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U.S. GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

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STATEMENT OF  
WALTER L. ANDERSON  
SENIOR ASSOCIATE DIRECTOR  
INFORMATION MANAGEMENT AND TECHNOLOGY DIVISION  
BEFORE THE  
SUBCOMMITTEE ON CENSUS AND POPULATION  
COMMITTEE ON POST OFFICE AND CIVIL SERVICE  
HOUSE OF REPRESENTATIVES  
ON  
BUREAU OF THE CENSUS'  
PLANNED 1985 PRETESTS FOR THE 1990 DECENNIAL CENSUS



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Madam Chairwoman:

I am pleased to be here today to discuss the Bureau of the Census' planned 1985 pretests for the 1990 Decennial Census. I am accompanied by Mr. Jack Kaufman who is responsible for the GAO audits at the Bureau of the Census. The Constitution requires that the decennial census provide a population count for the apportionment of the Congress. In addition, by law, census data are used in determining political representation at other levels and in distributing governmental funds. The Bureau must make every effort, therefore, to insure that the basic count and other critical data collected are as accurate as possible.

In response to your request and your subsequent direction, my comments will focus on the pretests and are based on our prior audit efforts.

#### PLANNED PRETESTS

The primary emphasis of the two planned 1985 pretests in Jersey City, New Jersey, and Tampa, Florida, will be on a two-stage census and on automation, respectively. The Bureau is testing a two-stage census because, theoretically, a two-stage enumeration could improve census accuracy. A two-stage census is one involving two questionnaires--one distributed to the entire population and a second one distributed subsequently to a sample of the population. In a two-stage census the households in the sample are required to respond to two different questionnaires. The 1980 census was a one-stage census. Although it involved two different questionnaires they were distributed simultaneously--one to a sample of

the population and the other to the balance of the population. Each household was required to respond to only one questionnaire.

Automation of census data processing is much more possible now than when the 1980 census was taken because of technological advances since the 1970's. Through automation the Bureau has an opportunity to reduce census costs in terms of 1980 dollars and to expedite the release of census information to users. In the pre-tests, the Bureau proposes to test automation of data processing previously done manually.

I will initially discuss our views on the two-stage census and next address automation. In particular I will highlight questionnaire design, which is the crucial aspect of the two-stage census and which will directly influence the automation procedures.

#### TWO-STAGE CENSUS

In our May 5, 1976, report on Programs to Reduce the Decennial Census Undercount (GGD-76-72), we indicated that questionnaire length and complexity could increase the undercount problem in 1980. We therefore recommended that the Census Bureau consider using a two-stage questionnaire for the 1980 census. At that time we proposed that the Bureau develop two questionnaires--a short, simple one dealing solely with the population count, and a longer, detailed form dealing with population and housing characteristics. The longer form might be distributed to all households or to a sample. We believed that a two-stage approach might be more effective because the population count is the key objective and should be done as simply and quickly as possible. Simplifying and shortening the first stage might encourage greater public cooperation and

thereby improve the accuracy of the population counts. Moreover, the shorter form would allow quicker processing and thus more time for Bureau and local officials to review the preliminary counts.

The Bureau did not agree with the recommendation on the basis that a two-stage census would add to the cost and complexity of the census and that, furthermore, it saw little evidence of any significant gains to be realized.

In the 1980 census, about 81 percent of the nation's housing units received the short forms which contained 19 population and housing questions. The other 19 percent received the long form which contained all the questions on the short form as well as 20 additional questions about the housing unit and 26 additional questions pertaining to each household member. We note that, of the 64 million questionnaires that were returned by mail in the 1980 census, only 13 percent of the short forms did not meet the Bureau's standards for completeness. On the other hand, 36 percent of the long forms did not meet these criteria.

