,019	$476,567	55.4%	58.1%
Training Salary	$187,712	$130,586	69.6%	15.9%
Mileage Cost	$335,259	$177,350	52.9%	21.6%
Miscellaneous	$5,708	$36,371	637.2%	4.4%

Source: DMD C&P

The actual workload was slightly higher than expected by 723 cases. Conversely, the total actually spent in the RUE operation was $820,874 or 59.1 percent of the budget. Production salary, training salary, and mileage costs ran under budget by 44.6 percent, 30.4 percent, and 47.1 percent, respectively. However, miscellaneous costs actually ran over budget by 637.2 percent. The miscellaneous cost, which includes the cost of lodging, per diem, and telephone calls, was notably higher than expected but did not affect overall spending much because the total miscellaneous cost amount represented only 4.4 percent of the actual total cost.

The largest contributing factor to the underspending was the production salary cost. We spent $476,567 or 55.4 percent of the $860,019 production salary budget. The other two significant factors were mileage and training salary costs. For mileage, we only spent $177,350 or 53 percent of the $335,259 mileage cost budget. For the training salary, we just spent $130,586 or 69.6 percent of the $187,712 training salary. Production salary was the largest category of spending accounting for 58.1 percent of the total costs.

5.3.2.2 RUE Cost per Case

Actual cost per case was lower than budgeted for each unit-level cost. The total cost per case was budgeted at $187.84; however, the actual cost per case was $101.17.

5.3.2.3 RUE Cases per Hour and Miles per Case

Table 137 displays the average number of cases worked per hour and average miles driven per case. The variance in the following tables is the difference between the budgeted and actual variables. The percent variance is the difference between the actual and budget divided by the budget.

Table 137: RUE Budgeted and Actual Total Cost

	Budgeted	Actual	Percent Variance
Cases Per Hour	0.37	0.42	-12.2%
Miles Per Case	42.45	36.09	15.0%

Source: DMD C&P

We budgeted 0.37 completed cases per hour; however, the actual cases per hour were higher at 0.42, a variance of -12.2 percent. The miles per case budgeted was 42.45 while the actual was 36.09, a variance of 15 percent.

5.3.2.4 RUE Variance by Position Type

In analyzing the cost variance, we reviewed the variance by position type: including enumerators, CLA, CL, FOS, and added a separate category for miscellaneous charges not directly associated with the four field positions. See Figure 2 in Section 2.4 for the hierarchy of field staff. Table 138 depicts the dollar variance and percent variance by position type. It also shows the variance by position type as a percentage of the total RUE variance.

Table 138: RUE Variance by Position Type

Position Type	Variance	Percent Variance of Position Type Budget	Percent of Total Variance
Total	**$567,824**	**40.9%**	**100.0%**
Enumerator	$216,920	26.5%	38.2%
CLA	$217,803	74.6%	38.4%
CL	$138,604	60.9%	24.4 %
FOS	$25,160	54.9%	4.4%
Miscellaneous	-$30,663	-537.2%	-5.4%

Source: DMD C&P

The total RUE cost variance is $567,824 or 40.9 percent of the total RUE budget. The largest variances in terms of dollars and percent of total variance in the enumerator and CLA costs. The enumerator cost variance is $216,920 or 26.5 percent of the enumerator budget; and the CLA cost variance is $217,803 or 74.6 percent of the CLA budget.

The enumerator and CLA positions account for 76.6 percent of the total variance. The CL position total variance is 24.4 percent. There is more information on the cost factors by position type in the following sections.

5.3.2.5 RUE Variance by Cost Factor

Almost all the cost factors contributed to the overall underspending. These factors are the funds allocated for training, salary, mileage, and miscellaneous cost, which include expenditures not classified by the four different position types: enumerator, CLA, CL, and FOS. Table 139 shows the dollar and percent variances by cost factor and each variance as a percent of the total variance.

Table 139: RUE Variance by Cost Factor and Position Type

Cost Factor	Variance	Percent Variance of Cost Factor Budget	Percent of Total Variance
Total	**$567,824**	**40.9%**	**100.0%**
Production Salary Total	**$383,452**	**44.6%**	**67.5%**
Enumerator	$140,454	29.2%	24.7%
CL	$42,661	27.1%	7.5%
CLA	$180,976	96.2%	31.9%
FOS	$19,361	57.2%	3.4%
Training Salary Total	**$57,126**	**30.4%**	**10.1%**
Enumerator	$50,668	30.7%	8.9%
CL	$1,599	10.2%	.3%
CLA	$4,757	92.1%	.8%
FOS	$102	5.1%	.0%
Mileage Cost Total	**$157,909**	**47.1%**	**27.8%**
Enumerator	$25,798	15.0%	4.5%
CL	$32,070	59.0%	5.7%
CLA	$94,344	95.6%	16.6%
FOS	$5,697	56.9%	1.0%
Miscellaneous	**-$30,663**	**-537.2%**	**-5.4%**

Source: DMD C&P

The two most significant under-spent variances were CLA and enumerator production salaries. The CLA salary cost variance was 96.17 percent; the enumerator production salary cost variance was 29.2 percent. These two categories represent a total surplus of $321,430. The CLA mile cost variance generated the third largest variance of $94,344 or 95.62 percent of the CLA miles cost budget.

The production salary cost variance was the largest contributing factor to the overall variance, with 67.5 percent of the total RUE cost variance. Lower salary costs significantly affected the total mileage cost, resulting in underspending of $157,909, or 27.8 percent of the total budget variance.

5.3.2.6 RUE Production Staffing

Table 140 depicts the budgeted and actual number of field positions along with the frontloading rate and the percent variance. The table represents how many field staff worked in RUE. If a person worked multiple operations, they were counted in each operation. If a person worked in multiple positions, within an operation, they were counted in the position in which they worked the most hours.

Table 140: RUE Staffing

Position	Frontloading	Number of Positions Budgeted	Number of Positions Actual	% Variance
Total	**-**	**241**	**295**	**-22.4%**
Enumerator	**100.0%**	194	257	-32.5%
CL	0.0%	17	25	-47.1%
CLA	0.0%	28	9	67.9%
FOS	0.0%	2	4	-100.0%

Source: DMD Cost Model and DAPPS

For RUE, we budgeted for 241 total field staff positions. We actually filled 295 positions, which yielded a variance of -22.4 percent. The CLs performed the quality control, and the vacant-delete verifications for the RUE operation. Therefore, the CLA position was the only position where more positions were budgeted than needed. The budget called for 28 CLA positions, but we only filled nine positions.

5.3.3 Training

There were no debriefings conducted for RUE. All training started and finished on schedule. Even though the verbatim training method has many drawbacks, it was the best proven method available in 2010 for ensuring consistency in training. Planning for the 2020 Census will include other training methodologies because of the changing environment utilizing automated devices.

5.3.4 Schedule

The RUE schedule lines comprised 400 lines of the 10,875 lines in the schedule. This count is slightly understated in that there were additional activities outside of the 400 activities also related to UDE (e.g. Assessment activities) that were not linked to the RUE schedule, but were linked to the UE operational schedule only. Thirty of the 400 activities were housed under the RUE[70] Work Breakdown Structure (WBS), and the remaining 370 activities spanned all functional areas related to UDE (e.g. FDCA, UCM).

As shown in Table 141 (below), of the finished activities, 156 activities (39.1 percent) both started and finished on time or ahead of schedule according to baseline dates.

Table 141: RUE Activities that Started and Finished On Time

	Number of Activities	Percent of Activities
Activities that Started and Finished on Time or Ahead	156	39.1%
Activities that Started or Finished Late	243	60.9%
Completed RUE Activities	**399**[71]	**100.0%**

Source: Master Activities Schedule

Table 142 shows the counts and percentages of activities that started and finished on time, grouped by all activities, milestone starts, milestone finishes, and task dependent activities. There were 233 (58.25 percent) activities that started on time or early and 233 (58.25 percent) activities that finished on time or ahead of schedule.

[7070] The RUE WBS identified the Remote Update Enumerate operation in the Primavera project management scheduling software.

[71] There are 400 total schedule activities. The schedule lines that are not finished relate to the UEO assessment and is not reported here.

Table 142: RUE Activities that Started or Finished on Time, by Activity Type

	All Activities		Milestone Starts		Milestone Finishes		Task Dependent Activities	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Activities Started on Time or Early	233	58.3%	12	60.0%	-	-	233	69.8%
Activities Finished on Time or Early	233	58.3%	-	-	23	50.0%	233	69.8%
Completed Activities	**399**	**100.0%**	**20**	**100.0%**	**46**	**100.0%**	**334**	**100.0%**

Source: Master Activities Schedule

5.4 Remote Alaska

The 2010 Census in Alaska primarily focused on enumeration of American Indian and Alaska Native villages. Alaska is big and sparsely populated, which presents specific challenges to conducting enumeration. There is virtually no road system outside the larger cities, the state has an extreme climate, few or no daylight hours during traditional census timeframes and has a very diverse population. RA enumeration has unique challenges associated with the accessibility to the communities in Alaska's most remote areas, where the population ranges from several hundred people to just a few people. The communities in these areas are widely scattered and rarely linked by roads. Most of these communities are accessible only by small engine airplane, snowmobile, four-wheel-drive vehicles, dogsled, or some combination thereof. These challenges demand particular attention for enumeration so a separate operation is devoted to this part of the country. Results of the RA enumeration will be discussed in Section 5.4.

- Section 5.4.1 discusses the workload and operational results from RA.
- Section 5.4.2 discusses the cost and staffing of RA.
- Section 5.4.3 discusses the training provided to RA staff.
- Section 5.4.4 discusses the schedule for RA.

5.4.1 Workload and Outcomes

This section presents the RA workload, results to the operation-specific research questions, and results to the specific assessment questions.

The results presented within Section 5.4.1 cover the following topics:

- Section 5.4.1.1 discusses the address updates made during RA.
- Section 5.4.1.2 discusses the formation of the analysis universe.
- Section 5.4.1.3 discusses the housing unit status of all cases worked in RA.

- Section 5.4.1.4 discusses the timing when RA interviews were completed and when they were checked-in.
- Section 5.4.1.5 discusses characteristics of RA interviews, notably key paradata results.
- Section 5.4.1.6 discusses characteristics of occupied housing units.
- Section 5.4.1.7 presents the standard demographic tables for RA.
- Section 5.4.1.8 discusses characteristics of housing units that were added during RA.

Updating the Address Listing Pages was the first thing an enumerator was to do when working on a case, so results of that component are presented first.

5.4.1.1 Address Record Characteristics

This section provides results on the address listing updates done by the RA enumerators in the field. Section 5.1.1.1 discussed the possible outcomes that enumerators could assign to an address in their AA.

Once the updates for the RA operation were completed in the field, they were data captured at NPC and files were delivered to GEO to update the MTdb for subsequent census operations. The Address Registers and Enumeration Questionnaires underwent processing within GEO where the address updates were either accepted or rejected. As with the RUE operation, some of the existing addresses were unrecognizable, which meant the enumerator had to delete the listed address and then add the housing unit structure that they found on the ground. Table 143 shows the number of RA cases rejected in MTdb.

Table 143: RA Cases Rejected in MTdb

Outcome	Number of Housing Units	Percent
Record Accepted	33,340	100.0%
Record Rejected	21	<0.1%
Total Records	**33,361**	**100.0**%

Data Source: 2010 UE/RUE/RA assessment tally files

A total of 33,361 RA address records were received by GEO; 21 of those records were rejected during GEO processing, leaving 33,340 accepted records. Records were rejected due to illegal or missing values, illegal block codes, the same MAFID is treated as a survivor and retired record, and the Surviving MAFID is filled on the ADDUP and the Unit Status does not equal "7" (duplicate).

Enumerators were expected to provide a status code for each address in their AA binder. Table 144 reports the distribution of final field outcome from the assessment tally files.

Table 144: RA final field outcomes

Field Action Code	Number of Housing Units	Percent
Verified	13,756	41.3%
Correction	9,096	27.2%
Uninhabitable	887	2.7%
Empty Mobile Home/Trailer Site	36	0.1%
Delete	2,971	8.9%
Duplicate	194	0.6%
Nonresidential	608	1.8%
Add	5,792	17.4%
Total Housing Units Processed	**33,340**	**100.0**%

Data Source: 2010 UE/RUE/RA assessment tally files

A total of 13,756, or 41.3 percent of the total RA HUs, were assigned a Verify action. A total of 9,096, or 27.2 percent of the total RA HUs, were assigned a Correction action. A total of 2,971, or 8.9 percent of the total RA HUs, were assigned a Delete action. Table 144 also shows that there were 5,792 HUs assigned an Add action, which accounted for 17.4 percent of the entire RA universe. Table 145 provides more details on those cases.

Table 145: Outcomes of Added Addresses in RA

Outcome	Number of Housing Units	Percent
Total New MAF Units Created	5,773	99.7%
New Records Added	5,501	95.0%
Matches Ignored and New MAF Unit created	272	4.7%
Total Records Merged (Updated Matched)	19	0.3%
Total Adds	**5,792**	**100.0%**

Data Source: 2010 U/E/RUE/RA assessment tally files

Table 145 shows, of the total RA adds, 5,773 (99.7 percent) resulted in the creation of new MAF Units in the MTdb, while 5,501 (95 percent) were new addresses to the MTdb (they did not match to existing records in the MTdb). Overall, 272 (4.7 percent) of the updates matched to existing records in the MTdb, but only 19 (0.3 percent) added during RUE updated existing records in the MTdb.

Types of Addresses

The addresses were classified into five categories based on the highest criterion met. The categories are complete city-style, complete rural route, complete P.O. Box, incomplete address, and no address information. Location house number and street name fields were used while location ZIP Code was not included in the criteria for determining a complete city-style address.

Addresses were further delineated by the presence or absence of a physical/location description provided during a 2010 Census field operation.

Table 146 shows the RA HUs in the Final Tabulation MAF extract by address type.

Table 146: RA MTdb update by Address Type

Address Type	Number of Housing Units	Percent
Complete City-Style Address	**7,821**	**23.5**%
with location description	4,268	12.8%
without location description	3,553	10.7%
Complete Rural Route Address	**162**	**0.5**%
with location description	161	0.5%
without location description	1	<0.1%
Complete Post Office Box Address	**8,410**	**25.2**%
with location description	8,351	25.1%
without location description	59	0.2%
Incomplete Address	**5,587**	**16.8**%
with location description	5,487	16.5%
without location description	100	0.3%
No Address Information	**11,354**	**34.1**%
with location description	11,108	33.3%
without location description	246	0.7%
Total	**33,334**	**100.0**%
with location description	29,375	
without location description	3,959	

Data Source: 2010 Final Tabulation MAF extract

Table 146 shows that 23.5 percent of the entire RA workload had complete city-style addresses. Almost 17 percent had an incomplete address and 34.1 percent had no address information. All address types other than city-style were supposed to be accompanied by a physical/location description. Most of the units without city-style addresses have a location description. For instance, of the housing units with no address information, the majority of addresses had a location description.

Table 147 contains a summary of the RA MTdb update action codes.

Table 147: RA MTdb update by Action

Action Codes	Number of Housing Units	Percent
Verify	13,756	41.3%
Correction*	9,089	27.2%
Add	5,793	17.4%
Delete	2,971	8.9%
Uninhabitable*	886	2.7%
Nonresidential	608	1.8%
Duplicate	194	0.6%
Empty Mobile Home/Trailer Site*	37	0.1%
Total	**33,334**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Notes: * *The breakdown of "C" actions was approximated using the percent of each field action from the UE/RUE/RA assessment tally file. The 2010 Final Tabulation MAF extract reported 10,012 for the combination of these three.*

There were 5,793 HUs given an Add action, which accounted for 17.4 percent of the entire RA universe. A total of 13,756, or 41.3 percent, of the total RA HUs were assigned a Verify action. Correction and Delete actions accounted for 27.2 percent and 8.9 percent of the total workload, respectively.

Table 148 shows the number of RA housing units in the census as a percent of each RA block that matches to a residential address on the DSF. The DSF is a list of the addresses serviced by the USPS.

Table 148: RA MTdb update by blocks that match the Delivery Sequence File

Percent of housing units in a block that match the DSF	Number of Blocks	Percent	Number of Housing Units	Percent
0 percent	1,967	99.9%	32,611	97.8%
0 < percent ≤ 25	1	0.1%	418	1.3%
25 < percent ≤ 50	1	0.1%	305	0.9%
50 < percent ≤ 75	0	0.0%	0	0.0%
75 < percent < 100	0	0.0%	0	0.0%
100 percent	0	0.0%	0	0.0%
Total	**1,969**	**100.0**%	**33,334**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Of these 1,969 blocks, almost none of the addresses were on the DSF. Such blocks, which in this case were a substantial percentage of all RA blocks, would presumably present mail delivery challenges for the USPS.

Table 149 presents the RA HUs in the Final Tabulation MAF extract by the size of the structure at the basic street address. A basic address was defined by a house number and a street name, in addition to other street name prefixes and suffixes (e.g. East, Old, Bypass) within a collection block and ZIP code.

Table 149: RA MTdb update by Basic Street Address

Size of Structure	Number of Housing Units	Percent
Single Unit	31,443	94.3%
Multi-Unit	1,891	5.7%
2 – 4 units	1,353	4.1%
5 – 9 units	159	0.5%
10 – 19 units	123	0.4%
20 – 49 units	35	0.1%
50+ units	221	0.7%
Total	**33,334**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

Single-unit housing structures comprised 94.3 percent of the total workload. Among the 1,891 addresses with a multi-unit structure, over 71 percent contained two to four units.

Table 150 shows the distribution of original sources for addresses in the Final Tabulation MAFX. The methodology for calculating the 2010 MAF Original Source variable was to compare the corresponding earliest census operation date by MAFID on the Final Tabulation MAF extract to the DSF refresh variable. If there was no DSF flag prior to the operation date, then the MAF source corresponding to that operation date was taken to be the original source. If there was a DSF flag prior to the earliest operation date, then that DSF update cycle was considered the original source.

Table 150 shows the distribution of Original Source for RA HUs in the Final Tabulation MAF extract.

Table 150: RA MTdb update by Original Source

Original Source	Number of Housing Units	Percent
1990 Census	144	0.4%
2000-2010 survey updates	2,442	7.3%
2010 RA/RUE/UE	5,775	17.3%
Census 2000 operations	24,901	74.7%
DSF: Census 2000 and before	45	0.1%
DSF: pre-Address Canvassing	26	0.1%
DSF: pre-Supplemental delivery	1	<0.1%
Total	**33,334**	**100.0**%

Data Source: 2010 Final Tabulation MAF extract

The highest percentage of RA Original Source was from Census 2000 operations (74.7 percent), followed by 2010 RA/RUE/UE (17.3 percent) and 2000-2010 survey updates (7.3 percent).

5.4.1.2 Formation of the DRF Analysis Universe

Section 5.4.1.1 discussed the address update component of RA enumerators' work. The rest of Section 5.4.1 discusses results of the enumeration component of the enumerators' work. The universe for these results came from the DRF, which identified a slightly different number of cases worked in the RA operation than the MAF extract and assessment tally files had identified (as reported in Section 5.4.1.1). Section 5.4.1.2 presents how the DRF universe was identified, before subsequent sections show the results obtained from the EQs completed in RA.

The top row in Table 151 is the total number of enumerator questionnaires on the DRF from Remote Alaska, including multiple copies of the same questionnaire and added questionnaires that were not able to associated with an address. The second row removes the multiple copies of the same questionnaire. The third row removes all questionnaires that were for an added housing unit which were not associated with an address. There were 133 of those from the RA universe. The last row in the table removes duplicated questionnaires generated for an address due to rework. There were nine additional questionnaires completed for housing units in the RA universe. The universe to analyze the results of the RA operation from the DRF in this assessment is 33,391 unique housing units.

Table 151: Remote Alaska Universe Characteristics

Remote Alaska Universe Characteristics	Number of Questionnaires
All Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	33,637
Unique Questionnaires on the DRF (including Adds not geocoded and assigned to an address)	33,533
Unique Questionnaires on the DRF (only including Adds geocoded and assigned to an address)	33,400
Unique Housing Units on the DRF (only including Adds geocoded and assigned to an address)	33,391

Source: DRF

5.4.1.3 RA Housing Unit Status

Table 152 shows what the reported housing unit status was for the 33,391 housing units in RA.

Table 152: RA Housing Unit Status

Housing Unit Status	Number of Housing Units	Percent
Occupied	16,692	50.0%
Vacant	11,673	35.0%
Delete	4,919	14.7%
Unresolved	107	0.3%
Total Housing Units	**33,391**	**100.0%**

Source: DRF

Table 152 shows that 50.0 percent of housing units in RA were found to be occupied, 35.0 percent were found to be vacant and 14.7 percent were deleted.

Table 153 reports how many RA cases were reported to be refusals, by housing unit status.

Table 153: RA Refusals

Housing Unit Status	Number of Housing Units	Number of Refusals	Refusal Percentage
Occupied	16,692	49	0.3%
Vacant	11,673	4	<0.1%
Delete	4,919	4	0.1%
Unresolved	107	1	0.9%
Total Housing Units	**33,391**	**58**	**0.2%**

Source: DRF

Of the 33,391 housing units in RA, there were 58 (0.2 percent) that were marked as a refusal on the questionnaire.

Occupied Housing Units

The reported population count of an occupied housing unit (as captured in Item C from Figure 3) was considered valid if it was from 1 to 49, inclusive. A population count for an occupied housing unit was considered invalid if it was either blank, zero, or ranged from 50 to 98. A value of 99 indicated the population count was unknown to the enumerator. Table 109 shows how often each of these three types of population counts was recorded in conjunction with a reported refusal.

Table 154: Types of Refusals for RA Occupied Housing Units

Type of Population Count	Number of Housing Units	Percent
Valid population count	28	57.1%
Invalid population count	1	2.0%
Unknown population count	20	40.8%
Refusals	**49**	**100.0%**

Source: DRF

Table 109 shows that over half of the refusals (57.1 percent) had a valid population count, while 40.8 percent had an unknown population count.

Vacant Housing Units

Table 152 showed that 11,673 housing units were determined to be vacant during RA. Table 155 describes the distribution of those vacant housing units.

Table 155: Types of RA Vacant Housing Units

Vacant Type	Number of Housing Units	Percent
Regular	5,898	50.5%
Usual Home Elsewhere (UHE)	5,762	49.4%
Unknown	13	0.1%
Total Vacant Housing Units	**11,673**	**100.0%**

Source: DRF

A bare majority (50.5 percent) were found to be regular vacants while 49.4 percent were UHEs.

Deleted Housing Units

Table 152 showed that 4,919 housing units were marked as deleted during RA. There are five classes of deletes and Table 156 shows their distribution in RA. If an enumerator indicated two or more delete classifications for an address, then it was coded as a Delete-Unknown.

Table 156: Types of RA Deleted Housing Units

Delete Type	Number of Housing Units	Percent
Demolished/Burned Out/Cannot Locate	2,998	60.9%
Nonresidential	728	14.8%
Empty Mobile Home/Trailer Site	34	0.7%
Uninhabitable	952	19.4%
Duplicate	192	3.9%
Delete-Unknown	15	0.3%
Total Deleted Housing Units	**4,919**	**100.0%**

Source: DRF

Table 156 shows that the largest delete category was "demolished/burned out/cannot locate" making up 60.9 percent of all the deletes in RA. An additional 19.4 percent were classified as uninhabitable and 14.8 percent were classified as nonresidential.

5.4.1.4 Interview Completion

The following section will discuss the timing of when RA interviews were conducted in the field with respondents. Given the difficulties with PBOCS (discussed in Section 5.5), all data in this section come from the data-captured EQs. There are no reliable data from PBOCS to report when EQs were checked-in or how long it took LCOs to finish their UE assignments. These results answer the research questions regarding how the planned start and finish dates for the RA operation compared to the actual start and finish dates, and how the accumulation of outcomes changed over time.

Remote Alaska was scheduled to start on January 25. The operation was conducted in three waves as follows:

Wave 1: 1/25/10 – 2/25/10, Western Alaska in Wade-Hampton (Bethel) Area
Wave 2: 2/22/10 – 4/10/10, Bristol Bay Area, the Aleutian Chain and Kodiak Island
Wave 3: 3/22/10 – 4/30/10, North Slope Area and Northwest Arctic Area

Enumeration began in late January due to the spring thaw across Alaska. The early timing permits travel to these areas during a period when conditions are most favorable. The frozen ground and rivers allow planes to fly in and out. Once the spring thaw begins, travel to these areas is difficult or impossible and people leave their homes to hunt and fish. Enumeration must finish before this happens or the 2010 Census will miss a large part of the population.

Table 157 shows the distribution of RA cases completed by week.

Table 157: Remote Alaska Cases completed by week

Week	Total for that Time Period	Percent for that Time Period	Cumulative Percent
1/10 - 1/16	2	<0.1%	<0.1%
1/17 - 1/24	4	<0.1%	<0.1%
1/25 - 1/30 Start of RA Wave 1	591	1.8%	1.8%
1/31 - 2/06	1,170	3.5%	5.3%
2/07 - 2/13	1,026	3.1%	8.4%
2/14 - 2/20	1,056	3.2%	11.5%
2/21 - 2/27 Start of Wave 2	1,524	4.6%	16.1%
2/28 - 3/06	2,875	8.6%	24.7%
3/07 - 3/13	3,951	11.8%	36.5%
3/14 - 3/20	5,076	15.2%	51.7%
3/21 - 3/27 Start of Wave 3	5,292	15.8%	67.6%
3/28 - 4/03	4,745	14.2%	81.8%
4/04 - 4/10	3,624	10.9%	92.6%
4/11 - 4/17	1,303	3.9%	96.5%
4/18 - 4/24	780	2.3%	98.9%
4/25 - 4/30 End of RA	281	0.8%	99.7%
5/01 - 5/08	36	0.1%	99.8%
5/09 - 5/15	3	<0.1%	99.8%
5/16 - 5/22	12	<0.1%	99.9%
5/23 - 5/29	11	<0.1%	99.9%
5/30 - 5/31	4	<0.1%	99.9%
Missing/Out of Range	25	0.1%	100.0%
Total Housing Units	**33,391**	**100.0%**	**100.0%**

Source: DRF and AUX

March was the most productive month for completing RA cases. Only 16.1 percent of cases were completed by February 27 but 67.6 percent of cases were completed by March 27. Over 90 percent of the RA workload was finished by April 10. Almost 100 percent of the Remote Alaska workload was finished by the official end of the RA operation on April 30.

There was much publicity over the first enumeration for the 2010 Census being conducted in Noorvik, Alaska as part of the Remote Alaska program. That enumeration happened on January 25.

The next three tables looks at when occupied, vacant, and deleted housing units were completed. The first table, Table 158, looks at the amount of occupied housing units completed by week.

Table 158: Remote Alaska Occupied Housing Units completed by week

Week	Total for that Time Period	Percent for that Time Period	Cumulative Percent
1/10 - 1/16	1	<0.1%	<0.1%
1/17 - 1/24	2	<0.1%	<0.1%
1/25 - 1/30 Start of RA Wave 1	396	2.4%	2.4%
1/31 - 2/06	817	4.9%	7.3%
2/07 - 2/13	621	3.7%	11.0%
2/14 - 2/20	638	3.8%	14.8%
2/21 - 2/27 Start of Wave 2	999	6.0%	20.8%
2/28 - 3/06	1,460	8.7%	29.6%
3/07 - 3/13	2,364	14.2%	43.7%
3/14 - 3/20	2,565	15.4%	59.1%
3/21 - 3/27 Start of Wave 3	2,818	16.9%	76.0%
3/28 - 4/03	1,996	12.0%	87.9%
4/04 - 4/10	1,370	8.2%	96.1%
4/11 - 4/17	479	2.9%	99.0%
4/18 - 4/24	116	0.7%	99.7%
4/25 - 4/30 End of RA	10	0.1%	99.8%
5/01 - 5/08	5	<0.1%	99.8%
5/09 - 5/15	3	<0.1%	99.8%
5/16 - 5/22	6	<0.1%	99.8%
5/23 - 5/29	8	<0.1%	99.9%
5/30 - 5/31	4	<0.1%	99.9%
Missing/Out of Range	14	0.1%	100.0%
Total Occupied Housing Units	**16,692**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 158 shows that approximately 96 percent of the occupied housing units were completed by April 10. Occupied housing units were completed at a faster pace in RA than vacant and deleted housing units. Table 159 shows that by April 10, 88.2 percent of vacant housing units were completed.

Table 159: Remote Alaska Vacant Housing Units completed by week

Week	Total for that Time Period	Percent for that Time Period	Cumulative Percent
1/10 - 1/16	1	<0.1%	<0.1%
1/17 - 1/24	1	<0.1%	<0.1%
1/25 - 1/30 Start of RA Wave 1	73	0.6%	0.6%
1/31 - 2/06	221	1.9%	2.5%
2/07 - 2/13	319	2.7%	5.3%
2/14 - 2/20	248	2.1%	7.4%
2/21 - 2/27 Start of Wave 2	251	2.2%	9.5%
2/28 - 3/06	901	7.7%	17.3%
3/07 - 3/13	1,084	9.3%	26.5%
3/14 - 3/20	1,795	15.4%	41.9%
3/21 - 3/27 Start of Wave 3	1,806	15.5%	57.4%
3/28 - 4/03	1,872	16.0%	73.4%
4/04 - 4/10	1,721	14.7%	88.2%
4/11 - 4/17	609	5.2%	93.4%
4/18 - 4/24	548	4.7%	98.1%
4/25 - 4/30 End of RA	189	1.6%	99.7%
5/01 - 5/08	22	0.2%	99.9%
5/09 - 5/15	0	0.0%	99.9%
5/16 - 5/22	5	<0.1%	99.9%
5/23 - 5/29	2	<0.1%	100.0%
5/30 - 5/31	0	0.0%	100.0%
Missing/Out of Range	5	<0.1%	100.0%
Total Vacant Housing Units	**11,673**	**100.0%**	**100.0%**

Source: DRF and AUX

Table 160 shows that by April 10, 91.3 percent of deleted housing units were completed.

Table 160: Remote Alaska Deleted Housing Units completed by week

Week	Total for that Time Period	Percent for that Time Period	Cumulative Percent
1/10 - 1/16	0	0.0%	0.0%
1/17 - 1/24	1	<0.1%	<0.1%
1/25 - 1/30 Start of RA Wave 1	121	2.5%	2.5%
1/31 - 2/06	129	2.6%	5.1%
2/07 - 2/13	83	1.7%	6.8%
2/14 - 2/20	164	3.3%	10.1%
2/21 - 2/27 Start of Wave 2	265	5.4%	15.5%
2/28 - 3/06	498	10.1%	25.6%
3/07 - 3/13	486	9.9%	35.5%
3/14 - 3/20	703	14.3%	49.8%
3/21 - 3/27 Start of Wave 3	653	13.3%	63.1%
3/28 - 4/03	860	17.5%	80.6%
4/04 - 4/10	530	10.8%	91.3%
4/11 - 4/17	212	4.3%	95.6%
4/18 - 4/24	115	2.3%	98.0%
4/25 - 4/30 End of RA	82	1.7%	99.7%
5/01 - 5/08	9	0.2%	99.8%
5/09 - 5/15	0	0.0%	99.8%
5/16 - 5/22	1	<0.1%	99.9%
5/23 - 5/29	1	<0.1%	99.9%
5/30 - 5/31	0	0.0%	99.9%
Missing/Out of Range	6	0.1%	100.0%
Total Deleted Housing Units	**4,919**	**100.0%**	**100.0%**

Source: DRF and AUX

5.4.1.5 Interview Characteristics

The following section presents some paradata about the interviews with RA respondents, including the language that interviews were conducted in, the number of contacts that enumerators made to enumerate a housing unit, and the type of respondents who completed RA interviews.

Language

Table 161 shows the top five languages in which RA interviews were conducted.

Table 161: Top Five Languages in Which RA Interviews Were Conducted

Language	Total	Percent
English	31,979	95.8%
Russian	23	0.1%
Spanish	9	<0.1%
Czech	7	<0.1%
Chinese[72]	4	<0.1%
All other languages	9	<0.1%
Multiple languages marked	10	<0.1%
Unknown	1,351	4.0%
Total Housing Units	**33,391**	**100.0%**

Source: DRF and AUX

The vast majority (95.8 percent) of RA interviews were conducted in English. There were 4.0 percent conducted in an unknown language. Enumerators did not have the option to identify a language if it was not one of the fifty languages on the Language Identification Flashcard so some of the unknown languages might have fit this description, such as Aleut.

The full distribution of languages used to conduct the RA operation are in Appendix F.

[72] Includes two Chinese dialects.

Record of Contact

The first column contains all 47,197,405 housing units in RA. Subsequent columns look strictly at housing units by their final occupancy status. There was one dummy return associated with the RA operation, which does not have any information available on the Record of Contact; it is reflected in the row for 'Unknown' number of contacts. Housing units reported to have zero contacts are those that did not fill in enough information on the EQ to meet our criteria for a contact.

Table 162 shows the distribution of the number of contacts made to an address in order to obtain a completed interview. The first column contains all 47,197,405 housing units in RA. Subsequent columns look strictly at housing units by their final occupancy status.[73] There was one dummy return associated with the RA operation, which does not have any information available on the Record of Contact; it is reflected in the row for 'Unknown' number of contacts. Housing units reported to have zero contacts are those that did not fill in enough information on the EQ to meet our criteria for a contact.

Table 162: Number of Contact Attempts made to RA Housing Units

Number of Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	63	0.2%	11	0.1%	20	0.2%	31	0.6%
1	28,171	84.4%	12,907	77.3%	10,522	90.1%	4,648	94.5%
2	3,625	10.9%	2,535	15.2%	865	7.4%	218	4.4%
3	963	2.9%	759	4.5%	188	1.6%	11	0.2%
4	369	1.1%	309	1.9%	52	0.4%	8	0.2%
5	124	0.4%	107	0.6%	14	0.1%	3	0.1%
6	75	0.2%	64	0.4%	11	0.1%	0	0.0%
Unknown	1	<0.1%	0	0.0%	1	<0.1%	0	0.0%
Total Housing Units	**33,391**	**100.0%**	**16,692**	**100.0%**	**11,673**	**100.0%**	**4,919**	**100.0%**

Source: DRF and AUX

A vast majority of the interviews with RA housing units were completed in one contact (84.4 percent). Interviews with occupied housing units required the most contacts. Over fifteen percent of the occupied housing units required two contacts, while only 7.4 percent of the

[73]Housing units with an unresolved status are reflected in the "All Housing Units" column but are not reported in their own column.

vacant and 4.4 percent of the deleted housing units required two contacts. Enumerators could contact an address either in person or over the telephone.
Table 163 shows the distribution of personal contacts.

Table 163: Number of Personal Contact Attempts made to RA Housing Units

Number of Personal Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	104	0.3%	21	0.1%	43	0.4%	39	0.8%
1	29,727	89.0%	14,079	84.3%	10,843	92.9%	4,706	95.7%
2	2,620	7.8%	1,826	10.9%	631	5.4%	158	3.2%
3	639	1.9%	506	3.0%	119	1.0%	12	0.2%
4	222	0.7%	197	1.2%	22	0.2%	3	0.1%
5	63	0.2%	52	0.3%	10	0.1%	1	<0.1%
6	15	<0.1%	11	0.1%	4	<0.1%	0	0.0%
Unknown	1	<0.1%	0	0.0%	1	<0.1%	0	0.0%
Total Housing Units	**33,391**	**100.0%**	**16,692**	**100.0%**	**11,673**	**100.0%**	**4,919**	**100.0%**

Source: DRF and AUX

Housing units classified as occupied were the most likely to require more than one personal visit. Table 164 shows the distribution of contacts made by telephone.

Table 164: Number of Telephone Contact Attempts made to RA Housing Units

Number of Telephone Contact Attempts	All Housing Units	All Percent	Occupied Status	Occupied Percent	Vacant Status	Vacant Percent	Delete Status	Delete Percent
0	31,866	95.4%	15,595	93.4%	11,302	96.8%	4,867	98.9%
1	1,327	4.0%	936	5.6%	340	2.9%	48	1.0%
2	143	0.4%	120	0.7%	19	0.2%	2	<0.1%
3	40	0.1%	31	0.2%	7	0.1%	2	<0.1%
4	10	<0.1%	6	<0.1%	4	<0.1%	0	0.0%
5	4	<0.1%	4	<0.1%	0	0.0%	0	0.0%
Unknown	1	<0.1%	0	0.0%	1	<0.1%	0	0.0%
Total Housing Units	**33,391**	**100.0%**	**16,692**	**100.0%**	**11,673**	**100.0%**	**4,919**	**100.0%**

Source: DRF and AUX

The majority of the RA universe was not contacted by telephone during the operation (95.4 percent). Of the occupied housing units, 5.6 percent received one telephone contact.

Table 165 shows what mode the presumed last contact was with a housing unit. Cases with an unknown final contact either had zero contacts identified, were dummy returns, or did not mark the checkbox to distinguish if it was a person visit or a telephone visit for the last box utilized in the record of contact section.

Table 165: Type of Final Contact for Housing Units in RA, by Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Final Contact	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Person	31,245	93.6%	15,126	90.6%	11,208	96.0%	4,811	97.8%
Telephone	1,395	4.2%	994	6.0%	347	3.0%	49	1.0%
Unknown	751	2.2%	572	3.4%	118	1.0%	59	1.2%
Total Housing Units	**33,391**	**100.0%**	**16,692**	**100.0%**	**11,673**	**100.0%**	**4,919**	**100.0%**

Source: DRF and AUX

Most of the RA workload was completed by a personal visit (93.6 percent). However, 6.0 percent of occupied housing units completed an interview over the telephone.

Type of Respondent

Table 166 shows the type of respondents for housing units interviewed during the RA operation, by housing unit status. Housing units with an unresolved status are included in the total but are not reported separately.

Table 166: Type of Respondent for RA Interviews, By Housing Unit Status

	Total Cases		Occupied		Vacant		Delete	
Respondent Type	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Household Member	15,086	45.2%	14,974	89.7%	85	0.7%	24	0.5%
Unknown Type	73	0.2%	22	0.1%	17	0.1%	25	0.5%
All Proxy	18,232	54.6%	1,696	10.2%	11,571	99.1%	4,870	99.0%
Proxy Type								
In-mover	13	<0.1%	2	<0.1%	11	0.1%	0	0.0%
Neighbor or other	18,219	54.6%	1,694	10.1%	11,560	99.0%	4,870	99.0%
Both marked	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total Housing Units	**33,391**	**100.0%**	**16,692**	**100.0%**	**11,673**	**100.0%**	**4,919**	**100.0%**

Source: DRF

A neighbor or other proxy accounted for 54.6 percent of all respondents. Actual April 1 household members were 45.2 percent of all respondents, but 89.7 percent of respondents at occupied housing units.

5.4.1.6 Characteristics of Occupied Housing Units

The tables in this section will discuss characteristics of the occupied housing units that were interviewed during RA. This section will include results on occupied housing units' reported population count, answers to the undercount question, and answers to the overcount question.

Population Count for Occupied Housing Units

Table 167 shows the distribution of population count within occupied housing units in RA using both the enumerator-reported population count and the number of data-defined people.

Table 167: Population Count of Occupied Housing Units in Remote Alaska

	Enumerator-Reported		Data-defined People	
Population Count	**Number of Addresses**	**Percent**	**Number of Addresses**	**Percent**
0	3	<0.1%	65	0.4%
1	4,003	24.0%	3,977	23.8%
2	3,917	23.5%	3,909	23.4%
3	2,256	13.5%	2,261	13.5%
4	2,036	12.2%	2,031	12.2%
5	1,665	10.0%	2,442	14.6%
6	1,030	6.2%	758	4.5%
7	706	4.2%	516	3.1%
8	410	2.5%	304	1.8%
9	261	1.6%	183	1.1%
10	158	0.9%	106	0.6%
11 – 15	177	1.1%	135	0.8%
16 – 20	7	<0.1%	5	<0.1%
21 – 30	7	<0.1%	0	0.0%
31 – 40	7	<0.1%	0	0.0%
41 – 49	0	0.0%	0	0.0%
50 – 97	23	0.1%	N/A	N/A
98 (Delete)	0	0.0%	N/A	N/A
99 (Unknown)	26	0.2%	N/A	N/A
Missing	0	0.0%	N/A	N/A
Total Occupied Housing Units	**16,692**	**100.0%**	**16,692**	**100.0%**

Source: DRF

From RA interviews with occupied housing units, there were more five person housing units with data-defined people (2,442) than enumerator-reported (1,665). Enumerators reported more housing units with over five people than there were housing units with over five data-defined people. This discrepancy could be explained because RA enumerators did not use the continuation form to capture information but more likely is a result of continuation forms from this operation not being successfully linked to the parent form due to the early start date of the operation. The RA operation was the first housing unit enumeration operation in the field and

as shown in Table 158 nearly all of the occupied housing units were finished by the end of April. The linking of continuation forms to the parent forms was communicated from PBOCS to the DRIS data capture centers. The data capture centers started data capture in February and there may have been issues with that communication with PBOCS due to the early start of RA. Another possible explanation is that the enumerators might have lost or not used the continuation forms due to the remote conditions.

Table 168 shows the number of continuation forms used to enumerate people at each address in RA. These numbers align with the numbers presented in the data-defined person column from Table 167.

Table 168: Number of Continuation Forms used at an Occupied Address in RA

Number of Continuation Forms	Number of Addresses	Percent
0	14,683	88.0%
1	1,869	11.2%
2	135	0.8%
3	5	<0.1%
Total Occupied Housing Units	**16,692**	**100.0%**

Source: DRF

Table 168 shows that while the majority of housing units enumerated in RA did not utilize a continuation form, a significant number did. Of the occupied housing units, 11.2 percent required one continuation form.

Table 167 reported that there were 26 cases in RUE where the enumerator reported the population count to be unknown. Table 169 reports how many of those cases were also marked as refusals.

Table 169: Unknown Population Counts for Occupied Housing Units in RA

Occupied Type	Number of Housing Units	Percent
Not Refusals	6	23.1%
Refusals	20	76.9%
Unknown Population Counts	**26**	**100.0%**

Source: DRF

The majority of occupied housing units (76.9 percent) where the enumerator did not know a population count were also marked as refusals.

Undercount Question

After the household roster and demographic information were collected during the RA interview, the enumerator asked a series of questions that probed if anyone else might have been staying at the address. Table 170 shows the frequency that each probe was marked with an affirmative answer, including one row for housing units that said 'Yes' to more than one of the probes.

Table 170: Distribution of Answers to the Undercount Probes at Occupied RA Housing Units

Undercount Category	Number of Housing Units	Percent
Only 'No' category marked	16,083	96.4%
At least one category marked	334	2.0%
Babies only	*57*	*0.3%*
Foster children only	*8*	*<0.1%*
Any other relatives only	*188*	*1.1%*
Roommates only	*18*	*0.1%*
Any other nonrelatives only	*24*	*0.1%*
Anyone else staying on April 1 who had no permanent place to live only	*23*	*0.1%*
Multiple categories marked	*16*	*0.1%*
Missing (All boxes blank)	275	1.7%
Total Occupied Housing Units	**16,692**	**100.0%**

Source: DRF

At least one undercount category was marked for 2.0 percent of the occupied RA housing units. The most common RA undercount category selected was "any other relatives".

If the respondent answered 'yes' to any of the undercount probes, the RA enumerator was to collect a maximum of two names for the people who were possibly undercounted.

Table 171: Number of Undercount Names Reported with any Undercount Category Selected in RA Occupied Housing Units

Total Number of Names	Total	Percent
Zero Names	11	3.3%
One Name	270	80.8%
Two Names	53	15.9%
Total Occupied Addresses with Category Selected	**334**	**100.0%**

Source: DRF and AUX

Of the questionnaires that positively marked at least one undercount category, Table 171 shows that 3.3 percent did not write a name into the boxes provided. There were 15.9 percent that provided two names.

Table 172 shows how often a name was provided to the enumerator when a respondent had replied affirmatively to each specific undercount category.