Subsequently the Bureau reconsidered the views of those who have advocated the two-stage census, and decided it needed some good solid research on the subject to evaluate the merit of the technique. The Bureau plans to test the two-stage census technique next year in Jersey City, New Jersey, to determine whether it increases the accuracy and efficiency of the census process in areas where it has been difficult to obtain accurate counts. The test is designed to compare the two-stage with the one-stage census in terms of speed and cost as well as the completeness of the counts and the quality of the data collected. The Bureau will first mail

a short form similar in content to the one used in the 1980 census to every household. A few weeks later the Bureau will send long forms to a one-in-six household sample. Thus, in the 1985 test, some households will be filling out two different forms at different times.

We believe now as we did in 1976 that a test of the two-stage census is warranted, and we wish to commend the Bureau for its plans. We do have some concerns, however, about the test.

Our primary concern centers on the size and content of the short form which will be used. We believe now, just as in 1976, that the short form should be limited to a few basic questions designed to obtain an accurate count of the population as required by the Constitution. We believe it should be smaller and simpler than the 1980 census short form, which contained numerous household questions extraneous to the basic count. For example, we feel that questions about plumbing facilities or the value and rent of housing units increase the complexity of the questionnaire and thus tend to discourage response.

We do not dispute the usefulness of such information; rather, we question its inclusion on the short form. In an era when many of the nation's residents are recent immigrants grappling with the English language, and others in the inner cities are having problems with reading comprehension, we believe the short form should be as simple and as brief as possible. We have attached as Exhibit I the household questions included on the 1980 census short form to highlight the information requested in that census and to focus on

the relative inappropriateness of such information on the short form.

#### EFFORTS TO INCREASE AUTOMATION

I will now direct my comments to the Bureau's 1985 pretest of increased automation for the next census. In our report of January 11, 1983, The Census Bureau Needs to Plan Now for a More Automated Census (GAO/GGD-83-10), we stressed two points--the need in the next census for the Bureau to (1) automate many of the manual operations performed in the 1980 census and (2) proceed as quickly as possible with this increased automation because of the long lead time required to prepare for the census. In our report we identified the various data processing activities in the 1980 census, including the various manual operations. We showed that these operations were time consuming, costly, and subject to clerical error because of the labor-intensive nature of the work.

We have included as Exhibit 2 a chart depicting the time and costs for the three data processing phases in the 1980 census: district level, processing center level, and headquarters level. The greatest reliance on manual procedures occurred in the 409 district offices located throughout the country. Considerable manual processing was also performed in the three processing centers in California, Indiana, and Louisiana. The Bureau used these centers to prepare the data for the eventual tabulation which was later accomplished at the Bureau's headquarters using large-scale computers.

For the district office data processing activities, the Bureau employed a staff of about 55,000 temporary employees at a cost of

\$106 million. This temporary staff manually performed about two dozen procedures associated with handling and processing questionnaires. While some overlap occurred, each procedure could generally be classified as (1) receiving, controlling, or batching questionnaires, (2) checking questionnaire completeness, (3) recording and compiling counts, or (4) other data manipulations. For example, editing returned questionnaires was a major procedure at the district offices. The Bureau spent \$29.5 million to determine if the questionnaires met standards for completeness. At the peak of the editing workload, the Bureau employed about 37,000 clerks for this operation. As another example, about 3,400 clerks were involved in manually compiling preliminary counts. This operation cost about \$6.9 million.

Additional manual operations were performed at the three processing centers. The overall cost of these operations was \$115 million. Coding handwritten responses into machine-readable form was the most time consuming and expensive procedure performed at the centers. This manual operation involved about 3,000 clerks, cost \$27.2 million, and took about 9 months to complete. The manual procedures were both time consuming and cumbersome. In addition, due to the vast number of temporary employees and the multitude of clerical functions involved, the operations tended to be error prone.