Table 172: Number of Undercount Names Reported for Specific Undercount Category Marked in Remote Alaska Occupied Housing Units

Undercount Category with Number of Names	Total	Percent
Babies only		
Zero Names	9	15.8%
One Name	41	71.9%
Two Names	7	12.3%
Total	**57**	**100.0%**
Foster children only		
Zero Names	0	0.0%
One Name	5	62.5%
Two Names	3	37.5%
Total	**8**	**100.0%**
Any other relatives only		
Zero Names	0	0.0%
One Name	165	87.8%
Two Names	23	12.2%
Total	**188**	**100.0%**
Roommates only		
Zero Names	1	5.6%
One Name	15	83.3%
Two Names	2	11.1%
Total	**18**	**100.0%**
Any other nonrelatives only		
Zero Names	0	0.0%
One Name	23	95.8%
Two Names	1	4.2%
Total	**24**	**100.0%**
Anyone else only		
Zero Names	1	4.3%
One Name	17	73.9%
Two Names	5	21.7%
Total	**23**	**100.0%**
Multiple		
Zero Names	0	0.0%
One Name	4	25.0%
Two Names	12	75.0%
Total	**16**	**100.0%**
None[74]		
Zero Names	16,335	99.9%
One Name	22	0.1%
Two Names	1	<0.1%
Total	**16,358**	**100.0%**

Source: DRF and AUX

[74]These numbers include both rows "Missing" and "Only 'No' category marked" from Table 170.

Table 170 showed that the category "other relatives" was the most commonly utilized undercount category, and Table 172 shows that the "other relatives" category was the category that was the second most likely to successfully elicit at least one name. Every housing unit that answered the "other relatives" category provided a name.

Respondents who indicated multiple undercount categories were also the most likely to provide two names (75.0 percent of the time). Respondents who indicated a baby might not have been counted did not provide a name in 15.8 percent of the interviews.

Overcount Question

There were 53,930 people data-defined on the EQs from occupied housing units in RA. Table 173 describes the outcome of the overcount question.

Table 173: Overcount Category for Data-defined People in Remote Alaska Occupied Housing Units

Overcount Category	Number of People	Percent
None	51,149	94.8%
At least one category marked	2,781	5.2%
College Housing only	159	0.3%
Military only	74	0.1%
Seasonal/Second Home only	1,634	3.0%
Child Custody only	69	0.1%
Jail or Prison only	50	0.1%
Nursing Home only	5	<0.1%
Another Reason only	765	1.4%
Multiple Categories	25	<0.1%
Total People in Occupied Housing Units	**53,930**	**100.0%**

Source: DRF

The vast majority of people (94.8 percent) did not indicate they lived or stayed anywhere else besides the RA address. The most common positive reply to the overcount question was for a seasonal or second home, which described 3.0 percent of people.

5.4.1.7 Standard Demographic Tables

There were 53,930 data-defined persons included on 16,692 RA forms in the 2010 Census. This section will present the demographic characteristics for these persons on the RA form. Table 174 gives RA person demographic characteristics: age, Hispanic origin, race, relationship to person 1, and sex. Age was calculated based on the date of birth provided; if no date of birth was provided then the write-in age was used. Age was calculated only if the date of birth fell within valid date ranges. Similarly, the calculated age or write-in age was used only if it fell within valid age ranges; otherwise it was considered missing. Table 174 also gives the distribution of tenure responses for housing units included in the RA operation.

Because the demographic data used in this assessment are unedited, direct comparisons with published 2010 Census results are not possible. These tables include a row for people with missing values for the specific characteristic. The data in published Census reports have undergone editing and imputation, and therefore will have no missing values.

Table 174: Standard Assessment Demographic Table

Demographic Item	Number	Percent
Age	**53,930**	**100.0**%
Under 5 years	5,031	9.3%
5 to 9 years	4,674	8.7%
10 to 14 years	4,743	8.8%
15 to 19 years	4,703	8.7%
20 to 24 years	3,801	7.1%
25 to 29 years	3,260	6.0%
30 to 34 years	2,751	5.1%
35 to 39 years	2,466	4.6%
40 to 44 years	2,767	5.1%
45 to 49 years	3,375	6.3%
50 to 54 years	3,345	6.2%
55 to 59 years	2,963	5.5%
60 to 64 years	2,065	3.8%
65 years and over	3,756	7.0%
Missing	4,230	7.8%
Hispanic Origin	**53,930**	**100.0**%
Not Hispanic or Latino checkbox only	52,573	97.5%
Mexican checkbox only	335	0.6%
Puerto Rican checkbox only	66	0.1%
Cuban checkbox only	7	<0.1%
Another Hispanic checkbox only	40	0.1%
Multiple checkboxes	7	<0.1%
Both Checkbox and Write-in	148	0.3%
Write-in Only	3	<0.1%
Missing	751	1.4%

Demographic Item	Number	Percent
Race	**53,930**	**100.0**%
White checkbox alone	11,573	21.5%
Black or African American checkbox alone	111	0.2%
American Indian and Alaska Native checkbox alone	1,367	2.5%
Asian Indian checkbox alone	15	<0.1%
Chinese checkbox alone	23	<0.1%
Filipino checkbox alone	100	0.2%
Japanese checkbox alone	9	<0.1%
Korean checkbox alone	19	<0.1%
Vietnamese checkbox alone	4	<0.1%
Other Asian checkbox alone	0	0.0%
Native Hawaiian checkbox alone	26	0.1%
Guamanian or Chamorro checkbox alone	5	<0.1%
Samoan checkbox alone	17	<0.1%
Other Pacific Islander checkbox alone	3	<0.1%
Some Other Race checkbox alone	6	<0.1%
Multiple checkboxes	395	0.7%
Both Checkbox and Write-in	39,568	73.4%
Write-in Only	179	0.3%
Missing	510	1.0%
Relationship Status to Householder (Person 1)	**53,930**	**100.0**%
Householder	16,623	30.8%
Husband or Wife of Householder	7,247	13.4%
Biological Son or Daughter of Householder	17,917	33.2%
Adopted Son or Daughter of Householder	2,136	4.0%
Stepson or Stepdaughter of Householder	472	0.9%
Brother or Sister of Householder	841	1.6%
Father or Mother of Householder	394	0.7%
Grandchild of Householder	3,484	6.5%
Parent-in-law of Householder	37	0.1%
Son-in-law or Daughter-in-law of Householder	230	0.4%
Other Relative	1,059	2.0%
Roomer or Boarder	82	0.2%
Housemate or Roommate	277	0.5%
Unmarried Partner	1,855	3.4%
Other Nonrelative	826	1.5%
Two or more relationships	68	0.1%
Missing	382	0.7%
Sex	**53,930**	**100.0**%
Male	28,442	52.7%
Female	25,131	46.6%
Both	12	<0.1%
Missing	345	0.6%

Demographic Item	Number	Percent
Tenure	**16,692**	**100.0**%
Owned with a mortgage or a loan	2,665	16.0%
Owned without a mortgage or a loan	8,000	47.9%
Rented	3,896	23.3%
Occupied without payment of rent	1,388	8.3%
Multiple	7	<0.1%
Missing	736	4.4%

Source: DRF

These distributions may vary across different 2010 Census operations due to differences in corresponding populations and procedures.

5.4.1.8 Characteristics of Added Housing Units

Enumerators in the RA operation had the ability to add housing units, just as was described in Section 5.1.1.8 about the UE operation. There are two types of added housing units that are relevant to this field operation: Type A and Type C cases. Type A cases consist of a cases where the respondent at a RA address might have reported the RA address as a vacation home and claimed that they really lived or stayed at another address where they should have been counted (called a Usual Home Elsewhere (UHE). An enumerator that observes a housing unit that was missing from their address binder and completes an EQ for the housing unit creates a Type C case. Table 175 shows the number of adds in RA for each type.

Table 175: Type of Added Housing Units Found in Remote Alaska

Add Type	Number of Addresses	Percent
Type A	0	0.0%
Type C	5,928	100.0%
Total Adds	**5,928**	**100.0%**

Source: DRF

All of the 5,928 cases in RA were Type C adds. Type C cases were supposed to come in from the field with an associated block. In some cases GEO did not have a block, but was able geocode the response. However that was not for the majority of the records.

All added housing units went through a process by the Geography Division that attempted to assign a MAFID to the address. Addresses with a MAFID are considered valid Census addresses. If the address information provided by the enumerator was not sufficient for Geography Division to associate the address with a census block, then it was not included on the DRF state files or given a MAFID. The operation (being specifically in remote parts of Alaska) was not taken into consideration during this processing. Table 176 shows the frequency of that occurrence.

Table 176: Frequency that Added Housing Units from Remote Alaska Associated with a State

Add Type	Number of Housing Units	Percent
In a State	5,795	97.8%
Not associated with a State	133	2.2%
Total Adds	**5,928**	**100.0%**

Source: DRF

Only 2.2 percent of the RA Adds were not associated with a state by the Geography Division. Even though the cases were enumerated in the Remote Alaska operation, the provided address information was not sufficient to be geocoded to a state in accordance with Geography Division's processing. The operation was not taken into consideration in this process.

The enumerators recorded address information about the added housing units in two places on the new questionnaire. Section 5.1.1.8 presented images of the areas where this information was collected on the questionnaire.

Type C adds were the added housing units that the enumerator visibly saw in front of them. For Census Bureau field staff to find a Type C Add in the future, a combination of address fields from question H3 and address fields near the label on the front of the EQ were needed. The necessary fields of stateside Type C addresses are:

- House Number (H3),
- Street Name (H3),
- Block (EQ front),
- County (EQ front), and
- State (EQ front)

Table 177 reports the completeness of address information collected on all Type C adds.

Table 177: Content of Address Fields for All Type C Adds from Remote Alaska

House Number, Street Name, Block, County, and State	Number	Percent
All filled	1,227	20.7%
All blank	5	0.1%
At least one field filled, but not all fields filled	4,696	79.2%
Total Type C Adds	**5,928**	**100.0%**

Source: DRF

As shown in Table 177, 79.2 percent of RA adds had at least one of the address fields filled, while 20.7 percent had all of the address fields filled.

5.4.2 Cost, Staffing, and Production Rates

5.4.2.1 Summary of the RA Field Operation Costs

In planning the RA enumeration operation, we considered RA's unique geography and cultural characteristics. Alaska is the largest state in the nation, extending over an area two and a half times larger than Texas. In addition to size, we considered the following:

1. Widely scattered communities accessible only by small engine airplane, snowmobile, four-wheel-drive vehicles, dogsled, or some combination thereof
2. Sparse population, it ranges from several hundred people to just a few people
3. Extreme climate
4. Few or no daylight hours during traditional census periods
5. Very culturally diverse population

In consideration of the demanding logistics in Remote Alaska, we estimated the travel and miscellaneous expenses separate from the direct payroll and mileage costs. The first part of this analysis shows the findings directly related to the staff, production and training salaries, and their mileage expenses. You will find logistics and miscellaneous expenses in Section 5.4.2.5 below.

Table 178 depicts the RA workload, the total RA budget, and actual costs, as well as a distribution of the budget and actual cost, by cost factor. The table also shows each cost factor as a percentage of the total operational cost.

The actual total direct cost of RA enumeration was $1,756,690, or 76.9 percent of our estimated $2,283,131. The operation ran under budget by $526,441.

Table 178: RA Summary of Field Operation Costs

	Budget	Actual	Percent of Budget Used	Percent of Actual Total Cost
Total	**$2,283,131**	**$1,756,690**	**76.9%**	**100.0%**
Workload	29,620	33,464	--	--
Production Salary	$2,150,778	$1,402,122	65.2%	79.8%
Training Salary	$89,713	$265,657	296.1%	15.1%
Mileage Cost	$42,640	$88,912	72.4%	5.1%

Source: DMD C&P

The most significant underspending factor was the production salary cost. We underspent this cost by $748,656 or 65.2 percent. On the other hand, we overspent the training salary and mileage cost factors by $265,657 and $88,912, respectively.

Overspending in training was due mostly to a late change. The original enumerator training was "On-the-Job" (OJT) but a late decision from the Field Division was to conduct a shortened, in-person verbatim enumerator training**.**

5.4.2.2 RA Cost per Case

Overall, the actual cost per case was less than planned. The total cost per case was budgeted at $77.08; however, the actual cost per case was $52.49.

5.4.2.3 RA Cases per Hour and Miles per Case

Table 137 displays the average number of cases worked per hour and average miles driven per case. The variance in the following tables is the difference between the budgeted and actual variables.

Table 179: RA Budgeted and Actual Total Cost

	Budgeted	Actual	Percent Variance
Cases Per Hour	**.91**	**2.00**	**-1.09**
Miles Per Case	**.0**	**.50**	**-.50**

Source: DMD C&P

We budgeted 0.91 cases per hour; however, the actual cases per hour were higher at 2.00, a variance of -1.1 percent. The miles per case budgeted was zero while the actual was 0.50, a variance of -0.50 percent.

5.4.2.4 RA Production Staffing

The table below depicts the budgeted and actual number of field positions along with the frontloading rate and the percent variance.

Table 180: RA Staffing

Position	Number of Positions Budgeted	Number of Positions Actual	Percent Variance
Total	**1,006**	**476**	**52.7%**
Enumerator	741	347	53.2%
CL	58	113	-94.8%
FOS	7	16	-128.6%
Person assisted CL	200	0	100.0%

Source: DMD Cost Model and DAPPS

Table 180 shows how many field staff worked in RA. If a person worked multiple operations, they were counted in each operation. If a person worked in multiple positions, within an operation, they were counted in the position in which they worked the most hours. For RA, we budgeted for 1,006 total field staff positions. We actually filled 476 positions, which yielded a variance of 52.7 percent.

5.4.2.5 RA Logistics and Miscellaneous Expenses

Additional funding for Remote Alaska was budgeted because of the unique challenges associated with accessing communities in Alaska's remote areas, where population ranges from a few people to several hundred people. The communities are widely scattered and rarely linked by roads. Most of these communities are accessible only by small-engine airplane, snowmobile, four-wheel-drive vehicles, dogsled, or some combination thereof. In addition, once the enumeration is completed and the CL meets with the tribal leader or appointed official, the completed enumerator questionnaires along with the address binders are shipped from the village to the LCO for check-in and processing. Shipping cost for these materials is another additional cost.

We budgeted for logistical and miscellaneous expenses for Remote Alaska. However, the LCO did not always charge these expenses to the appropriate project number. Because of this, there is no accurate accounting of these expenses. Table 181 displays the budgeted funding but the actual costs incurred were not charged to the correct project and are therefore estimates of the spending based on an accounting at the RCC. Based on the reporting from the RCC, the estimated spending was about 47.2 percent of the budget.

Table 181: RA Logistics and Miscellaneous Expenses

	Budget	Actual	Variance	Percent of Budget Used
Total	**$4,442,417**	**$2,347,237**	**$2,095,180**	**47.2%**
Air Fare	$1,126,430	$1,890,177	-$763,747	-67.8%
Alternative Travel	$450,572	$268,297	$182,275	40.5%
Rental Car	$75,095	$0	$75,095	100.0%
Misc. Supplies and Equipment	$300,381	$0	$300,381	100.0%
Per Diem	$1,363,731	$61,475	$1,302,256	95.5%
Postal Services	$818,539	$105,482	$713,057	87.1%
Telecom	$300,381	$16,538	$283,843	94.5%
Training Travel	$7,288	$5,268	$2,020	27.7%

Source: DMD Cost and Progress

5.4.3 Training

Training in Alaska poses unique situations and requires other methodologies not used in other operations. Terminating enumerators who do not complete the training as in other areas is not possible since recruiting was conducted locally and enumerators are appointed by tribal leaders/representatives. Villages are small where everyone is known. Tribal management sends people who can be trusted within the community.

Originally, the Seattle RCC was going to write the training for Remote Alaska. When they could not meet the schedule due to other problems, the Field Division at HQ took over the project. The main problem was that HQ was under the impression that training and

enumeration would follow very closely with the procedures used in Census 2000. Very late in the process, the Seattle RCC decided they wanted a more traditional training (verbatim script) for the enumerators. This left little time to prepare for training and to meet the deadline.

There were no debriefings conducted for RA. All training started and finished on schedule. Even though the verbatim training method has many drawbacks, it was the best proven method available in 2010 for ensuring consistency in training. Planning for the 2020 Census will include other training methodologies because of the changing environment utilizing automated devices.

5.4.4 Schedule

The Remote Alaska (RMA as identified in the 2010 Master Activity Schedule (MAS)) schedule lines comprised 397 of the 10,875 lines in the 2010 MAS. This count is slightly understated in that there were additional activities outside of the RMA also related to UDE (e.g. Assessment activities) that were not linked to the RMA schedule, but were linked to the UE schedule only. Thirty-three of the 397 activities were housed under the RMA[75] Work Breakdown Structure (WBS), and the remaining 364 activities spanned all functional areas related to RMA (e.g. FDCA, UCM).

As shown in Table 182 of the finished activities, 234 activities (58.9 percent) both started and finished on time or ahead of schedule according to baseline dates.

Table 182: RA Activities that Started and Finished On Time

	Number of Activities	Percent of Activities
Activities that Started and Finished on Time or Ahead	234	58.9%
Activities that Started or Finished Late	163	41.1%
Completed RA Activities	**397**	**100.0%**

Source: Master Activities Schedule

Table 183 shows the counts and percentages of activities that started and finished on time, grouped by all activities, milestone starts, milestone finishes, and task dependent activities. There were 234 (58.9 percent) activities that started on time or early and 163 (41.1 percent) activities that finished on time or ahead of schedule. Overall, the milestone activities, particularly the milestone finishes were less frequently on schedule than task dependent activities.

[75] The RMA WBS identified the Remote Alaska Operation in the Primavera project management scheduling software.

Table 183: RA Activities that Started or Finished on Time, by Activity Type

	All Activities		Milestone Starts		Milestone Finishes		Task Dependent Activities	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Activities Started on Time or Early	235	59.3%	12	63.2%	-	-	212	63.9%
Activities Finished on Time or Early	234	50.1%	-	-	23	51.1%	222	66.9%
Completed Activities	**397**		**19**		**45**		**332**	

Source: Master Activities Schedule

5.5 Automation

The UEOs used four Integral Systems and nine Support Systems to prepare, conduct, and complete backend activities. Those systems were described in Section 2.4.7.

The sections that follow will detail both how the systems worked in production and any issues documented for each system during UEO.

5.5.1 Integral Systems

5.5.1.1 Decennial Applicant, Personnel and Payroll System (DAPPS)

DAPPS experienced performance issues in the spring/summer of 2009 during the early 2010 Census Address Canvassing operation; by March 2010 a new architecture for the DAPPS environment was successfully deployed. DAPPS stability and performance improved tremendously, enabling DAPPS to meet the Update Enumerate Operations (UEO) and subsequent operations peak demands on the system. For example, at peak processing on May 4, 2010, DAPPS supported over 8,000 concurrent users who performed the necessary administrative functions to facilitate the hiring, training and paying of the temporary workforce needed to conduct the critical 2010 Census operations.

Alternate Shipping Solution

The frequent outages of the Paper-Based Operation Control System (PBOCS) and the slow performance during the first two months of critical 2010 Census field operations delayed over 10 million questionnaires from being processed at the three Paper Data Capture Centers (PDCCs), and caused a large backlog in LCO processing capabilities. This backlog impacted the 2010 Census schedule for Nonresponse Follow-up (NRFU) and the UE operations. To mitigate the negative impact on the 2010 Census caused by PBOCS, the questionnaire shipping functionality was moved from PBOCS to the contingency shipping application on May 22, 2010. On the first two days, the contingency application was opened up to 24 LCOs across the 12 regions, resulting in the scanning and tracking of over 322,000 questionnaires and the shipment of 1,120 boxes (for NRFU and UE). On the fourth day, May 25, 2010, the

contingency application was opened up to all 494 LCOs across all 12 regions, resulting in the scanning and tracking of 2,519,790 questionnaires and the shipment of over 8,533 boxes (for NRFU and UE). UE was officially added to the shipping application on May 31 and the LCOs began shipment on June 3.

Based on these numbers, the contingency application was modified to handle the remaining questionnaires for both UE and UE QC operations. The change was deployed on May 30th, 2010 to all 494 LCOs across all 12 regions, resulting in the total scanning and tracking of 367,635 questionnaires and the shipment of 1,557 boxes for both operations.

5.5.1.2 Paper-Based Operations Control System (PBOCS)

In fall 2008, the decision[76] was made to implement a contingency plan to descope the operational control system development for all paper-based operations from the Field Data Collection Automation (FDCA) contract. The PBOCS was established as the contingency application to manage and control the work conducted by field enumerator staff and to provide status reporting to management staff within the Local Census Offices, the Regional Census Centers, and at Census Bureau Headquarters. As a direct result of the contingency nature of the PBOCS, reduced testing time affected the performance of the application throughout operations. The paragraphs below highlight the most prominent issues dealt with during NRO.

PBOCS was the first web-based operations control solution used at the Census Bureau. Using PBOCS, we were able to manage most of the field operations from one centralized location while still maintaining a regional and local office control model. This design led to some major gaps in executing, monitoring, and tracking operations not only from HQ, but also from Regional Census Centers and LCOs. Given the limitation of users prescribed on the system, the regions implemented administrative controls to ensure adherence to directives from HQ. However, the west coast was most impacted by the daily maintenance windows of 12:01AM – 7AM EST. As a result, offices on the west coast would often begin work at 4AM local time in order to maximize system use while available. The lesson learned from this experience is to separate regional data, even though it may be physically located in the same location.

This centralized regional design scenario and reduced testing cycle time, coupled with an incompatibility between operating system software (Redhat), the hardware (Egenera) and the Oracle database created a scenario such that no more than three users (prescribed, but four or five actual) could be on the system at one time performing functions within the application at each site. This problem had significant impact during the early days of NRFU while office staff was trying to make assignments and check work in and out of the office. A backup plan was initiated to create the capability within PBOCS to generate the listing pages in batch mode. The number of pages required for printing was approximately 35 million pages. To minimize the impact on performance and in order to meet the schedule for the operation, a sophisticated batch process was developed to generate about 8 million PDF files within a 24-hour period. Eliminating the time for report generation at the LCO level allowed for printing to occur immediately, which triggered an unexpected performance impact. Immediate delivery of one-half of the assignment area listings and related materials led to the check-out of assignment

[76] This decision is discussed more thoroughly in Section 2.2 of this document.

binders at a rate which was not a documented performance benchmark. This "immediate checkout" usage scenario was not considered and therefore was neither documented nor tested during the limited performance testing cycles. The design was for the checkout to be more evenly distributed; when an AA was checked-out, all the corresponding cases within that AA were also updated to reflect a checked-out state. This was important for controlling check-in at a case-level by ensuring it was checked-out first. This design, coupled with expediting the delivery of the listing PDF files and the database contention and blocking problems created significant negative performance and escalated regional concern that the system could not perform to complete the 2010 Census.

Once the work started flowing back into the LCOs, the check-in functionality also experienced performance issues due to the physical database configuration. This issue affected the cases flagged for RI, and therefore, users in the field worked around this by checking in questionnaires for vacant housing units, while the PBOCS team fixed the problem. However, many questionnaires were accumulating in the LCOs to the point that the DRIS data capture centers did not have enough work to keep staff busy. In addition, FLD did not design the LCOs to store and accumulate all these forms and this raised significant concerns related to data loss.

FLD HQ turned off the shipping component within PBOCS and made changes in the workflow to support the change, and AMSD developed an alternative shipping application for this purpose. In order to provide consistency for the Field Division, we used the AMSD alternative shipping application for all operations throughout the end of the 2010 Census.

Cost and progress monitoring at all levels during the 2010 Census was another tremendously visible issue within the PBOCS. As a result of the challenges noted above, the stability of the database caused an unrecoverable impact to the design of the reports solution, which utilized Oracle Streams to synchronize data to a reporting database. The backlog of transactions to synchronize became so great that over time, we could not catch up. This resulted in eliminating the Performance Report (D-341) and changing the architecture for the critical Progress Report (D-948). Modifications were also made to the DMD C&P interface to ensure progress numbers were matching the field reports.

By mid May, and during peak production for NRFU, PBOCS was still having problems handling workloads for multiple operations. A decision was made to suspend using PBOCS for UE and RUE and to discontinue it entirely for UE RI. UE and RUE check-in was limited to narrow windows (12am-2am). The limited PBOCS processing time impacted field work as well as resulting in the LCOs being unable to identify missing cases. The scheduled end date for UE data collection was May 29, to which the LCOs met this date. However, due to limited check-in opportunities and some related problems checking work into PBOCS, the LCOs reached 100 percent check-in on June 28.

In addition, the UE QC portion of PBOCS was impacted when it was shut down in order to dedicate the system to NRFU. Contingencies were implemented in order to complete the UE QC fieldwork. These contingencies covered tracking and monitoring of the D-1(E) RI, Reinterview Questionnaires, and AA Binders; instructions for manually completing D-950 (UE QC), DQC, and D-957 (UE QC), Delete Verification Record; and instructions for shipping AA Binders and RI Questionnaires. See Section 5.5.1 on 2010 Census MaRCS Automation for the contingencies we implemented to complete UE RI.

Because tracking was entirely a manual process, it was prone to error. Since PBOCS was not available to the LCOs, they could not research the status of binders (See Section 5.5.2.8) that had been shipped but were being reported as not received at NPC.

Despite the above, due to dedication and commitment of contractor and government staff, data analysis and performance monitoring during operations revealed that work would be completed on time.

5.5.1.3 Field Data Collection Automation – Office Computing Environment (FDCA-OCE)

Small Format Map Printing

The design decision to retain small-format map file metadata in a central database but to cache small-format map files to the Local Census Offices (LCOs) worked well. Metadata could be updated easily without worry of synchronization issues, and maps, once cached, could be printed without impact on network performance.

Using generic small-format block maps across multiple operations eliminated the need to create and distribute electronic copies of the small-format block maps to the LCOs for each operation. Electronic copies of the small-format block maps specific to the RA and RUE operations were distributed prior to those operations since those operations were the first operations to use those block maps. However, the UE operation reused the generic small-format block map files delivered to the LCOs for earlier operations, thus saving bandwidth and freeing up systems to perform other activities during a critical time.

There were two phases of map printing:

- Phase 1 – Printed one copy of each (Locator, AA, and block maps)
- Phase 2 – Printed extra copies of maps needed as needed

(Phase 2 for UE was only needed to print the maps for each AA)

The map printing workload for the three UEOs was approximately 230,000 Locator, AA, and block maps (15,000 for RA, 5,000 for RUE, and 210,000 for UE).

The need for FLD reports was emphasized during the design of the map printing control system. However, there was not sufficient emphasis placed on the needs of the FLD Geographic Support Branch for reports to monitor the ingest of maps and the printing of maps. As a result, daily, weekly, and monthly ad hoc reporting was developed and refined during production operations. While FLD reports are essential, reports to monitor the ingest of maps and the printing of maps across all LCOs and across all operations for the FLD Geographic Support Branch are also essential.

The D-1189, Map Printing Report for LCO, listed AAs in the LCO with state/county code and information on (1) when the maps in the AA were available for printing, (2) when they were printed, and (3) when they were placed on hold and taken off hold. However, the report, as originally designed, did not list the FOSD/CLD in which the AAs were located, only the

state/county code. FDCA office staff often had to access specific maps within an AA for printing, reprinting, or placing maps on hold. To locate specific maps easily within an AA, the office staff needed to know the Field Operations Supervisor District/Crew Leader District (FOSD/CLD) in which the AA was located, otherwise they had to manually search for the AA by looking at the contents of each FOSD/CLD combination in the LCO until they found the AA that they were seeking. Thus, the D-1189, because it did not contain a FOSD/CLD column, did not provide the FDCA office staff the basic information they needed to eliminate this search time. The D-1189 was redesigned to include a four-digit FOSD/CLD column (and any CLD range data appended to the four-digit FOSD/CLD in those cases where CLDs had been divided into ranges of AAs).

The map printing control system was designed on the assumption that address delineation for each operation would result in crew leader districts (CLDs) with a limited number of Assignment Areas (AAs) in each CLD (i.e., less than 150) and AAs with a limited number of Blocks in each AA (i.e., less than 150). This assumption proved to be wrong. It was discovered that address delineation produced some CLDs for some operations in which there were thousands of AAs and some AAs for some operations in which there were thousands of Blocks. As a result, the map printing control system user interface had to be redesigned to display in drop-down lists these 'large' CLDs as ranges of AAs within the CLD and these 'large' AAs as ranges of Blocks within the AA.

Passwords

A lack of understanding of how the OCE related to PBOCS and other applications made it challenging for staff to understand how passwords and access rights worked (e.g., a user might have a PBOCS account but could not access the system if they did not also have a FDCA account).

If staff without an email address forgot their password, then a new password could not be sent through email, increasing the number of remedy tickets.

Enumerators moving between LCOs

The system could not accommodate enumerators moving between LCOs, and so if an enumerator was moved to another LCO it required manual intervention from DAPPS in order for transferred enumerators to show up in the control system.

MaRCS Access

Access to external sites through the FDCA Portal was set up early and so DSSD had to create a workaround to allow MaRCS access through this structure.

2010 Census Matching, Reviewing, and Coding System (2010 Census MaRCS)

During the Update Enumerate and NRFU operations, there were 487 problem tickets that were resolved by the software developers or Field Quality Assurance Branch. The majority of these occurred during NRFU but the tickets were not able to be separated by operation. There were

many more routine requests resolved by the 2010 DOTS staff. Please refer to Table 184 for the count of tickets by problem category.

Table 184: 2010 Census MaRCS Remedy Tickets by Category

Problem description	Tickets
MaRCS Performance Issues	98
User misunderstandings	70
Out of disk space error	52
MaRCS System Issues	51
Data discrepancies	38
Invalid Applicant IDs	37
Training database – reset data, add data, not working as expected	37
DRIS data not available in MaRCS	26
Partially Worked locks	23
Reports	21
RI problems in other systems – PBOCS, Shipping	15
Unusual MaRCS access issues	12
Other	7
Total	**487**

Source: 2010 Census MaRCS

Most remedy tickets were submitted due to periods of poor performance, which was caused by various factors that were exacerbated by the MaRCS contingency to not rely on PBOCS data. Using contingency processing, data capture errors in the applicant ID caused the creation of 5.3 million different enumerators in the MaRCS system. This slowed down processing significantly because we designed the system for only around 630,000 enumerators. Other factors that affected MaRCS performance were:

- More concurrent users than the system was designed to handle, because LCOs used MaRCS to resolve shipping issues
- Original server configuration and size was not adequate to handle the workloads

The second most common type of ticket was user misunderstandings. Some examples of these are users who wanted to reset cases more than once (which the system does not allow), did not understand the content of reports, or were looking for a database that was not yet released. These tickets were usually resolved by explaining how to do something or why it must not be done at all. In the future, we should try to prevent these types of tickets with better MaRCS training and better knowledge-based articles in the remedy system.

Of all tickets, we see that at least 173 of them (performance issues, data discrepancies, and invalid applicant IDs) could have been avoided if we had not needed to abandon the PBOCS interface. In addition, the 26 issues of DRIS data not being available would have been avoided with an automated interviewing instrument. Hopefully more testing and automation will prevent all of these tickets for future enumerations.

Of the tickets listed in Table 184, some were opened for major incidents that required immediate MaRCS changes implemented during brief MaRCS shutdowns during the work day.

Some other incidents required a MaRCS shutdown but did not have remedy tickets because they were initiated by Census Bureau Headquarters and the LCOs were given advance notice. All such incidents, and how they were resolved, are described in Table 185.

Table 185: 2010 Census MaRCS Incidents

Incident	Resolution
Out of disk space error	Deleted unnecessary back-up logs and set up system to notify developers when memory was low.
Performance issues	Limited number of users and improved enumerator search efficiency
System Crash	The MaRCS website was inadvertently restarted while Personal Interview RI MaRCS was installed onto the same server. MaRCS was back on-line within a few minutes.
MaRCS down-time to resolve urgent issues	MaRCS restored after fix – usually within 30 minutes.
Widespread MaRCS Access Denied	Fixed the authentication username search to return FDCA users missed in original query.

5.5.2 Support Systems

5.5.2.1 Master Address File/Topologically Integrated Geographic Encoding and Referencing System (MAF/TIGER)

The MAF/TIGER automation components for the UEO operations were the Geographic Reference File – Code (GRF-C), Address List, FOSD/CLD Delineation Software, Large Format Map Software, and Small Format Map Software. There were no issues reported with the GRF-C, Address List, Large Format Maps Software and Small Format Maps Software. The large format maps and address list were printed without any problems.

5.5.2.2 Universe Control and Management System (UCM)

GEO delivered the initial RA and RUE Universes with the AA Delineation as designed.

The Geography Division (GEO) received and processed address updates from the 2010 Remote Alaska (RA), Remote Update Enumerate (RUE), and Update Enumerate (UE) address registers between June 9, 2010 and July 20, 2010, which included over 70,000 add actions. However, approximately 5,000 add records were rejected because they contained duplicate processing IDs (PIDs). Further research showed that the PIDS were not necessarily unique across the operations as intended. In addition, duplicate PIDs were also found in the RA/RUE/UE questionnaire add records. A contingency plan was implemented at HQ to resolve the duplication.

5.5.2.3 Response Processing System (RPS)

There were no specific issues with the Response Processing System.

5.5.2.4 Decennial Response Integration System (DRIS)

Due to the de-scope of the shipping functionality from PBOCS, the defined interface between PBOCS and DRIS was unsuccessful in completely satisfying all of the required functions to achieve comprehensive inventory control. The following describes each of the interfaces between DRIS and PBO and the operational deviations that were actually performed during production:

- **Linkage of enumerator continuation forms to parent forms**

  As a result of job scheduling decisions, delays and users shipping without checking into PBOCS, many continuation forms were received from the LCOs before the linkage information was received electronically. A special linking application was created by DRIS to periodically search for the linking data necessary to associate continuation forms that were previously unlinked.

  Through additional effort during production, the DRIS team worked closely with the PBOCS team and additional Census Bureau stakeholders, generating tools, scripts, and queries that drove unlinked enumerator Supplemental forms counts from the hundreds of thousands to a few thousand each.

- **Questionnaire Version Number**

  The primary issue with the DRIS-PBOCS interface was related to DRIS tracking/sending the version number for the case. All the forms from DRIS were coming with the same version number even though multiple versions were shipped from the LCO. Despite the version number conflict, all cases were reconciled through the last operation. Field Division was provided with custom reports and data queries for this additional reconciliation. In many instances, forms encountered by DRIS did not contain a proper version number. DRIS was instructed to capture the handwritten version number (if one existed) if the labeled version number was missing. The handwritten number was subject to legibility issues and data capture error. DRIS was instructed to default to the same version number if no version could be ascertained from either the label or handwritten information on the form. In some instances, PBOCS printed the labels "out of register" such that the break between labels fell across the middle of the label area, resulting in labels that contained multiple case ID barcodes and multiple versions on one label. DRIS instituted a manual workaround, but if the true version number could not be determined, DRIS was instructed to use the default version number.

- **DRIS to PBO Notification of box receipt**

  DRIS transmitted receipt notifications to PBOCS of all boxes received. However, once shipping was discontinued from PBOCS the DRIS interface did not send box confirmations to PBOCS. However, all form notifications were received by PBOCS and reconciled by making some changes in the implementation to reflect absence of the shipping functionality. Due to the removal of the shipping functionality from the PBOCS, these data were not used as intended during UEO. Very few acknowledgments were received from PBO in response to these notifications.

- **Notification of form receipt**

  DRIS transmitted receipt notifications to PBOCS of all forms received from the field. During most of the production period, no acknowledgements were received in response as a result of the shipping descope. PBOCS worked extensively with UCM to ensure accountability.

5.5.2.5 Cost and Progress System (C&P)

Due to a compressed PBOCS development and testing schedule, PBOCS had to limit the number of variables that they would provide to C&P, which resulted in the need for DMD operational staff to modify and eliminate several reports. Because of these late changes, there were inaccuracies in the progress data that PBOCS provided C&P that were later corrected. There were many days in which no file was transmitted to C&P because the processing was taking so long. This resulted in time-consuming workarounds (monitoring production and checking-in manually) and occasionally required that DMD operational staff use Microsoft Excel spreadsheets to report out on the UEOs, increasing the chance of human error. As a work around, PBOCS started sending C&P the data from alternate tables within the PBOCS schema. These alternative tables were refreshed within the timeframe needed to pass the data to C&P.

C&P experienced only occasional automation problems with the other source systems for the UEO. Other problems included database links not operational because the source database was down at the time the scheduled jobs ran.

5.5.2.6 2010 Census Evaluations and Experiments System (CEE)

CEE was the interface that transferred data from DRIS directly to DSSD. The auxiliary (AUX) data from paper questionnaire data capture was transferred through CEE. The AUX data were not part of the core data that DRIS transferred to DSPO. The core data created the DRF and CUF. The auxiliary data arrived daily to DSSD starting on February 25 and ending on October 5. There were several days during this period that DRIS was unable to transfer the data to DSSD. This was due to the interface being down or not working. It happened infrequently and when it did happen, it was fixed the next day. There were no negative repercussions for DSSD for receiving the data a day later. DRIS would then transfer the data on the following day when the interface was working.

5.5.2.7 National Processing Center

NPC conducts the backend processing to support the 2010 Census operations. Once work in the field was completed, LCOs shipped AA Binders containing maps and forms on a flow basis to NPC. Update Enumerate Quality Control DQC and DV forms were shipped with the AA binders as part of the binder content. Observation forms were shipped at the close of UE.

Upon arrival at NPC, binders were sent to the staging area where the Geography Branch staff separated and checked in the AA Binder and its contents using the Automated Tracking and Control System (ATAC) system. An AA binder could have consisted of one or more address registers. Contents were forwarded to NPC data capture staff for keying into the Visual Basic Key from Paper (VB-KFP) system. UE QC forms, Observation forms, and Address Listing pages were keyed by NPC staff. Address Registers without living quarters did not require data capture. Once the Address Registers with living quarters were captured using the VB-KFP and passed keying quality assurance, the address updates files were posted for transmission to the Geography Division at HQ.

Map pouches were also separated from AA Binders at initial check-in. All map sheets were scanned into GATRES, including exception maps (site maps, etc.). Once accepted by the GATRES system, maps sheets were digitized and underwent quality control. Map digitizing was considered complete once the map sheet passed the quality control component.

5.5.2.8 Automated Tracking and Control System (NPC-ATAC)

There were no automation problems with the Automated Tracking and Control System for the check-in of UEO forms and address binders.

Check-in of UEO Address Binders occurred early March to mid July 2010. There were 32,214 binders checked in for UE, 214 for RUE, and 1,258 for RA. Of the binders that NPC received, 53 were lost. NPC completed a Computer Incident Response (CIRT) for the 43 UE and 10 RUE Address Binders that were missing and could not be located.

Operational forms were not tracked through PBOCS. NPC conducted the check-in of Update Enumerate Quality Control Operation DQC forms, DV forms, and Observation forms from March 29 to July 12, 2010. A total of 43,977 DQC forms, 30,054 DV forms, and 11,596 Observation forms were checked into the NPC-ATAC system.

5.5.2.9 Visual Basic Key from Paper (VB-KFP)

There were no automation problems for the VB-KFP for the data capture of the UE QC forms, observations forms, and address listing pages.

The Address Listing Pages were pulled from the Address Registers and data captured March 8 through the end of July 2010. UE DQC forms, DV forms, and Observation forms were keyed at NPC from August 19 to September 27, 2010. The actual number of forms keyed into the Visual Basic system can be found in Section 5.2.2 of this document.

5.5.2.10 Geographic Acquis-based Topological Real-time Editing System (GATRES)

GATRES did not undergo testing before it was made operational. During production, the functionality was slow.

Map scanning and map digitizing occurred March 15 through the end of July 2010. A total of 34,725 maps were digitized for UE, 459 for RUE, and 1,622 for Remote Alaska.

5.6 Change Control

Change control was the process of identifying, documenting, approving or rejecting, and controlling changes to the UEO baseline. The UEO baseline reflected the original project plan, including requirements, schedule, and budget documentation. The HUE OIT - and if necessary, the 2010 Census Integration Group (CIG) - carefully reviewed proposed changes before incorporating changes to the baseline. The change control process successfully facilitated the implementation of changes throughout the lifecycle of the UEOs.

Following a decision made by CIG on December 17, 2008, many UEO changes only required approval at the HUE OIT level. The CIG approved a revision to the Change Control Management Plan that empowered teams, such as the HUE OIT, to make changes to the schedule when appropriate without direct involvement from the CIG. The purpose of the Change Control Management Plan revision was to accomplish the following:

- Create a more effective and efficient change control process
- Improve integration of schedule changes
- Define the roles and expectations of stakeholders
- Define the change control documentation and communication process

The new process allowed integration teams to make their own changes except in the following instances:

- Increase in costs to the baseline budget
- Impact to other key activities on the alert report (for example, a change to a planned start or finish date)
- Owners of impacted activities did not agree on change
- Change to operation scope
- At the discretion of the initiator

In general, the change control process was user friendly. Most divisions submitted change requests for their schedule activities in a timely manner. However, at times, Decennial Management Division (DMD) staff had to prepare change requests for other areas to get the requests submitted in a timely manner. These situations occurred during the most demanding time of the operations and created additional work for DMD staff that was already short staffed. The ability of the team to make decisions on operational changes as long as scope creep, budget and operation impacts were contained was a big advantage. It allowed quick implementation of changes that enabled the operation to continue on a reasonably uninterrupted course.

5.6.1 Schedule Changes

The 2010 master activity schedule (MAS) contained 10,875 schedule lines. Of the 10,875 activities, 33 had a work breakdown structure (WBS) for the Remote Alaska operation, 52 specific to the Update Enumerate and Update Enumerate Control operations, and 30 specific to RUE. Furthermore, 297 activity lines contained the operation code 'RMA', 497 for 'UDE' to include quality control activities, and 400 for 'RUE'.

The 2010 Census schedule was baselined on May 22, 2008. Subsequent to the baseline schedule, we approved and implemented 87 UEO related change requests. Nineteen of these changes related to RA, 13 were specific to RUE and 20 were specific to UE and UE QC. Several program related CRs were required to correct the RMD schedule and separate the UEOs, including the activities that occur in each. From July to October 2009, there was several issues surrounding preparation and delivery of training and field materials causing RUE Production to schedule late. A number of meetings were required, two CRs were submitted, and a lockup was later implemented. All meetings included discussion of and changes to dates, logic, relationships (including bounding), and durations within the Infrastructure, DMD, and NPC owned portions of the schedule. Training and field materials issues included 1) delivery of training materials and forms, which were late and pushed back on printing/kitting activities, and 2) changes to quantities (kit specification revisions).

UEO schedule changes affected many areas including - but not limited to - the following:

- Field staff training and operation start and finish dates
- Cost and progress
- Address extract and the universe
- Assignment preparation
- MaRCS development
- Observation forms
- Assessments

The changes included revisions to lags, durations, baseline dates, predecessor and successors, and responsible divisions. Some changes also added or deleted activities from the schedule.

5.6.2 Requirement Changes

The majority of change requests were program related; however there was one requirement change under the HUE-OIT specific to each of the RA, RUE, and UE operations. This change was for the late deployment of PBOCS, which was pushed back two weeks due to the Census HQ building losing power the weekend of January 16-18, 2010. Due to this, the PBOCS Steering Committee agreed to change the Deployment date from January 15, 2010 to January 19, 2010 so that the system would not need to be shut down the day after it is released to production. These changes affected when FLD could begin printing listings for affected operations as well as when Cost and Progress began to receive data from PBOCS.

For UE QC, a requirements change request was submitted for the addition of MaRCS for UE. With the conversion of NRFU from automation back to paper, part of the replan was to design the paper NRFU operation to include the use of MaRCS for Reinterview. By making it possible to effectively use MaRCS for NRFU, this opened the opportunity to use MaRCS for UE. Because the NRFU and UE RI operations are conducted on the same forms, this further facilitated the potential use of MaRCS for UE RI. The other requirements change was for the late deployment of PBOCS, which was pushed back two weeks due to late program changes.