In our 1983 report on automating the decennial census, we recommended developing an automation plan for the 1990 census that would include decision points for evaluating the acquisition, testing, and installation of ADP equipment. The Bureau's planned 1985

pretests will incorporate features to log-in returned questionnaires, identify nonrespondents, perform early data entry and editing, and provide automated preliminary counts. While these features address some of the manual inefficiencies mentioned in our report, we still have concerns about the tests. For example, it is unclear whether the Bureau will include automated procedures for coding written responses for such items as industry and occupation. As discussed previously this coding operation was a major manual activity in the last census and thus provides a leading opportunity for improvement.

Another major concern we have is whether the Bureau has scheduled sufficient time to implement automation procedures for the next census. Historically the Bureau and the Department of Commerce have taken 4 to 5 years to make automated equipment available after its need was identified. This period was required to identify the type of equipment, develop specifications, request and evaluate proposals, award a contract, receive and install the hardware, test software, and train staff. Based on prior experience the Bureau needs to start its acquisition process no later than spring 1986 if the new equipment is to be available for the next census.

We believe the Bureau cannot realistically define its ADP requirements until it has first decided what data will be collected in 1990. This decision is critical to determining the data workload to be processed. The Bureau has announced that questionnaire content and design will not be tested until 1986. We question whether the Bureau will have sufficient time to complete the ADP



acquisition cycle if it postpones workload decisions until after the 1986 test.

On a related point, we encourage the Bureau to incorporate in its 1985 pretest activity the newly automated maps. Census geography, including maps, has been a problem in the past few censuses. The difficulty stems from a need to accurately define the location of housing units on the ground so they can be correctly aggregated within the boundaries of congressional districts, cities, counties, and other jurisdictions. According to testimony previously presented on May 24, 1984, to this subcommittee, the Bureau's first automated map file will be prepared for Florida. Thus the Tampa pretest in 1985, which will emphasize automation, seems to be an appropriate opportunity to try the automated maps. Early testing of the new automated map system would serve a most useful purpose.

As a final comment, we wish the Bureau success in its pretest activities and hope it will consider the concerns we have presented today.

This concludes my prepared statement, Madam Chairwoman. I will be happy to respond to any questions.

**NOW PLEASE ANSWER QUESTIONS H1-H12 FOR YOUR HOUSEHOLD**

If you listed more than 7 persons in Question 1, please see note on page 4.