5.7 Risk Management

Risk management for the 2010 Census focused on the identification, analysis, and mitigation of potential risks to the success of the program. The 2010 Census Risk Management plan allows for positive identification and mitigation of identifiable risks with the potential to affect overall program cost, schedule, technical, or compliance objectives.

Six primary functions comprise the program-level risk management process: Identify Risks, Analyze Risks, Plan Mitigation, Mitigate Risks, Assess Effectiveness, and Reassess Exposure.

As shown in Table 186, the 2010 Census Risk Register for RA, RUE, UE, and UE QC contained 41 risks. The UEO sub team monitored these risks on a monthly basis prior to and during production. There were no risks escalated to the CIG prior to the start of production. Stakeholders delivered requirements for the operations on time, and the load of the universe from UCM into PBOCS was successful. Hiring and retention in RA was the only identified risk that presented an issue prior to entering the field. FOSs and Partnership staff had difficulty recruiting locally from villages to support the RA operation. Several of the enumerators recommended by tribal leaders were rejected by the DAPPS system due to lack of credit, bank accounts, or fingerprints in the federal system, therefore, making them ineligible for hire. Since this problem is unique to Alaska, the Census Bureau relied on the recommendations of the tribal council or manager. These villages are small where everyone is known. Therefore, it is in the best interest of the tribal management to have people who can be trusted within the community.

Staff escalated one risk to the CIG during UEO production for backend activities. To resolve the issues, stakeholders implemented a work-around for tracking shipped forms, binders, and maps to NPC. DMD staff met weekly with all parties and used spreadsheets to track work using NPC system data.

In addition, there were no risks escalated to the CIG after the operations closed in the field. The C&P system was fully functional throughout production, yet PBOCS data were unreliable which made reporting to senior staff a challenge. The C&P does not reflect actual closeout data from PBOCS.

The table below shows the total numbers of risks identified for UEO under the HUE-OIT along with their risk status (red, yellow, and green).

Table 186: UEO Summary of Risks Status

Team	Operation	Total Risks	# of Red Risks	# of Yellow Risks	# of Green Risks
HUE OIT	Update Enumerate Operations (RA, RUE, UE , UE QC)	41	11	20	10

Data Source: UEO Risk Register

6 RELATED EVALUATIONS, EXPERIMENTS, AND/OR ASSESSMENTS

- 2010 Census Nonresponse Followup Contact Strategy Experiment
- 2010 Census Nonresponse Followup Operations Assessment Report
- 2010 Census Nonresponse Followup Quality Profile Report
- 2010 Decennial Census: Item Nonresponse and Imputation Assessment Report
- 2010 Census Field Verification Operational Assessment Report
- 2010 Census Address Canvassing Operational Assessment Report
- 2010 Census Address Canvassing Profile Report
- 2010 Census Field Office Administration and Payroll Assessment Report
- 2010 Census Recruiting and Hiring Field Staff Assessment Report
- 2010 Census Decennial Applicant, Personnel, and Payroll System Assessment Report
- 2010 Census Content and Forms Design Assessment Report
- 2010 Census Decennial Response Integration System Paper Questionnaire Data Capture Assessment Report
- 2010 Operational Assessment for Type of Enumeration Area Delineation Assessment Report

- 2010 Census Universe Control and Management and Response Processing System Assessment Report
- 2010 Census Non-ID Processing Assessment Report
- 2010 Census Cost and Progress Assessment Report
- 2010 Census Group Quarters Enumeration Assessment Report
- 2010 Census Local Update of Census Addresses Assessment Report

7 KEY LESSONS LEARNED, CONCLUSIONS, AND RECOMMENDATIONS

Following the completion of the UEOs, DMD conducted a series of Lessons Learned sessions, which included stakeholders from the UEO subteam and the HUE-OIT. The group used a modified nominal group technique to gather information from all participants on a range of topics related to the UEOs. Section 7.1 of this assessment highlights the key successes, challenges, and recommendations identified by the group. The detailed Lessons Learned document is appended to this document.

The HUE-OIT and UEO Subteam identified and gathered the following top lessons learned, conclusions, and 2020 Census recommendations listed below.

7.1 Update Enumerate Operations

This section applies to UE, UE QC, RUE, and RA.

7.1.1 Successes

- The UEO team developed a detailed operation plan (DOP) that documented the planning design and process improvement for the 2010 UEOs at the same detailed level of high visibility operations. Documentation included a complete workflow, narrative, and schedule. The DOP became a useful resource that stakeholders used throughout the project life cycle.
- Partnership efforts with Tribal Leaders improved the 2010 Census counts. In the 2010 Census, of the 565 federally recognized tribes, 99 percent participated in the census enumeration. Only six American Indian Tribal Areas refused Census Bureau access.
- Communication between HQ and the RCCs and the RCCs to LCOs for UEOs was effective. Video teleconferencing with the regions and e-mailing operational logs with updates to procedures were also successful.
- PBOCS successes included:
    a. The Enhanced Questionnaire Check-in procedures that collected status information about the case. We collected the same information for the Update Enumerate Operations as we did for the Nonresponse Followup Operations.
    During UEOs, we collected housing unit status and other data items such as type of respondent population count for each case checked in. This allowed us to; identify the number and percent of, for example, vacants, deletes, proxies, and POP 1 cases. When we saw LCOs with questionable numbers and percents, we

were able to take action during the operation rather than later. In addition, the data allowed us to identify cases that went to RI.

b. Electronic association of the questionnaire continuation form with its parent questionnaire as we did in the Nonresponse Followup Operations. During check-in of completed cases, there was a check to make sure that if the population count was greater than five the system prompted the clerk to check for continuation forms. The clerks then checked-in the continuation form at the prompt thus linking or associating the continuation forms with its parent form.

- FDCA Map printing system was successful for printing the UEO enumerator maps.
- Implementation of the Alternate Shipping Solution to ship and track address registers.
- Even with all of the kit changes and changes to the specifications, UEO kits at NPC were delivered to the LCOs on schedule. There were no major problems encountered during the UE kit assembly operations.

7.1.2 Challenges

- Changes to the 2010 program design in 2008 resulted in changes in requirements and requirement processing. Due to time constraints, this often resulted in gaps in requirements integration.
- The lack of full integration made daily reporting a challenge. Data compiled for reports came from multiple sources (DAPPS, C&P, FLD) and required several reviews for accuracy.
- PBOCS Challenges
  a. One of the challenges with the control system was because of NRFU volumes and PBOCS being unable to handle the load of cases there were PBOCS performance and outage issues which impacted check-in and shipping. We mitigated this issue by temporarily restricting access to the control system. Fieldwork continued as planned and ultimately cases were checked into the control system and all production cases were reconciled.
  b. Outside of fieldwork and checkin, PBOCS was unable to provide certain report variables which impacted our tracking and monitoring capabilities. We had to eliminate our progress report for UE QC that showed how many cases were completed by personal visit and telephone follow-up during the course of the operation. Modifications were also made to the C&P interface to ensure progress numbers were matching the field reports. Additionally, FLD staff at HQ and in the LCOs could not evaluate performance and production standards of the enumerator. Two of the reports used by the operations, the D-341 Performance Report was eliminated, and the D-948 Progress Report was inconsistently available. DSSD was also impacted in that because PBOCS was not turned on, reports were not visible for viewing Reinterview data. By the time DSSD was able to access the system and create reports for viewing, the data were old and we were no longer looking at current, real-time data.
  c. MaRCS had planned to use some data from PBOCS, but due to persistent delays in receiving the data, DSSD exercised the alternative of getting it through DRIS. PBOCS errors results in delays and the LCOs having to create workarounds to finish up the UE QC work.
- We planned reconciliation of UE EQs to the Address Register Listing pages but did not follow through with the reconciliation due to duplicate Processing IDs for adds. PBOCS

did not program the PIDs to be unique across operations. DSPO required that each questionnaire "add" record must have a unique PID to link to the newly created MAF ID in the Non-ID Feedback Table (NIFT). To ensure correct processing of "adds"; we implemented a contingency plan requiring DSPO to reassign PIDs to questionnaires received for the UEOs. The MTdb was updated with the "adds" from the enumerator questionnaires and adds from the Address Register listing pages were ignored.

- Not all production forms were tested. An example is the Delete Verification Form with which field staff had difficulty.
- Lack of HUE OIT team meetings during production hindered communication to the team on progress and issues.

7.1.3 Recommendations

- Automate the questionnaire, operational forms such as payroll and Info-comm forms[77], and all related sources of paradata. This will reduce the amount of paper to be handled and reduce enumerator error.
- Develop a data warehouse to create a consolidated repository of operational data that all systems can access. This will facilitate the ability to monitor the progress of the Update Enumerate Operations (e.g., budget and staffing) in real time.
- Improve communication about the enumeration method for Update Enumerate Operations' areas. Many residents were expecting questionnaires in the mail, due to the nationwide media campaign.
- Use a Spanish in-language questionnaire where a majority of persons speak that language.
- Improve communication with stakeholders by ensuring teams meet regularly through production and utilize a shared portal site or shared drive to communicate information.
- Develop a public website or method to inform the public what type of enumeration will occur in their area and the timeframe.
- If paper is needed for the 2020 Census enumeration operations, continue the same method of printing enumerator maps as used in the 2010 FDCA map printing system. Test all operational forms and questionnaires to ensure their usability by field staff.
- Fully integrate systems and provide consistent real time reporting to stakeholders
- The Content IPT reviews all forms that involve asking questions to the public and require OMB approval. However, the "Delete Verification" was developed by DSSD and FLD who are the primary stakeholders. FLD and DSSD should review and field-tested these kinds of forms. In future form design, include the Content IPT in reviewing and the Center for Survey Measurement Division in testing of forms.

7.2 Update Enumerate Production

7.2.1 Successes

See 7.1.1 for UE successes.

[77] Info-comms reported accidents or other incidents that occurred in the field or LCO during the operations.

7.2.2 Challenges

- PBOCS- After the start of NRFU in early May, PBOCS was down frequently due to load issues. This resulted in a decision to limit the time LCOs could spend processing UE or UE QC work, affecting the accuracy of the reports compared with work status (real-time monitoring and limited progress data). This resulted in a delay of seven days for completing production work. The decision to discontinue using PBOCS for UE QC resulted in inconsistencies tracking completed work. However, since the UE operation occurred in only 88 LCOs and progress was well under way, the overall impact was minimal.

7.2.3 Recommendations

- Review criteria for updating addresses in Update Enumerate areas. Update Enumerate was included in the Address Canvassing operation. Results data show that 80 percent of Update Enumerate addresses were verified and 88 percent were complete City-Style addresses. Consider if certain areas of Update Enumerate can be included in the Nonresponse Followup Operation and not include an address update.

See 7.1.3 for automation recommendations for PBOCS challenges.

7.3 Update Enumerate Quality Control

7.3.1 Successes

- A separate office staff and AMQA managed the UE QC, allowing office staff to focus all attention on QC activities.
- The 2010 Census MaRCS used for UE made the review process efficient. The automated RI matching process compared the enumerator and RI enumerator responses. Having the developer contractor on-site facilitated timely communication and problem resolution.

7.3.2 Challenges

- MaRCS was designed to work with automated systems but was used in a paper environment. This introduced problems that would not have occurred in an automated environment. For example, MaRCS received DRIS data before they were quality checked; therefore, the data contained errors.
- Tracking workloads
    a. There was no specific requirement for PBOCS to monitor vacant housing units that were seasonal.
    b. Not all reports were available in PBOCS (e.g., the D-957 DV form). We could track progress but not quality.

7.3.3 Recommendations

- Investigate possible ways to streamline and simplify the quality control components in Update Enumerate Quality Control operation.
- Continue to have an independent office staff to conduct the UE RI.
- Continue the use of MaRCS for RI.

- Add a requirement for PBOCS to flag UE seasonal vacants and track them through MaRCS.
- Reduce the number of Non-Interview and LCO Relief cases, particularly for the Outlier, Supplemental, and Hard Fail Cases. See Table 60.

7.4 Remote Update Enumerate

7.4.1 Successes

- RUE was implemented as planned.

7.4.2 Challenges

- The Census Bureau policy requires an independent certification of delete and vacant addresses. The Census Bureau's requirement to verify one hundred percent of vacant and deletes considerably increased the workload for crew leaders.
- Weather is a challenge in remote areas. The Remote Update Enumerate areas for Remote Alaska and Remote Maine are in sparsely populated areas. The roads are difficult to travel (i.e. dirt roads) and weather conditions in spring bring heavy rain and sometimes snow that make getting to these communities difficult.

7.4.3 Recommendations

- Explore different enumeration methods for Remote Update Enumerate. The workload for Remote Update Enumerate was just over 8,000 housing units, yet the operation required the same amount of documentation and planning. The quality control aspect should also be reconsidered if Remote Update Enumerate remains separate for the 2020 Census. Verification of every housing unit identified as vacant or delete involved significant time and resources. Results data show that 2,571 occupied housing units contained 5,555 people. Consider if the 5,710 vacant and nonexistent housing units can be identified without an enumerator visit. In addition, consider if this operation is able to use Administrative Records for these rural areas.
- Review objectives and best methods for quality checks in Remote Update Enumerate. Results data showed that 69 percent of cases in the operation needed to be followed up with by a crew leader. Consider if Administrative Records can be used to verify vacant and deleted housing units to avoid crew leader verification.

7.5 Remote Alaska

7.5.1 Successes

- Including the RA FOSs in the preliminary visits to the Alaskan villages was a successful change from Census 2000. The RA FOSs focused on obtaining operational information while the partnership specialist focused on promoting village cooperation and participation.
- The Seattle RCC received convenience checks and traveler's checks in 2000 and in 2010 for use in purchasing vendor services to remote locations. These methods of payment were effective for vendors in Alaska that did not accept credit cards.
- The kickoff of the 2010 Census conducted in Noorvik, Alaska was successful in promoting the 2010 Census and achieving news coverage.

- The concept of "wave" enumeration allowed planning for enumeration based on weather conditions unique to Alaska.

7.5.2 Challenges

- The original training design for training RA enumerators called for an OJT type of training as in Census 2000. However, late in the process, the Seattle RCC decided to have a more traditional type of training for the RA enumerators. FLD-HQ incorporated material that the Seattle RCC specifically created and wanted included in the enumerator manual. This resulted in changes to the delivery of some of the materials to FLD-Logistics Branch for printing and distribution. Since there are no debriefing data, it could not be determined if changes improved training or if there was any impact due to the late receipt of training materials.
- Alaska had unusual group quarters requiring specific instructions. There were 77 GQs in the RA operation that were carried over from Census 2000. The design of RA was that the CL conducted the GQ enumeration in the Alaska Native village while the housing unit enumeration was occurring. However, some of these GQs were in areas outside the Alaskan Native villages. Due to their location and population, these GQs were enumerated by regular GQ trained staff instead of the RA CL.
- Remote Alaska requires extensive travel arrangements for CLs and FOSs. There is also a heavy volume of travel to sparsely populated villages to conduct the enumeration. Not all travels costs for RA were charged to the correct project number or captured on financial management reports. This made it difficult to track the travel in Remote Alaska.
- Recruitment and staffing in Alaska was an overall challenge.
    a. Recruiting in Alaska is at a 50 percent attrition rate (people leave after they are hired for various reasons).
    b. The applicant pool remained low due to recruits failing of their background checks.
    c. The Area Manager spent 50 percent of her time in and with the Anchorage LCO.

7.5.3 Recommendations

- Develop specific verbatim training for RA Enumerators and include classroom training in addition to OJT.
- Have a dedicated GQ supervisor for RA to handle unique group quarters (one remote, and one regular) to handle areas outside of the Alaskan Native villages. This person will have knowledge of enumeration in group quarters in addition to housing units.
- Consider an additional travel section for the LCO in Alaska to monitor and handle the heavy volume and extensive RA travel arrangements, and work closely with the travel agency/contractor. This would also ensure travel is charged to the correct project number. The LCO AMA was responsible for providing travel support, tracking, etc. but was overwhelmed during the operation.
- Continue the concept of enumeration in "waves" but do not incorporate the "wave" concept in the Master Activity Schedule.

7.6 Conclusions

Housing units are included in the UEO universe because they are located in areas considered to have a special enumeration need. However, it is not entirely apparent if we are meeting those special needs, if there is a better way to meet those needs, or if those needs are special enough to be considered separately in the first place.

In the UE universe, addresses were included if they came from tracts identified as either:

- On (or around) an American Indian reservation
- In (or near) a Colonia
- In an area with a large percent of seasonal residences
- In an area with a large percent of addresses that do not receive mail delivered to their house (often utilizing post office boxes instead).

Colonias and American Indian reservations are considered hard-to-enumerate in part because of their geographic isolation, but also because of resident's mistrust of government data collectors and sometimes problems with the address list. Seasonal areas have a high percent of vacant (or seasonally occupied) housing units. One large impediment to assessing if these communities' needs were met is the inability to distinguish in the data which addresses were considered to be in each of the four distinct types of communities that made up the UE universe.

The recommendations in Section 7.1 mention that these communities could have been better served in the 2010 Census with enhanced communication about the enumeration method for these areas (as many were expecting questionnaires in the mail, due to the nationwide media campaign). Only a Spanish language job-aid was used in the Colonias, not a full Spanish questionnaire as was recommended after Census 2000.

The RUE universe consisted of housing units even more remote and rural than those in the UE universe. As mentioned previously in the background section, RCCs self-selected into the RUE operation. A number of RCCs that Census Bureau Headquarters thought would take advantage of RUE did not. Those areas were then enumerated in UE and no information is available to show if that decision was detrimental to their enumeration.

The RA universe requires special consideration in part because of concerns with weather and population mobility that necessitate a different timeline for enumeration than the rest of the country, in addition to cultural and logistical concerns. These concerns will still exist in ten years so it is reasonable to expect that the RA operation will still be needed in the 2020 Census. The Census Bureau should continue to plan ahead and work with these communities to ensure a successful enumeration.

The quality control aspect of these operations should also be reconsidered. Crew leaders in RA and RUE were to verify every housing unit identified as vacant or delete, which often involved significant time and resources. Especially for RUE, where enumeration was done in pairs, alternatives to do this double verification could be considered. No reinterview was conducted to confirm the accuracy of interviews with occupied housing units. The quality assurance for the RA universe came largely from the tribal leader who reviewed all completed work for a given village. This assessment does not report on any results of those reviews.

Overall, the UEOs were successful in enumerating their populations, but improvements can always be made. Future planners should give more attention and thought to these operations and populations when planning for the 2020 Census.

8 ACKNOWLEDGEMENTS

In addition to the main authors of this document, the following individuals/staffs contributed to helping write and gather data for the UEO Assessment.

Field Division (FLD)

Hilda Dimmock

Irvin Vann

David Katzoff

John O'Farrell

Mike Haas

Geography Division (GEO)

Karen Owens

Alicia Wentela

Gordon Wood

Decennial Statistical Studies Division (DSSD)

Ryan Kitts-Jensen

Population and Housing Division (POP)

Denise Flanagan-Doyle

9 REFERENCES

Alexander, Dee (2007). "Final Report: 2006 Census Test American Indian and Alaska Native Operational Synthesis" DMD 2010 Census Planning Memoranda Series, No. 60, March 29, 2007.

Burlow, Elizabeth (2007). "2010 Census: Key Challenges to Enumerating American Indian Reservations Unresolved by 2006 Census Test" Final Inspection Report, September 19, 2007.

Census 2000 Testing, Experimentation, and Evaluation Program (2004), "Address List Development in Census 2000" Census 2000 Topic Report No. 8, March 2004.

Census 2000 Testing, Experimentation, and Evaluation Program (2004), "Data Collection in Census 2000" Census 2000 Topic Report No. 13, March 2004.

Census 2000 Testing, Experimentation, and Evaluation Program (2004), "Census 2000 Ethnographic Studies" Census 2000 Topic Report No. 15, March 2004.

Childs, Jennifer Hunter and Nathan Jurgenson (2011), "Behavior Coding of the 2010 Nonresponse Followup (NRFU) Interviews Report," DSSD 2010 Census Planning Memoranda Series, No. 150, August 30, 2011.

Coon, David et al., (2012), "DRIS Paper Questionnaire Data Capture Assessment Report," Final, April 10, 2012, 2010 Census Planning Memorandum Series, No. 195.

Decennial Management Division (2003a), "Re-engineering the 2010 Decennial Census: The Baseline Design for 2010," DMD 2010 Census Planning Memoranda Series, No. 14, June 3, 2003.

Decennial Management Division (2003b), "2004 Census Test Operational Plan," DMD 2004 Census Test Memorandum Series, No. 13R, September 29, 2003.

Dimmock, Hilda (2009), "2010 Census Update Enumerate (UE) Enumerator Manual," 2010 UE Field Material D-1202, July 2009.

Grinberg, Emmanuella. "Impoverished border town grows from shacks into community." *CNN*. July 8, 2011. Retrieved on November 9, 2011.

Heimel, Sarah K. (2010), "Observation of 2010 Census Nonresponse Followup and Nonresponse Followup Reinterview in the Springfield, Massachusetts LCO from May 18 to 20, 2010," 2010 Field Observation Memorandum Series, No. 10-169, December 16, 2010.

Hogan, Howard (1999). "Quality Assurance Specifications for Census 2000 Remote Areas of Alaska," DSSD Census 2000 Procedures and Operations Memorandum Series#II-2.

Housing Unit Enumeration Operational Integration Team (2009), "2010 Census Operations Plan for the Update Enumerate Operation Group." DMD 2010 Census Information Memoranda Series, No. 43, January 14, 2010.

Jackson, Geoff (2006). "2006 Census Test Update Enumerate Data Collection Quality Control Plan, Revision." DSSD 2006 Census Test Memorandum Series # B-06R.

Kitts, Ryan (2009). "2010 Census: Quality Control Plan for the Update Enumerate Operation." 2010 Census Planning Memorandum Series, No. 213.

Kitts-Jensen, Ryan (2010), "Specifications for Handling Replacement Cases Resulting from the Nonresponse Followup and Update Enumerate Reinterview Operations (Revision)," DSSD 2010 Decennial Census Memorandum Series, No. E-03R1, September 9, 2010.

Kitts-Jensen, Ryan (2011). "2010 Census: Update Enumerate Reinterview Quality Profile." DSSD 2010 Decennial Census Memorandum Series # Q-05.