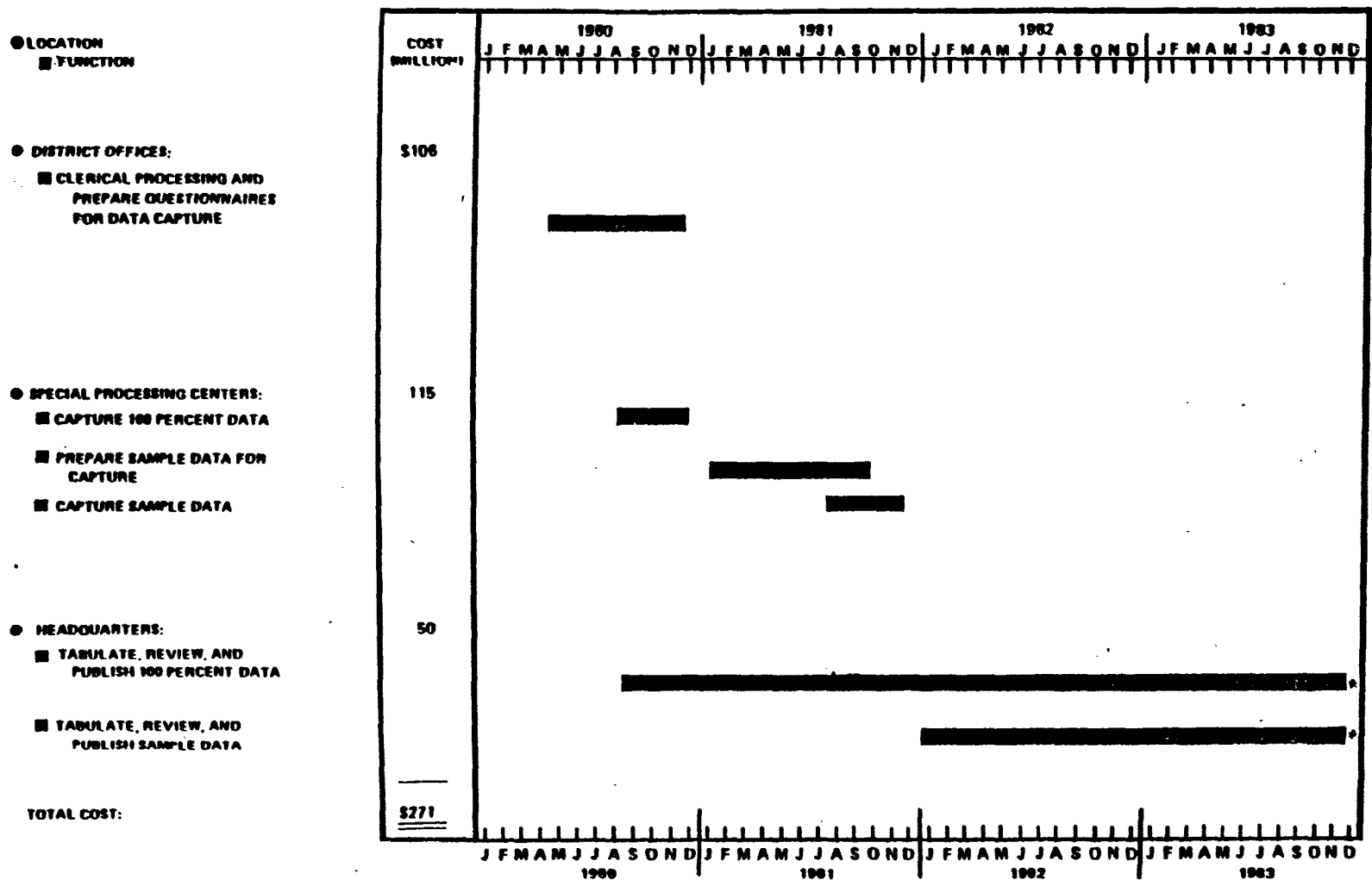
<p><b>H1.</b> Did you leave anyone out of Question 1 because you were not sure if the person should be listed — for example, a new baby still in the hospital, a lodger who also has another home, or a person who stays here once in a while and has no other home?</p> <p><input type="radio"/> Yes — On page 4 give name(s) and reason left out.  <input type="radio"/> No</p>	<p><b>H9.</b> Is this apartment (house) part of a condominium?</p> <p><input type="radio"/> No  <input checked="" type="radio"/> Yes, a condominium</p>																								
<p><b>H2.</b> Did you list anyone in Question 1 who is away from home now — for example, on a vacation or in a hospital?</p> <p><input type="radio"/> Yes — On page 4 give name(s) and reason person is away.  <input type="radio"/> No</p>	<p><b>H10.</b> If this is a one-family house —</p> <p>a. Is the house on a property of 10 or more acres?  <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>b. Is any part of the property used as a commercial establishment or medical office?  <input type="radio"/> Yes <input checked="" type="radio"/> No</p>																								
<p><b>H3.</b> Is anyone visiting here who is not already listed?</p> <p><input type="radio"/> Yes — On page 4 give name of each visitor for whom there is no one at the home address to report the person to a census taker.  <input type="radio"/> No</p>	<p><b>H11.</b> If you live in a one-family house or a condominium unit which you own or are buying —</p> <p>What is the value of this property, that is, how much do you think this property (house and lot or condominium unit) would sell for if it were for sale?</p> <p>Do not answer this question if this is —</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> A mobile home or trailer</li> <li><input type="radio"/> A house on 10 or more acres</li> <li><input type="radio"/> A house with a commercial establishment or medical office on the property</li> </ul> <table style="width:100%; border: none;"> <tr> <td style="width:50%;">Less than \$10,000</td> <td style="width:50%;">\$50,000 to \$54,999</td> </tr> <tr> <td>\$10,000 to \$14,999</td> <td>\$55,000 to \$59,999</td> </tr> <tr> <td>\$15,000 to \$17,499</td> <td>\$60,000 to \$64,999</td> </tr> <tr> <td>\$17,500 to \$19,999</td> <td>\$65,000 to \$69,999</td> </tr> <tr> <td>\$20,000 to \$22,499</td> <td>\$70,000 to \$74,999</td> </tr> <tr> <td>\$22,500 to \$24,999 <input checked="" type="radio"/></td> <td>\$75,000 to \$79,999</td> </tr> <tr> <td>\$25,000 to \$27,499</td> <td>\$80,000 to \$89,999</td> </tr> <tr> <td>\$27,500 to \$29,999</td> <td>\$90,000 to \$99,999</td> </tr> <tr> <td>\$30,000 to \$34,999</td> <td>\$100,000 to \$124,999</td> </tr> <tr> <td>\$35,000 to \$39,999</td> <td>\$125,000 to \$149,999</td> </tr> <tr> <td>\$40,000 to \$44,999</td> <td>\$150,000 to \$199,999</td> </tr> <tr> <td>\$45,000 to \$49,999</td> <td>\$200,000 or more</td> </tr> </table>	Less than \$10,000	\$50,000 to \$54,999	\$10,000 to \$14,999	\$55,000 to \$59,999	\$15,000 to \$17,499	\$60,000 to \$64,999	\$17,500 to \$19,999	\$65,000 to \$69,999	\$20,000 to \$22,499	\$70,000 to \$74,999	\$22,500 to \$24,999 <input checked="" type="radio"/>	\$75,000 to \$79,999	\$25,000 to \$27,499	\$80,000 to \$89,999	\$27,500 to \$29,999	\$90,000 to \$99,999	\$30,000 to \$34,999	\$100,000 to \$124,999	\$35,000 to \$39,999	\$125,000 to \$149,999	\$40,000 to \$44,999	\$150,000 to \$199,999	\$45,000 to \$49,999	\$200,000 or more