Kostanich, Martine (2009). "Identification of the 2010 Coverage Followup Eligible Universe and Selection Requirements," DSSD 2010 Decennial Census Memorandum Series, No. I-06, April 30, 2009.

Lynch, Christine; Oliver, Broderick (2000). "Specifications for the Quality Assurance for the Census 2000 Update/Enumerate Operation," DSSD Census 2000 Procedures and Operations Memorandum Series #II-11R.

Pennington, Robin A., Jerry D. Imel, and Nick Alberti (2010), "Specification for Assigning Living Quarters Record Status and Population on the Preliminary Census Unedited File in the 2010 Census," DSSD 2010 Decennial Census Memorandum Series, No. G-10-R1, October 22, 2010.

Peterson, Sandra (2009), "2010 Census: Quality Control Plan for the Update Enumerate Operation," DSSD 2010 Decennial Memorandum Series, No. F-02, June 11, 2009.

Rose, Jazmin, Heather Fallica, Bei Zhang, and Geoff Jackson (2010), "2010 Census Study Plan for the Update Enumerate Operations Assessment," DMD 2010 Census Planning Memorandum Series, No. 102, December 21, 2010.

Rosenthal, Miriam (2003). "Census 2000 Update/Enumerate Final Report," Census 2000 Evaluation F-12.

Rosenthal, Miriam (2003). "Census 2000 List/Enumerate Final Report," Census 2000 Evaluation F-13.

Treat, Jim (2009), "2010 Census Change Control Management Plan," DMD 2010 Census Information Memoranda Series, No. 25, May 12, 2009.

Walker, Shelley (2000). "Program Master Plan: Census 2000 List/Enumerate Program Master Plan", 2000 Census Information Memoranda Series, No. 46, March 2, 2000.

Walker, Shelley (2000). "Program Master Plan: Census 2000 Update/Enumerate Program Master Plan", 2000 Census Information Memoranda Series, No. 79, November 9, 2000.

Walker, Shelley (2000). "Program Master Plan: Census 2000 American Indian/Alaska Native Program", 2000 Census Information Memoranda Series, No. 86, December 6, 2000.

Wechter, Keith M. (2010). "Customer Requirements for the 2010 Remote Alaska, Remote Update/Enumerate, and Update/Enumerate Operation Address Updates to the MAF/TIGER Database," DSSD 2010 Decennial Census Memorandum Series, No. D-11R2, January 27, 2010.

Zhang, Bei (2010). "Customer Requirements for the 2010 Census Final Collection and Tabulation Address Products Deliveries," DSSD 2010 Decennial Census Memorandum Series, No. D-17R1, June 4, 2010.

APPENDIX A: Terminology and Acronyms

Additional 2010 Census terminology can be found in the 2010 Census Planning Memorandum Series #12.

Term	Definition
Usual Home Elsewhere	A respondent that lives and sleeps at a different residence than the one they are at on Census Day.
ADDUPS	The file that DSPO creates and provides to GEO for updating the MAF/TIGER database with added addresses.
STRUCTS	The file layout that GEO uses to update the MAF/TIGER. The STRUCT is the spatial version containing any spatial updates recorded from an operation.
Housing Unit	A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from the outside of the building or through a common hall.
Acronym	**Meaning**
AA	Assignment Area
AC	Address Canvassing
AMA	Assistant Manager for Administration
AMFO	Assistant Manager for Field Operations
AMQA	Assistant Manager for Quality Assurance
AMR	Assistant Manager for Recruiting
C&P	Cost and Progress
CEE	Census Evaluations and Experiments System
CL	crew leader
CLA	crew leader assistant
CLD	crew leader district
CPMB	Cartographic Products Management Branch
DAPPS	Decennial Applicant, Personnel and Payroll System
DCC	Data Capture Center
DMD	Decennial Management Division

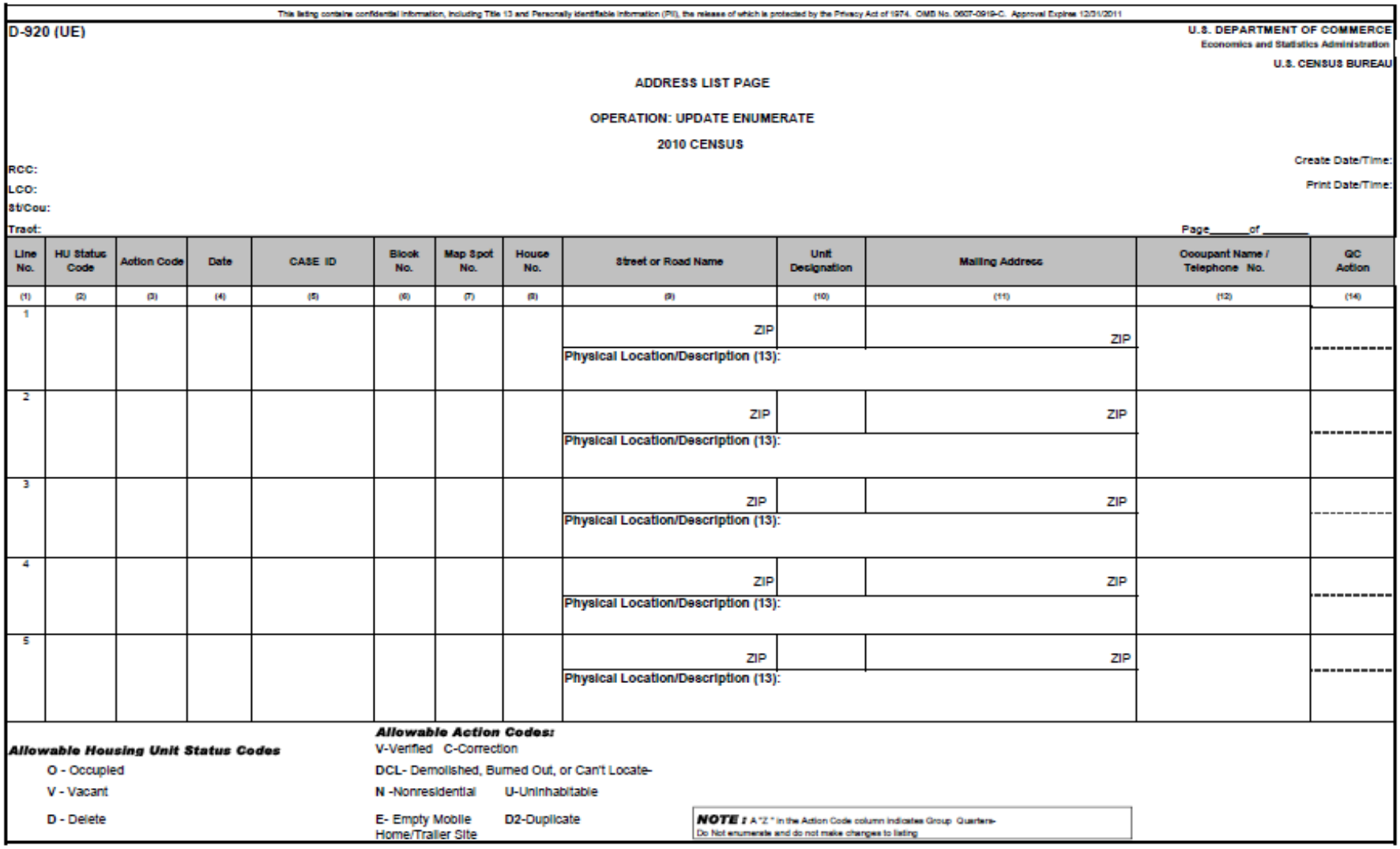
DRIS	Decennial Response Integration System
DSF	Delivery Sequence File
DSPO	Decennial Systems and Processing Office
DSSD	Decennial Statistical Studies Division
ELCO	Early Local Census Office
EQ	Enumerator Questionnaire
ETL	Enumeration at Transitory Locations
FDCA	Field Data Collection Automation
FISMA	Federal Information Security Management Act
FLD	Field Division
FOS	Field Operations Supervisor
FOSD	Field Operations Supervisor District
GEO	Geography Division
GQ	Group Quarters
GQE	Group Quarters Enumeration
GQV	Group Quarters Validation
GRF-C	Geographic Reference File – Code
GSB	Geography Service Branch
HH	Household
HQ	Census Bureau Headquarters
HTE	Hard to Enumerate
HU	Housing Unit
HUE-OIT	Housing Unit Enumeration-Operational Integration Team
HUE-PBO	Housing Unit Enumeration-Paper Based Operations
ICR	Individual Census Report
IPP	Integrated Program Plan
LCO	Local Census Office
LCOM	Local Census Office Manager
MAF/TIGER	Master Address File / Topologically Integrated Geographic Encoding and Referencing System

MaRCS	Matching, Reviewing, and Coding System
MAS	Master Activity Schedule
MCR	Military Census Report
MTDB	The Master Address File / Topologically Integrated Geographic Encoding and Referencing System Database
NPC	National Processing Center
OCE	Office Computing Environment
OIT	Operational Integration Team
OJT	On-the-Job Training
OMB	Office of Management and Budget
OOS	Office Operations Supervisor
OOSQA	Office Operations Supervisor for Quality Assurance
PID	Processing ID
PBOCS	Paper Based Operations Control System
POMB	Production Operations Management Branch
POP	Population Division
PRAO	Puerto Rico Area Office
PUF	Public Use Form
QC	Quality Control
RA	Remote Alaska
RCC	Regional Census Center
RCLD	Reinterview crew leader district
RI	Reinterview
RI EQ	Reinterview Enumerator Questionnaire
RO	Regional Office
RPS	Response Processing System
RT	Regional Technician
RUE	Remote Update Enumerate
TEA	Type of Enumeration Area
UCM	Universe Control and Management

UECT	Universe Enumeration Control Table
UHE	Usual Home Elsewhere
URdbS	Universal Response Database Schema
USPS	United States Postal Service
VB KFP	Visual Basic Key From Paper
WHUHE	Whole Household Usual Home Elsewhere

APPENDIX B: Sample Address Listing Page from AA Binders

The image on this page shows an example of an Address Listing Page. These pages listed every address within an AA known to the Census Bureau at the start of the UE operations.



This listing contains confidential information, including Title 13 and Personally Identifiable Information (PII), the release of which is protected by the Privacy Act of 1974. OMB No. 0607-0919-C. Approval Expires 12/31/2011

D-920 (UE)

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

ADDRESS LIST PAGE

OPERATION: UPDATE ENUMERATE

2010 CENSUS

RCC:
LCO:
St/Cou:
Tract:

Create Date/Time:
Print Date/Time:
Page_____of_____

Line No.	HU Status Code	Action Code	Date	CASE ID	Block No.	Map Spot No.	House No.	Street or Road Name	Unit Designation	Mailing Address	Occupant Name / Telephone No.	QC Action
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(14)
1								ZIP Physical Location/Description (13):		ZIP		
2								ZIP Physical Location/Description (13):		ZIP		
3								ZIP Physical Location/Description (13):		ZIP		
4								ZIP Physical Location/Description (13):		ZIP		
5								ZIP Physical Location/Description (13):		ZIP		

Allowable Housing Unit Status Codes

O - Occupied
V - Vacant
D - Delete

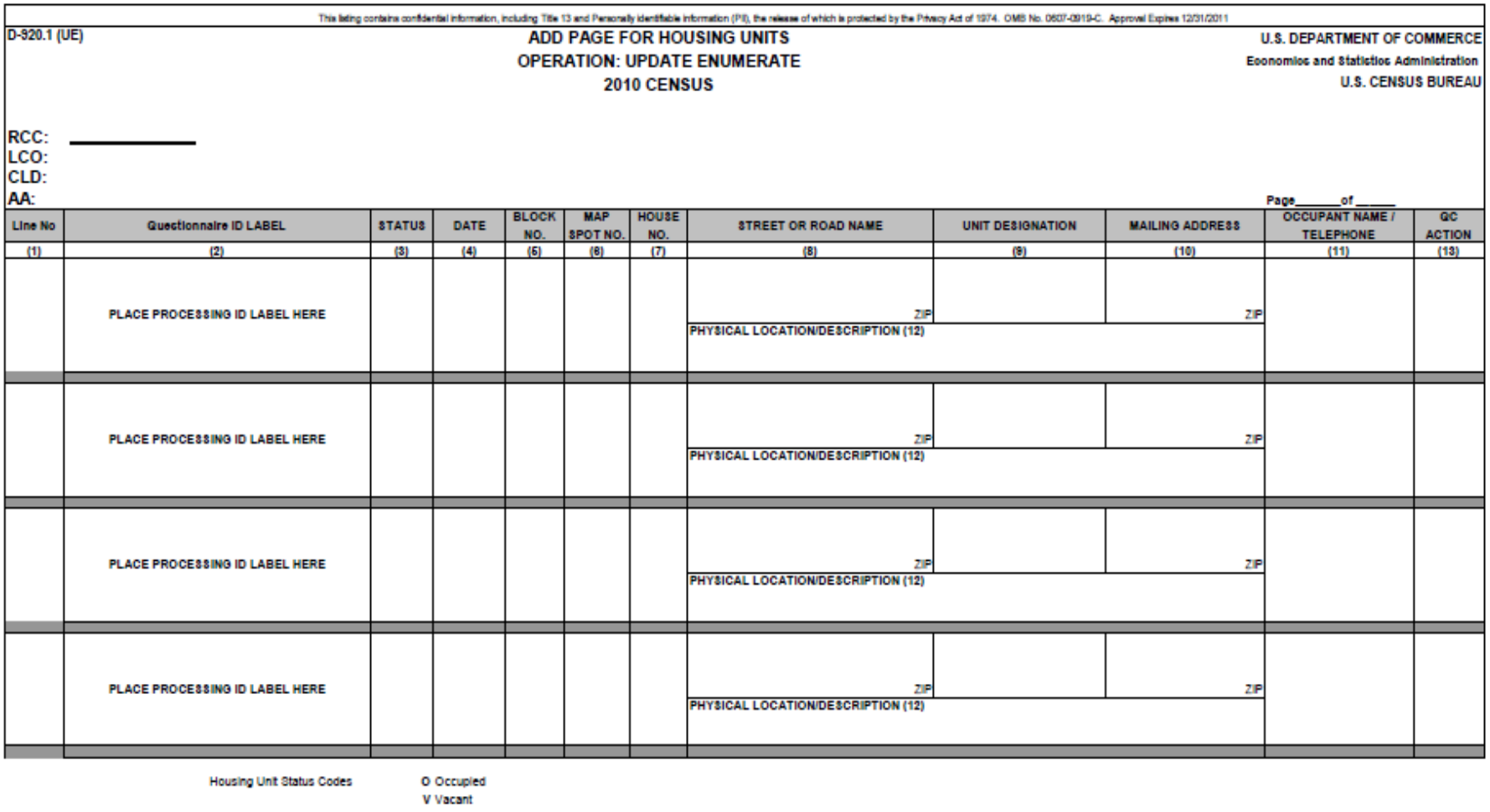
Allowable Action Codes:

V-Verified C-Correction
DCL- Demolished, Burned Out, or Can't Locate-
N -Nonresidential U-Uninhabitable
E- Empty Mobile Home/Trailer Site D2-Duplicate

NOTE : A "Z " in the Action Code column indicates Group Quarters-
Do Not enumerate and do not make changes to listing

Appendix C: Sample Add Page from AA Binders

The image on this page shows an example of an Add Page. If a housing unit was not included on an enumerator's Address Listing Page, then they were to write address information for the housing unit on this blank page.



This listing contains confidential information, including Title 13 and Personally Identifiable Information (PII), the release of which is protected by the Privacy Act of 1974. OMB No. 0607-0919-C. Approval Expires 12/31/2011

D-920.1 (UE)

ADD PAGE FOR HOUSING UNITS
OPERATION: UPDATE ENUMERATE
2010 CENSUS

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

RCC: _____
LCO:
CLD:
AA:

Page_____of_____

Line No	Questionnaire ID LABEL	STATUS	DATE	BLOCK NO.	MAP SPOT NO.	HOUSE NO.	STREET OR ROAD NAME	UNIT DESIGNATION	MAILING ADDRESS	OCCUPANT NAME / TELEPHONE	QC ACTION
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(13)
	PLACE PROCESSING ID LABEL HERE						ZIP PHYSICAL LOCATION/DESCRIPTION (12)		ZIP		
	PLACE PROCESSING ID LABEL HERE						ZIP PHYSICAL LOCATION/DESCRIPTION (12)		ZIP		
	PLACE PROCESSING ID LABEL HERE						ZIP PHYSICAL LOCATION/DESCRIPTION (12)		ZIP		
	PLACE PROCESSING ID LABEL HERE						ZIP PHYSICAL LOCATION/DESCRIPTION (12)		ZIP		

Housing Unit Status Codes O Occupied
V Vacant

APPENDIX D: UE OBSERVATION CHECKLIST

Form D-1222 (UEO) U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

OBSERVATION CHECKLIST
Update Enumerate Operations
2010 Census

IDENTIFICATION ITEMS

	1. Enumerator Name:			2. Applicant ID
	3. Type of Observation [X]: RA: _____ RUE: _____ UE: _____ UE QC: _____			
1st Observation	4. Observer Name:	5. Date [Month/Day]: /	6. No. Listings Observed:	7. CLD No:
2nd Observation		/		8. LCO No:

SAFETY & SECURITY REMINDERS

- As required by law, use a seatbelt while driving
- Protect all Title 13 data or any medium that may contain Personally Identifiable Information (PII)
- Any lost or stolen medium containing Title 13 data or PII must be reported as soon as possible according to the instructions in your manuals

GENERAL INSTRUCTIONS

- Use this checklist to evaluate and document overall performance of UEO Enumerators as you observe them in the field
- As you are observing, keep in mind the tasks listed
- For every task listed, mark "X" in the appropriate column:
  - **Y** -> Yes, task observed and performed correctly
  - **N** -> No, task observed but not performed correctly (discuss proper procedure before observing next address)
  - **N/A** -> Not Applicable, task not observed (discuss proper procedure at the end of observation)
- Use Section A to record performance for UEO Enumerators
- Record observation result in Section B for UEO Enumerators

Section A -- OBSERVATION PERFORMANCE

Tasks:	1st Observation Y	1st Observation N	1st Observation N/A	2nd Observation Y	2nd Observation N	2nd Observation N/A
Non-Critical Tasks:						
1. Introduced him/herself to contact person and showed Census ID.						
2. Gave each repondent a D-1(F) Information Sheet, containing the Privacy Act Notice.						
3. Wore seatbelt while driving on the job.						
Critical tasks:						
Census Map						
4. Used map correctly in locating and validating Housing Unit address						
5. Made corrections and/or updates to the block maps as necessary.						
6. Used Census maps to confirm the location of the cases.						
7. Correctly map spotted and/or updated a multi-unit structure.						
Address Listing Page						
8. Correctly added HU(s) to the HU Add Page(s).						
9. Correctly deleted HU(s) when it could not be found in the block.						
10. Assigned the correct address status on the Address Listing Page.						
11. Correctly made changes to address information on Address Listing Page.						
General						
12. Planned an efficient route of travel to the followup addresses.						

13. Interviewed or attempted to interview an eligible respondent.						
14. Read the questions as worded.						
15. Filled in the questionnaire neatly and accurately						
16. Understood how to use the various forms, such as the Information Sheet, Language Flashcards, Notice of Visit, InfoCoMM, etc.						
17. Followed census procedures to protect PII and confidentiality of census materials.						

Section B -- OBSERVATION RESULT

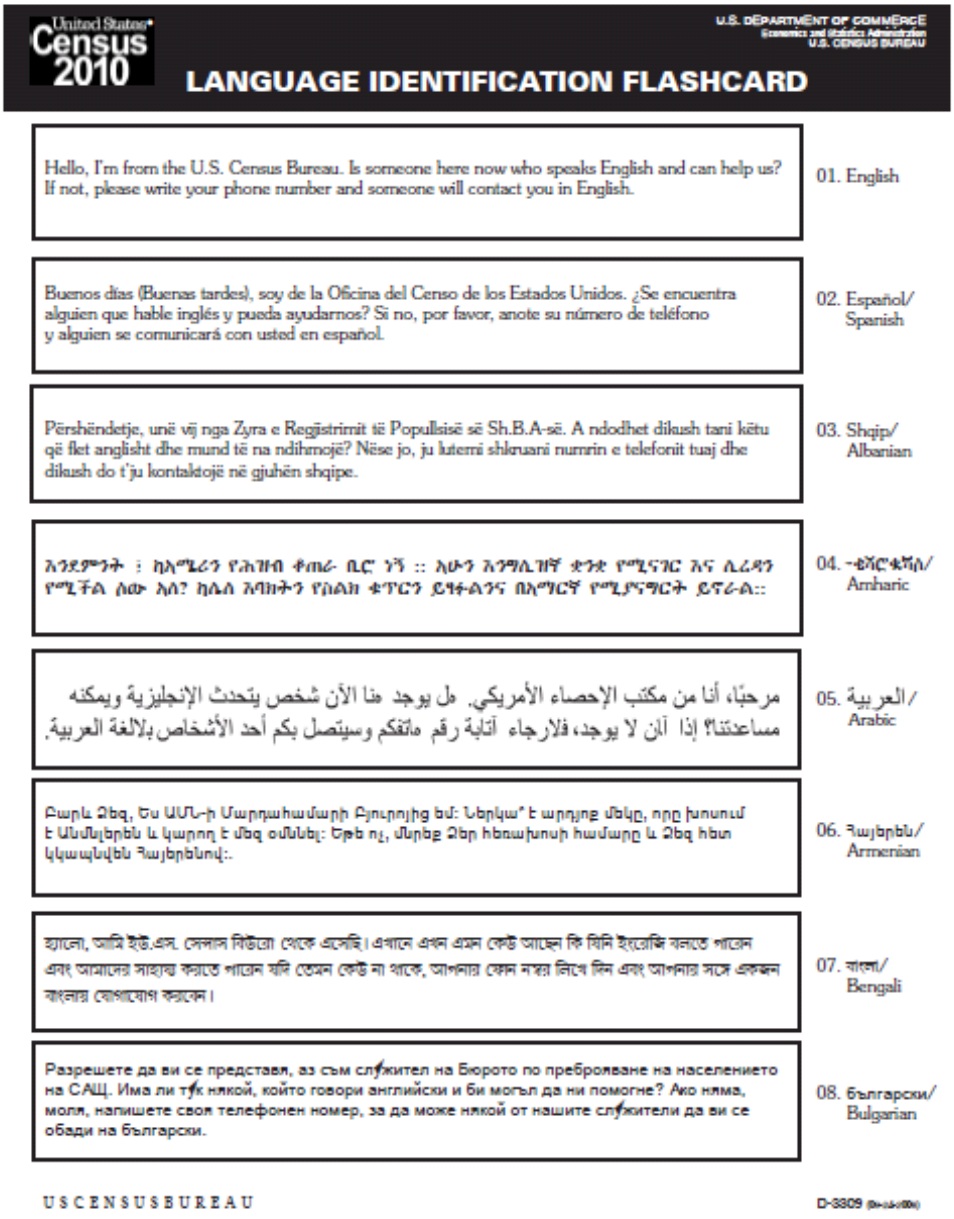
- **Rate "Satisfactory" if the Enumerator demonstrated a good overall understanding of the tasks**
- If you believe the Enumerator did NOT demonstrate a good overall understanding of the tasks, contact your immediate supervisor to discuss action to be taken (retraining, 2nd observation, marking "Unsatisfactory", etc)
  - **Do not mark "Unsatisfactory"** unless instructed by your supervisor
- Other - can be used if the Enumerator has resigned before you could observe him/her in the field
- Notes are required detailing procedural problems observed and actions to be taken

[ ] Satisfactory -- By the end of observation, Enumerator understands and follows procedures.
[ ] Unsatisfactory -- By the end of observation, Enumerator does NOT understand or follow procedures. (Notes required to explain)
[ ] Other -- for example, employee resigned before observation could take place. (Notes required to explain)

NOTES

APPENDIX E: LANGUAGE FLASHCARD

If an enumerator encountered a language barrier when addressing a respondent, they were to use the Language Identification Flashcard to determine which language the respondent spoke. There were 51 languages identified on the Language Identification Flashcard (including Traditional Chinese and Simplified Chinese).



United States Census 2010

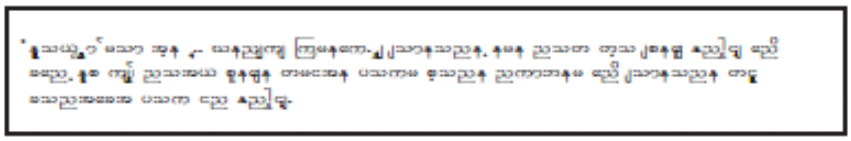
U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

LANGUAGE IDENTIFICATION FLASHCARD

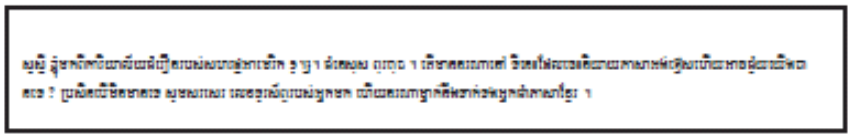
Hello, I'm from the U.S. Census Bureau. Is someone here now who speaks English and can help us? If not, please write your phone number and someone will contact you in English.	01. English
Buenos días (Buenas tardes), soy de la Oficina del Censo de los Estados Unidos. ¿Se encuentra alguien que hable inglés y pueda ayudarnos? Si no, por favor, anote su número de teléfono y alguien se comunicará con usted en español.	02. Español/ Spanish
Përshëndetje, unë vij nga Zyra e Regjistrimit të Popullisë së Sh.B.A-së. A ndodhet dikush tani këtu që flet anglisht dhe mund të na ndihmojë? Nëse jo, ju lutemi shkruani numrin e telefonit tuaj dhe dikush do t'ju kontaktojë në gjuhën shqipe.	03. Shqip/ Albanian
አንደምንት ፡ ከአሜሪን የሕዝብ ቆጠራ ቢሮ ነኝ :: አሁን አንግሊዝኛ ቋንቋ የሚናገር እና ሊረዳን የሚችል ሰው አለ? ከሌለ አባክትን የስልክ ቁጥርን ይዣፉልንና በእግርኛ የሚያናግርት ይናራል::	04. ኣማርኛ/ Amharic
مرحبًا، أنا من مكتب الإحصاء الأمريكي. هل يوجد هنا الآن شخص يتحدث الإنجليزية ويمكنه مساعدتنا؟ إذا آلان لا يوجد، فالارجاء آتابة رقم هاتفكم وسيتصل بكم أحد الأشخاص بالالغة العربية.	05. العربية/ Arabic
Բարև Ձեզ, Ես ԱՄՆ-ի Մարդահամարի Բյուրոյից եմ: Ներկա՞ է արդյոք մեկը, որը խոսում է Անմնլերեն և կարող է մեզ օմննել: Եթե ոչ, մնրեք Ձեր հեռախոսի համարը և Ձեզ հետ կկապնվեն Հայերենով:.	06. Հայերեն/ Armenian
হ্যালো, আমি ইউ.এস. সেন্সাস বিউরো থেকে এসেছি। এখানে এখন এমন কেউ আছেন কি যিনি ইংরেজি বলতে পারেন এবং আমাদের সাহায্য করতে পারেন যদি তেমন কেউ না থাকে, আপনার ফোন নম্বর লিখে দিন এবং আপনার সঙ্গে একজন বাংলায় যোগাযোগ করবেন।	07. বাংলা/ Bengali
Разрешете да ви се представя, аз съм служител на Бюрото по преброяване на населението на САЩ. Има ли тук някой, който говори английски и би могъл да ни помогне? Ако няма, моля, напишете своя телефонен номер, за да може някой от нашите служители да ви се обади на български.	08. български/ Bulgarian

USCENSUSBUREAU

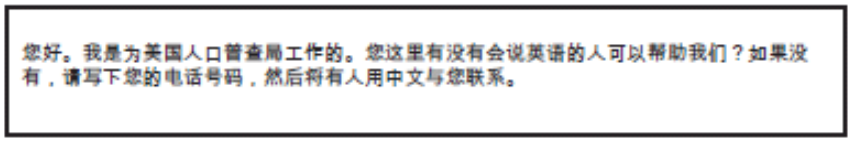
D-3309



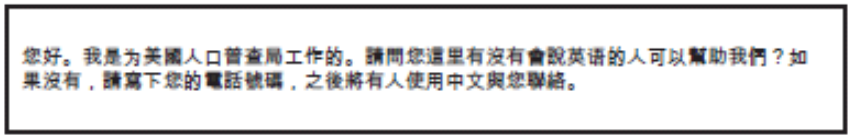
09. မြန်မာ/ Burmese



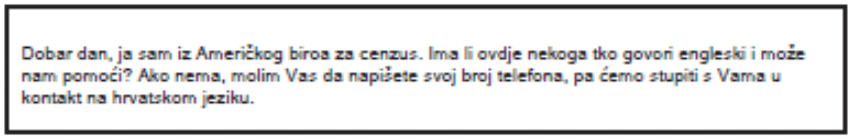
10. ភាសាខ្មែរ/ Cambodian



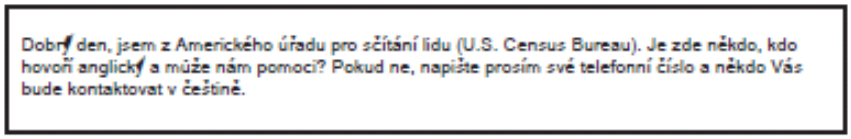
11. 中文/ Chinese (Simplified)



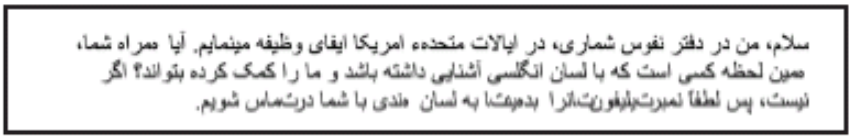
12. 中文/ Chinese (Traditional)



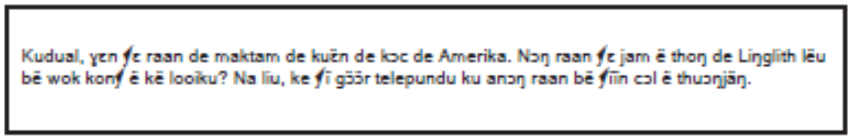
13. hrvatski/ Croatian



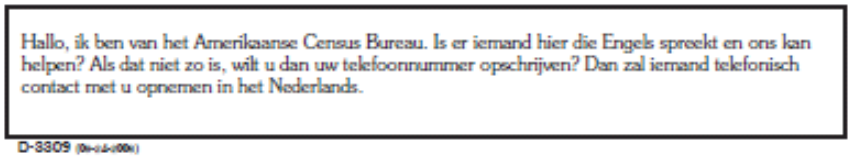
14. čeština/ Czech



15. دری / Dari



16. Thuɔŋjäŋ/ Dinka



17. Nederlands/ Dutch

سلام. من یک کارمند اداره سرشماری ایالات متحده هستم. آیا کسی حالا اینجا هست که به زبان انگلیسی صحبت میکند و میتواند به ما کمک کند؟ اگر کسی نیست، لطفا شماره تلفنتان را بنویسید، و یک نفر به زبان فارسی با شما تماس خواهد گرفت.	18. فارسی/ Farsi
Bonjour, je travaille pour le Bureau de Recensement des États-Unis. Y a-t-il quelqu'un ici qui parle anglais et puisse nous aider ? Sinon, notez votre numéro de téléphone pour que quelqu'un puisse vous contacter en Français.	19. Français/ French
Guten Tag, ich komme im Auftrag des Bundesbüro zu Durchfuhrung von Volkszählungen. Kann ich mit jemandem sprechen, der Englisch spricht und der uns helfen kann? Wenn nicht, schreiben Sie bitte Ihre Telefonnummer auf und es wird sich jemand in deutscher Sprache mit Ihnen in Verbindung setzen.	20. Deutsch/ German
Γειά σας, Είμαστε από την Υπηρεσία Απογραφής των ΗΠΑ. Είναι κανείς εδώ αυτή τη στιγμή που μιλάει Αγγλικά να μας εξυπηρετήσει; Αν όχι, παρακαλώ σημειώστε το τηλέφωνό σας και θα επικοινωνήσει κάποιος μαζί σας στα ΕΛΛΗΝΙΚΑ.	21. Ελληνικά/ Greek
Bonjou, mwen se anpwlaye biwo resansman ameriken. Èske m ka pale ak yon moun nan kay la ki konn pale anglè ? Si pa gen moun nan kay la ki pale anglè, tanpri ekri nimewo telefòn ou pou yon moun kki pale kreyòl ayisyen rele w.	22. kreyòl ayisyen/ Haitian Creole
שלום, אני ממשרד מפקד האוכלוסין של ארצות הברית. האם יש כאן מישהו ברגע זה שמדבר אנגלית ויכול לעזור לנו? במידה ולא, אנא כתבו את מספר הטלפון שלכם ומישהו ייצור קשר אתכם בשפה העברית.	23. עברית/ Hebrew
हैलो, मैं यूएस. जनगणना ब्यूरो से हूं। क्या अभी यहां ऐसा कोई व्यक्ति है जो अंग्रेजी बोलता हो और हमारी मदद कर सकता हो? यदि नहीं, तो कृपया अपना फोन नंबर लिखें और कोई व्यक्ति आपसे हिन्दी में संपर्क करेगा।	24. हिन्दी/ Hindi
Nyob zoo. Kuv tuaj hauv Teb Chaws Asmeskas Chaw Suav Pej Xeem tuaj. Puas muaj leej twg nyob hauv tsev uas txawj lus Askiv thiab pab tau peb? Yog tsis muaj, thov sau koj tus xov tooj tseg, mam li muaj ib tug neeg hais lus Hmoob hu tuaj rau koj.	25. Hmoob/ Hmong
Jó napot kívánok, az Egyesült Államok Népszámlálási Hivatalától vagyok. Van a közelben valaki, aki beszél angolul, és segíteni tud nekünk? Ha nem, kérem, írja le a telefonszámát, és kapcsolatba fogunk lépni Önnel magyarul.	26. Magyar/ Hungarian

Hello, taga Census Bureau ako ng U.S. Adda kadi kadakayo nga makapagsarita ti English ken mabalin nga tumulong kaniami? Nu awan paki surat yo iti numero iti telepono yo ta adda iti tumawag kaniayo nga ag Ilocano.

27. Ilocano/ Ilocano

Salve, chiamo da parte del Census Bureau degli Stati Uniti. C'è qualcuno che parla inglese ed è in grado di aiutarci? In caso negativo, scriva il numero di telefono e sarà contattato da qualcuno che parla Italiano.

28. Italiano/ Italian

こんにちは。私は米国勢調査局の係員です。こちらには英語を理解できこの調査にご協力いただける方がいらっしゃいますか？もしいない場合は、あなたのお電話番号をお書きいただければ、日本語を話す係員が連絡をいたします。

29. 日本語/ Japanese

안녕하세요. 저는 미국 인구조사국에서 일하고 있습니다. 영어를 사용하시는 분 중에 저희를 도와 주실 수 있는 분이 여기 계십니까? 없으신 경우, 전화번호를 적어주시면 한국어를 할 수 있는 직원이 연락을 드릴 것입니다.

30. 한국어/ Korean

ສະບາຍດີ, ຂ້ານ້ອຍເຈົ້າ ມາຈາກສຳນັກງານສຳຫຼວດພົນລະເມືອງ ແຫ່ງສະຫະລັດອາເມລິກາ. ມີໃຜຢູ່ທີ່ນີ້ ສາມາດເວົ້າພາສາອັງກິດ ແລະ ຊ່ວຍເຫຼືອພວກເຮົາໄດ້? ຖ້າບໍ່ມີ, ກະລຸນາຂຽນເລກ ໂທລະສັບຂອງທ່ານ ແລະ ພວກເຮົາ ຈະຕິດຕໍ່ຫາທ່ານ ເປັນພາສາລາວ.

31. ພາສາລາວ/ Laotian

Sveiki, aš esu iš JAV Gyventojų surašymo biuro. Ar čia dabar yra kas nors, kas kalba angliškai ir galėtų mums padėti? Jei ne, prašome užrašyti savo telefono numerį ir su jumis susisieks lietuvių kalba.

32. Lietuvių/ Lithuanian

ഹലോ, ഞാൻ യു എസ് സെൻസസ് ബ്യൂറോയിൽ നിന്നാണ്. ഇപ്പോഴി സംസാരിക്കുന്ന ആരെങ്കിലും ഇവിടെയുണ്ടോ ഞങ്ങളെ സഹായിക്കാൻ? ഇല്ലെങ്കിൽ, നിങ്ങളുടെ ടെലിഫോൺ നമ്പർ എഴുതി നൽകുക. മലയാളത്തിൽ സംസാരിക്കുന്ന ആരെങ്കിലും നിങ്ങളെ ബന്ധപ്പെടും.

33. മലയാളം/ Malayalam

Yá'át'ééh, Neeznáá nináháhágo Bíla'ashdla'ii náółtah bił haz'á bá naashnish. Háidanísh kǫǫ́ Bilagáanaa bíǫ zaad yee yáłti'ígíí hóló? 'Ádingo 'éí nibéésh bee hane'é niha 'ádíílíił dóó t'áá háida t'áá Diné Bizaad yee yáłti'ígíí nich'į' náhodoolnih.

34. Diné Bizaad/ Navajo

नमस्ते, म अमेरिकाको जनगनना अफिसबाट आएको । यहाँ अंग्रेजी बोल्न जान्ने अन्त हामीलाई मदत गर्नसक्ने कोहि मान्छे छन ? नभा, तपाईको फोन नम्बर लेखिदिनु अनि कसैले तपाईसित नेपाली भाषामा कुरा गर्नेछन् ।

35. नेपाली/ Nepali

ਹੋਲੋ, ਮੈਂ ਯੂ.ਐੱਸ. ਜਨਗਣਨਾ ਬਿਊਰੋ ਵਲੋਂ ਆਇਆ/ਆਈ ਹਾਂ। ਕੀ ਇਥੇ ਕੋਈ ਅੰਗਰੇਜ਼ੀ ਬੋਲ ਸਕਦਾ ਹੈ ਅਤੇ ਸਾਡੀ ਮਦਦ ਕਰ ਸਕਦਾ ਹੈ ? ਜੇ ਨਹੀਂ, ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਆਪਣਾ ਟੈਲੀਫ਼ੋਨ ਨੰਬਰ ਲਿਖ ਦਿਉ ਅਤੇ ਕੋਈ ਤੁਹਾਨੂੰ ਪੰਜਾਬੀ ਵਿੱਚ ਸੰਪਰਕ ਕਰੇਗਾ।	36. ਪੰਜਾਬੀ/ Panjabi
Dzień dobry. Jestem z Amerykańskiego Biura Spisu Ludności. Czy ktoś tutaj mówi po angielsku i mógłby nam pomóc? Jeżeli nie, proszę napisać swój numer telefonu, a ktoś skontaktuje się z Państwem po polsku.	37. Polski/ Polish
Olá, sou do Serviço de censo dos Estados Unidos. Alguém aqui fala inglês e pode nos ajudar? Caso contrário, escreva seu telefone e alguém vai entrar em contato com você em português.	38. Português/ Portuguese
Bună ziua, sunt de la Biroul de Recensământ al S.U.A. Este cineva aici, în acest moment, care vorbeşte engleză şi ne poate ajuta? Dacă nu, vă rog scrieţi-vă numărul de telefon şi cineva vă va contacta telefonic în română.	39. Română/ Romanian
Здравствуйте! Я представляю Бюро переписи населения Соединенных Штатов. Присутствует здесь кто-нибудь, кто говорит по-английски и мог бы помочь нам? Если нет, то, пожалуйста, напишите свой телефонный номер, чтобы наши сотрудники могли побеседовать с вами по-русски.	40. русский/ Russian
Добар дан, ја сам из Америчког бироа за попис становништва. Да ли овде има некога ко говори енглески и може да нам помогне? Ако нема, молим Вас да напишете свој број телефона, па ћемо контактирати с Вама на српском језику.	41. српски/ Serbian
Hallo, Waxaan anigu ka tirsanahay Xafiiska Tirakoobka Mareykanka. Halkan ciddi ma Joogta hadda oo ku hadasha Ingiriisiga oo na caawin karta? Haddi kalese, fadlan qor lambarka talafoonkaaga markaasna qof ayaa kugulasoo xidhiidhi doona adiga Soomaalliga.	42. Soomaali/ Somali
Halo, nimetoka Shirika la Sensa la Merika Je, kuna mtu hapa sasa anayezungumza Kiingereza na anaweza kutusaidia? Ikiwa hakuna, tafadhali andika nambari yako ya simu na mtu atawasiliana na wewe kwa Kiswahili.	43. Kiswahili/ Swahili
Hello, Ako'y galing sa U.S. Census Bureau. Mayroon ba ditong marunong magsalita ng Ingles at makakatulong sa amin ngayon? Kung wala, pakisulat ang telepono ninyo at may tatawag sa inyo sa Tagalog.	44. Tagalog/ Tagalog

สวัสดีครับ/ค่ะ ผม/ดิฉันเป็นเจ้าหน้าที่จากสำนักงานสัมมะโนประชากรสหรัฐ มีใครพอจะพูดภาษาอังกฤษเพื่อช่วยแปลได้บางหรือเปล่า ครับ/ค่ะ ถ้าไม่มีช่วยแจ้งเบอร์โทรศัพท์เพื่อที่เราจะสามารถติดต่อกลับมาใหม่ได้เป็นภาษาไทย	45. ไทย/ Thai
ሃሎው፡ ካብ ቤት ጽሕፈት ምዕዛር ሕዝቢ አሜሪካ እየ ኣነ። ሕጂ እንግሊዝኛ ዝዛረብን ክሕግዘኒ ዝኽእልን ሰብ ኣብዚ ኣሎዶ? እንተዘይኮነ፡ ብኽብረትኩም ቁጽሪ ቴለፎንኩም ጽሓፉሎ ሓደሰብ ብትግርኛ ክዛረበኩም እዩ።	46. ትግርኛ/ Tigrinya
Merhaba, A.B.D. İstatistik Bürosu'ndanım. Orada İngilizce konuşan ve bize yardım edebilecek birisi var mı? Yoksa, lütfen telefon numaranızı yazın, sizinle Türkçe dilinde temasa geçilecek.	47. TÜRKÇE/ Turkish
Привіт, Мя з США. Сенсес Бюро. Тут є хтось, хто володіє англійською мовою і може допомогти нам? Якщо ні, будь ласка, запишіть ваш телефонний номер і з вами зв'яжуться на українській мові.	48. українська мова/ Ukrainian
ہیلو، میں امریکی مردم شماری بیورو سے ہو ں۔ کیا یہاں کوئی ایسا شخص ہے جو انگریزی بولتا ہو اور ہماری مدد کرسکتا ہو؟ اگر نہیں، تو براہ کرم اپنا فون نمبر لکھوائیں اور کوئی شخص آپ سے اردو زبان میں رابطہ کرے گا۔	49. اردو/ Urdu
Xin chào, tôi là nhân viên của Cục Thống Kê Dân Số Hoa Kỳ. Ở đây hiện có ai biết nói tiếng Anh và có thể giúp chúng tôi không? Nếu không, xin vui lòng ghi lại số điện thoại của quý vị. Chúng tôi sẽ liên lạc lại với quý vị bằng tiếng Việt.	50. Tiếng Việt/ Vietnamese
האלאָ, איך בין פון די יוניטעד סטעיטס צענזוס ביורא. איז פאראן דא איינער וואס רעדט ענגליש און קען אונז העלפן? אויב נישט, ביטע שרייבט אראפ אייער טעלעפאן נומער און איינער וועט זיך פארשטענדיגן מיט אייך אויף אידיש.	51. אידיש/ Yiddish

Appendix F: Complete Language Tables

The following tables present all languages that were reported to have been used to conduct interviews during the UE operations. A subset of these was presented in Section 5.