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<p><b>H4.</b> How many living quarters, occupied and vacant, are at this address?</p> <p><input type="radio"/> One  <input type="radio"/> 2 apartments or living quarters  <input type="radio"/> 3 apartments or living quarters  <input type="radio"/> 4 apartments or living quarters  <input type="radio"/> 5 apartments or living quarters  <input type="radio"/> 6 apartments or living quarters  <input type="radio"/> 7 apartments or living quarters  <input type="radio"/> 8 apartments or living quarters  <input type="radio"/> 9 apartments or living quarters  <input type="radio"/> 10 or more apartments or living quarters  <input type="radio"/> This is a mobile home or trailer</p>	<p><b>H12.</b> If you pay rent for your living quarters —</p> <p>What is the monthly rent?</p> <p>If rent is not paid by the month, see the instruction guide on how to figure a monthly rent.</p> <table style="width:100%; border: none;"> <tr> <td style="width:50%;"><input type="radio"/> Less than \$50</td> <td style="width:50%;">\$160 to \$169</td> </tr> <tr> <td>\$50 to \$59</td> <td>\$170 to \$179</td> </tr> <tr> <td>\$60 to \$69</td> <td>\$180 to \$189</td> </tr> <tr> <td>\$70 to \$79</td> <td>\$190 to \$199</td> </tr> <tr> <td><input type="radio"/> \$80 to \$89</td> <td>\$200 to \$224</td> </tr> <tr> <td><input checked="" type="radio"/> \$90 to \$99</td> <td>\$225 to \$249</td> </tr> <tr> <td>\$100 to \$109</td> <td>\$250 to \$274</td> </tr> <tr> <td>\$110 to \$119</td> <td>\$275 to \$299</td> </tr> <tr> <td>\$120 to \$129</td> <td>\$300 to \$349</td> </tr> <tr> <td>\$130 to \$139</td> <td>\$350 to \$399</td> </tr> <tr> <td>\$140 to \$149</td> <td>\$400 to \$499</td> </tr> <tr> <td>\$150 to \$159</td> <td>\$500 or more</td> </tr> </table>	<input type="radio"/> Less than \$50	\$160 to \$169	\$50 to \$59	\$170 to \$179	\$60 to \$69	\$180 to \$189	\$70 to \$79	\$190 to \$199	<input type="radio"/> \$80 to \$89	\$200 to \$224	<input checked="" type="radio"/> \$90 to \$99	\$225 to \$249	\$100 to \$109	\$250 to \$274	\$110 to \$119	\$275 to \$299	\$120 to \$129	\$300 to \$349	\$130 to \$139	\$350 to \$399	\$140 to \$149	\$400 to \$499	\$150 to \$159	\$500 or more
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<p><b>H5.</b> Do you enter your living quarters —</p> <p><input type="radio"/> Directly from the outside or through a common or public hall?  <input type="radio"/> Through someone else's living quarters?</p>																									
<p><b>H6.</b> Do you have complete plumbing facilities in your living quarters, that is, hot and cold piped water, a flush toilet, and a bathtub or shower?</p> <p><input type="radio"/> Yes, for this household only  <input type="radio"/> Yes, but also used by another household  <input type="radio"/> No, have some but not all plumbing facilities  <input type="radio"/> No plumbing facilities in living quarters</p>																									
<p><b>H7.</b> How many rooms do you have in your living quarters? Do not count bedrooms, porches, balconies, foyers, halls, or half-rooms.</p> <p><input type="radio"/> 1 room <input checked="" type="radio"/> 2 rooms <input type="radio"/> 3 rooms <input type="radio"/> 4 rooms <input type="radio"/> 5 rooms <input type="radio"/> 6 rooms <input type="radio"/> 7 rooms <input type="radio"/> 8 rooms <input type="radio"/> 9 or more rooms</p>																									
<p><b>H8.</b> Are your living quarters —</p> <p><input type="radio"/> Owned or being bought by you or by someone else in this household?  <input type="radio"/> Rented for cash rent?  <input type="radio"/> Occupied without payment of cash rent?</p>																									