Table F1: Languages in which UE Interviews were Conducted

Language	Total	Percent
English	1,291,993	88.3%
Spanish	83,307	5.7%
Navajo	13,295	0.9%
Portuguese	56	<0.1%
Nepali	51	<0.1%
French	39	<0.1%
Russian	28	<0.1%
Hmong	17	<0.1%
Bengali	15	<0.1%
Lithuanian	14	<0.1%
Polish	11	<0.1%
Chinese	10	<0.1%
Hindi	6	<0.1%
Amharic	5	<0.1%
Albanian	4	<0.1%
Arabic	4	<0.1%
Haitian	4	<0.1%
Panjabi	4	<0.1%
Czech	3	<0.1%
Italian	3	<0.1%
Romanian	3	<0.1%
Swahili	3	<0.1%
Thai	3	<0.1%
Vietnamese	3	<0.1%
German	2	<0.1%
Ilocano	2	<0.1%
Turkish	2	<0.1%
Ukrainian	2	<0.1%
Cambodian	1	<0.1%
Croatian	1	<0.1%
Greek	1	<0.1%
Korean	1	<0.1%
Malayalam	1	<0.1%
Tagalog	1	<0.1%
Urdu	1	<0.1%
Multiple Languages Indicated	4,980	0.3%
Missing	69,813	4.8%
Total Addresses	**1,463,689**	**100.0%**

Source: DRF and AUX

Table F2: Languages in which UE RI Interviews were Conducted

Language	Total	Percent
English	189,489	86.5%
Spanish	9,647	4.4%
Navajo	1,993	0.9%
Hindi	11	<0.1%
Nepali	9	<0.1%
Portuguese	9	<0.1%
French	7	<0.1%
Russian	3	<0.1%
Amharic	2	<0.1%
Haitian	2	<0.1%
Lithuanian	2	<0.1%
Greek	1	<0.1%
Hmong	1	<0.1%
Laotian	1	<0.1%
Ukrainian	1	<0.1%
Urdu	1	<0.1%
Vietnamese	1	<0.1%
Multiple Languages Indicated	671	0.3%
Unknown	17,126	7.8%
Total Addresses	**218,977**	**100.0%**

Source: DRF and AUX

Table F3: Languages in which RA Interviews were Conducted

Language	Total	Percent
English	31,979	95.8%
Russian	23	0.1%
Spanish	9	<0.1%
Czech	7	<0.1%
Chinese	4	<0.1%
Tagalog	3	<0.1%
Arabic	2	<0.1%
Farsi	2	<0.1%
German	1	<0.1%
Multiple Languages Indicated	10	<0.1%
Unknown	1,351	4.0%
Total Addresses	**33,391**	**100.0%**

Source: DRF and AUX

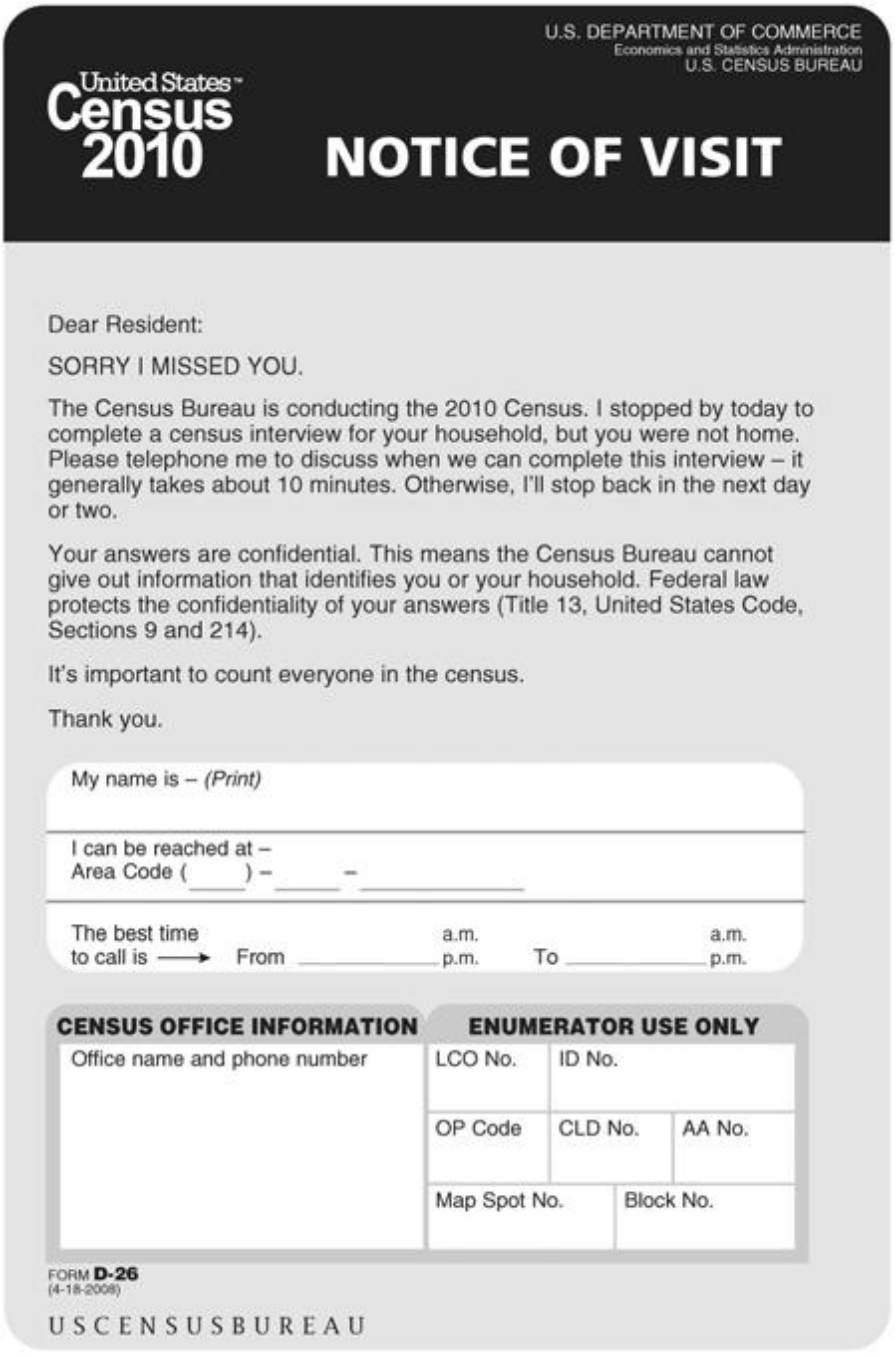
Table F4: Languages in which RUE Interviews were Conducted

Language	Total	Percent
English	7,894	95.3%
French	7	0.1%
Spanish	3	<0.1%
Unknown	377	4.6%
Total Addresses	**8,281**	**100.0%**

Source: DRF and AUX

Appendix G: Notice of Visit

The image on this page shows the Notice of Visit. Enumerators were instructed to complete this form and leave it at a housing unit if a respondent was not available. Enumerators were also given Spanish translations of this form.



U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

United States Census 2010

NOTICE OF VISIT

Dear Resident:

SORRY I MISSED YOU.

The Census Bureau is conducting the 2010 Census. I stopped by today to complete a census interview for your household, but you were not home. Please telephone me to discuss when we can complete this interview – it generally takes about 10 minutes. Otherwise, I'll stop back in the next day or two.

Your answers are confidential. This means the Census Bureau cannot give out information that identifies you or your household. Federal law protects the confidentiality of your answers (Title 13, United States Code, Sections 9 and 214).

It's important to count everyone in the census.

Thank you.

My name is – *(Print)*

I can be reached at –
Area Code (____) – _____ – _____

The best time to call is → From _____ a.m. p.m. To _____ a.m. p.m.

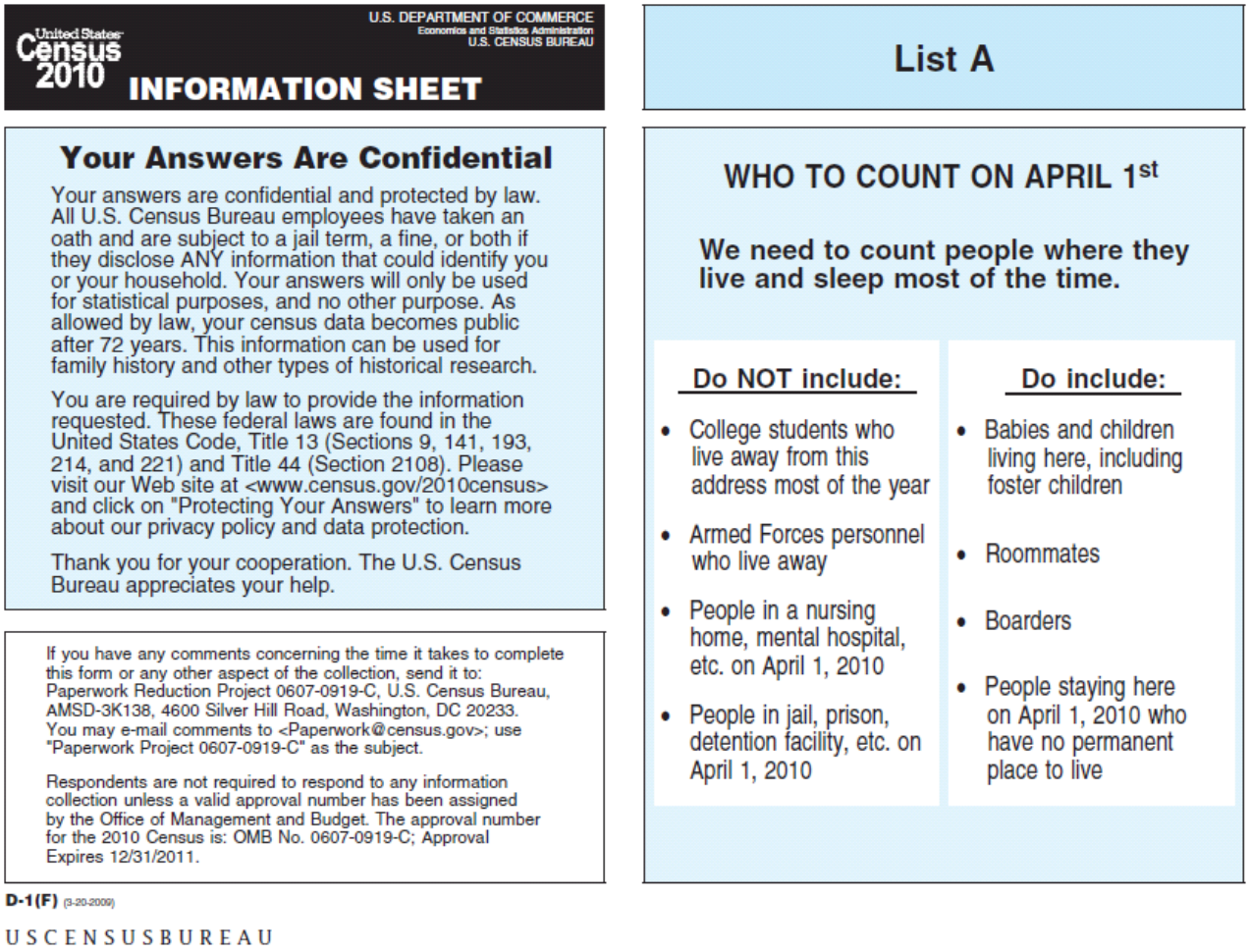
CENSUS OFFICE INFORMATION	ENUMERATOR USE ONLY		
Office name and phone number	LCO No.	ID No.	
	OP Code	CLD No.	AA No.
	Map Spot No.	Block No.	

FORM **D-26**
(4-18-2008)

USCENSUSBUREAU

Appendix H: Information Sheet D-1 (F)

The image on this page shows the front side of the information sheet. The left column presented the information about confidentiality that enumerators were required to convey to respondents. The right side presented the Residence Rule and examples of how the census counts people in various living situations.



United States Census 2010

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

INFORMATION SHEET

Your Answers Are Confidential

Your answers are confidential and protected by law. All U.S. Census Bureau employees have taken an oath and are subject to a jail term, a fine, or both if they disclose ANY information that could identify you or your household. Your answers will only be used for statistical purposes, and no other purpose. As allowed by law, your census data becomes public after 72 years. This information can be used for family history and other types of historical research.

You are required by law to provide the information requested. These federal laws are found in the United States Code, Title 13 (Sections 9, 141, 193, 214, and 221) and Title 44 (Section 2108). Please visit our Web site at <www.census.gov/2010census> and click on "Protecting Your Answers" to learn more about our privacy policy and data protection.

Thank you for your cooperation. The U.S. Census Bureau appreciates your help.

If you have any comments concerning the time it takes to complete this form or any other aspect of the collection, send it to: Paperwork Reduction Project 0607-0919-C, U.S. Census Bureau, AMSD-3K138, 4600 Silver Hill Road, Washington, DC 20233. You may e-mail comments to <Paperwork@census.gov>; use "Paperwork Project 0607-0919-C" as the subject.

Respondents are not required to respond to any information collection unless a valid approval number has been assigned by the Office of Management and Budget. The approval number for the 2010 Census is: OMB No. 0607-0919-C; Approval Expires 12/31/2011.

D-1(F) (3-20-2009)

U S C E N S U S B U R E A U

List A

WHO TO COUNT ON APRIL 1st

We need to count people where they live and sleep most of the time.

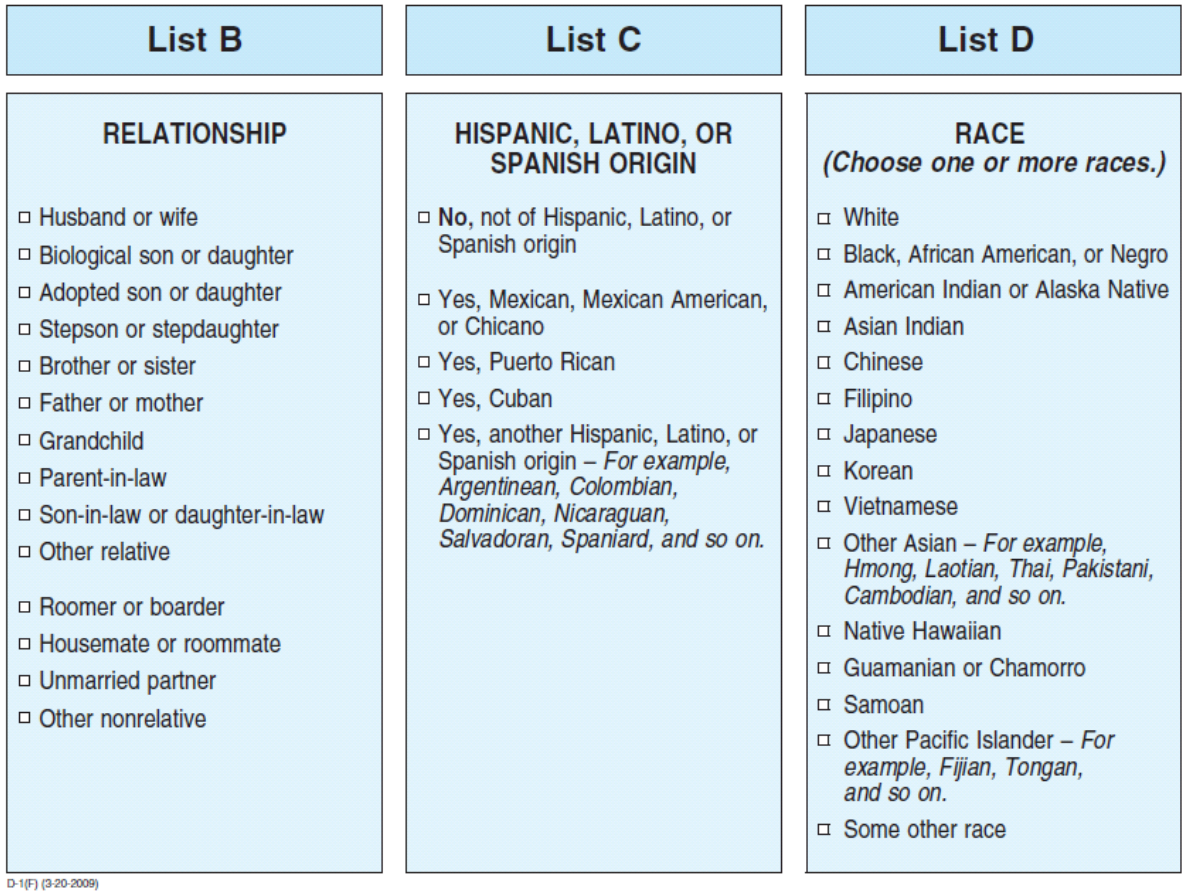
Do NOT include:

- College students who live away from this address most of the year
- Armed Forces personnel who live away
- People in a nursing home, mental hospital, etc. on April 1, 2010
- People in jail, prison, detention facility, etc. on April 1, 2010

Do include:

- Babies and children living here, including foster children
- Roommates
- Boarders
- People staying here on April 1, 2010 who have no permanent place to live

The image on this page shows the back of the information sheet. These three lists were to help respondents answer person-level demographic questions. List B presented the fourteen relationship categories, List C presented answers to the Hispanic origin question, and List D presented answers to the race question. The categories printed on the Information Sheet were the same as the ones printed on the 2010 Census questionnaire.



List B

RELATIONSHIP

- ☐ Husband or wife
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative

- ☐ Roomer or boarder
- ☐ Housemate or roommate
- ☐ Unmarried partner
- ☐ Other nonrelative

D-1(F) (3-20-2009)

List C

HISPANIC, LATINO, OR SPANISH ORIGIN

- ☐ **No**, not of Hispanic, Latino, or Spanish origin

- ☐ Yes, Mexican, Mexican American, or Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin – *For example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

List D

RACE
(Choose one or more races.)

- ☐ White
- ☐ Black, African American, or Negro
- ☐ American Indian or Alaska Native
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian – *For example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander – *For example, Fijian, Tongan, and so on.*
- ☐ Some other race

Appendix I: Fundamental UEO Differences in the 2010 Census

	Update Enumerate	UE Quality Control	Remote Update Enumerate	Remote Alaska
Type of Enumeration Area	- Data collection method for areas with special enumeration needs. Conducted in rural and urban communities to include: seasonally vacant HUs, selected American Indian reservations, and the Colonias; the latter were generally unincorporated communities near the Mexican border.	- Quality control operation for UE production. - Contained a Delete Verification, a Final Delete Verification, a Dependent Quality Control and a Recanvass, and Reinterview which included a vacant check embedded in the program.	- Data collection method used in rural areas of Maine and Alaska requiring special travel and other arrangements. As in previous censuses, very remote, sparsely settled areas; visited only once, at the time of enumeration.	- Data collection method used in remote areas of Alaska requiring special travel and other arrangements. Comprised southwestern and western parts of Alaska, northwestern and central Alaska, and the north and east parts of the state. Many of these areas were accessible only by small plane, snowmobile, four-wheel drive vehicles, dogsleds, or a combination thereof. Lastly, it was a one pass only operation.
Recruitment and Staffing	- LCOs conducted recruiting for all positions. - Partnership staff to assist with communications in hard to enumerate areas	- Separate and independent QC staff.	- LCOs conducted recruiting for all positions. - Partnership staff to assist with communications in hard to enumerate areas	- Staff was hired from local communities. Enumerators were appointed by tribal leaders. - Partnership staff to assist with communications in hard to enumerate areas
Group Quarters	- If discovered, an ADD Page was filled out for the GQ. The address was removed from the UE	- Same procedures in production applied for any new found GQ.	- The CL enumerates any GQ previously identified or identified by the Enumerator while	- The CL enumerates any GQ previously identified or identified by the Enumerator while

	Update Enumerate	UE Quality Control	Remote Update Enumerate	Remote Alaska
	universe and delivered to GQ staff for enumeration.		canvassing the AA.	canvassing the AA.
Training	-The Local Census Office (LCO) management staff recruited and trained the FOSs, supervisory office clerks, and office clerks. The FOSs trained the CLs. The CLs reported to the FOSs. The CLs trained the enumerators and selected the CLAs from among the enumerators. The enumerators and the CLAs reported to the CLs.	-The Local Census Office (LCO) management staff recruited and trained the FOSs, supervisory office clerks, and office clerks. The FOSs trained the CLs. The CLs reported to the FOSs. The CLs trained the enumerators and selected the CLAs from among the enumerators. The enumerators and the CLAs reported to the CLs.	-The Local Census Office (LCO) management staff recruited and trained the FOSs, supervisory office clerks, and office clerks. The FOSs trained the CLs. The CLs reported to the FOSs. The CLs trained the enumerators and selected the CLAs from among the enumerators. The enumerators and the CLAs reported to the CLs. - No initial observations - On-the-Job training (OJT) provided to Enumerators as needed.	-The Local Census Office (LCO) management staff recruited and trained the FOSs, supervisory office clerks, and office clerks. The FOSs trained the CLs. The CLs reported to the FOSs. The CLs trained the enumerators and selected the CLAs from among the enumerators. The enumerators and the CLAs reported to the CLs. - No initial observations - OJT only for Enumerators
Number of Enumerator Visits	- Enumerators generally attempt six times to contact occupied units and units that appear occupied to the Enumerator for which “no one is home” (three personal visits and three phone calls).	- Enumerators generally attempt six times to contact occupied units and units that appear occupied to the Enumerator for which “no one is home” (three personal visits and	-Enumerators generally attempt one contact with occupied units and units that appear occupied to the Enumerator.	-Enumerators generally attempt one contact with occupied units and units that appear occupied to the Enumerator.

	Update Enumerate	UE Quality Control	Remote Update Enumerate	Remote Alaska
		three phone calls).		
Quality Control	- Has a separate quality control operation containing a Delete Verification (DV), a Dependent Quality Control (DQC), a Reinterview (RI), and a vacant check.	-NA-	- There is no formal QC component. The CL personally verifies and conducts a 100 percent check of all HUs with a vacant or delete status.	- No formal QC component - Upon completion of the enumeration process, and before the crew leader leaves the village, a sworn-in local official (Tribal Leader/Liaison) reviews and certifies the count of HUs and GQs for the settlement at the block level. Any discrepancies are resolved immediately.