**FOR CENSUS USE ONLY**

A4. Block number	A5. Serial number	B. Type of unit or quarters	C1. Is this unit for —	D. Months vacant	E. Indicators	F. Total persons
001	001	Occupied First form	Year round use	Less than 1 month	1. <input type="radio"/> Mail return	0
001	002	Continuation	Seasonal/Mig. — Ship C2, C3, and D.	1 up to 2 months	2. <input type="radio"/> Pop./F	0
001	003	Vacant	C2. Vacancy status	2 up to 6 months		0
001	004	Regular	For rent <input checked="" type="radio"/>	6 up to 12 months		0
001	005	Usual home elsewhere	For sale only	1 year up to 2 years		0
001	006	Group quarters	Rented or sold, not occupied	2 or more years		0
001	007	First form	Held for occasional use			0
001	008	Continuation	Other vacant			0
			C3. Is this unit boarded up?			
			Yes <input type="radio"/> No <input type="radio"/>			

Source: U.S. Department of Commerce, Bureau of the Census, Form D-1, 1980, p. 3.

### TIME AND COST BY LOCATION AND FUNCTION TO PROCESS 1980 CENSUS DATA



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\* Some of the reports were released in 1984.

Source: The Census Bureau Needs to Plan Now for a More Automated Census  
(GAO/GGD-83-10, Jan. 11, 1983, p. 7.)